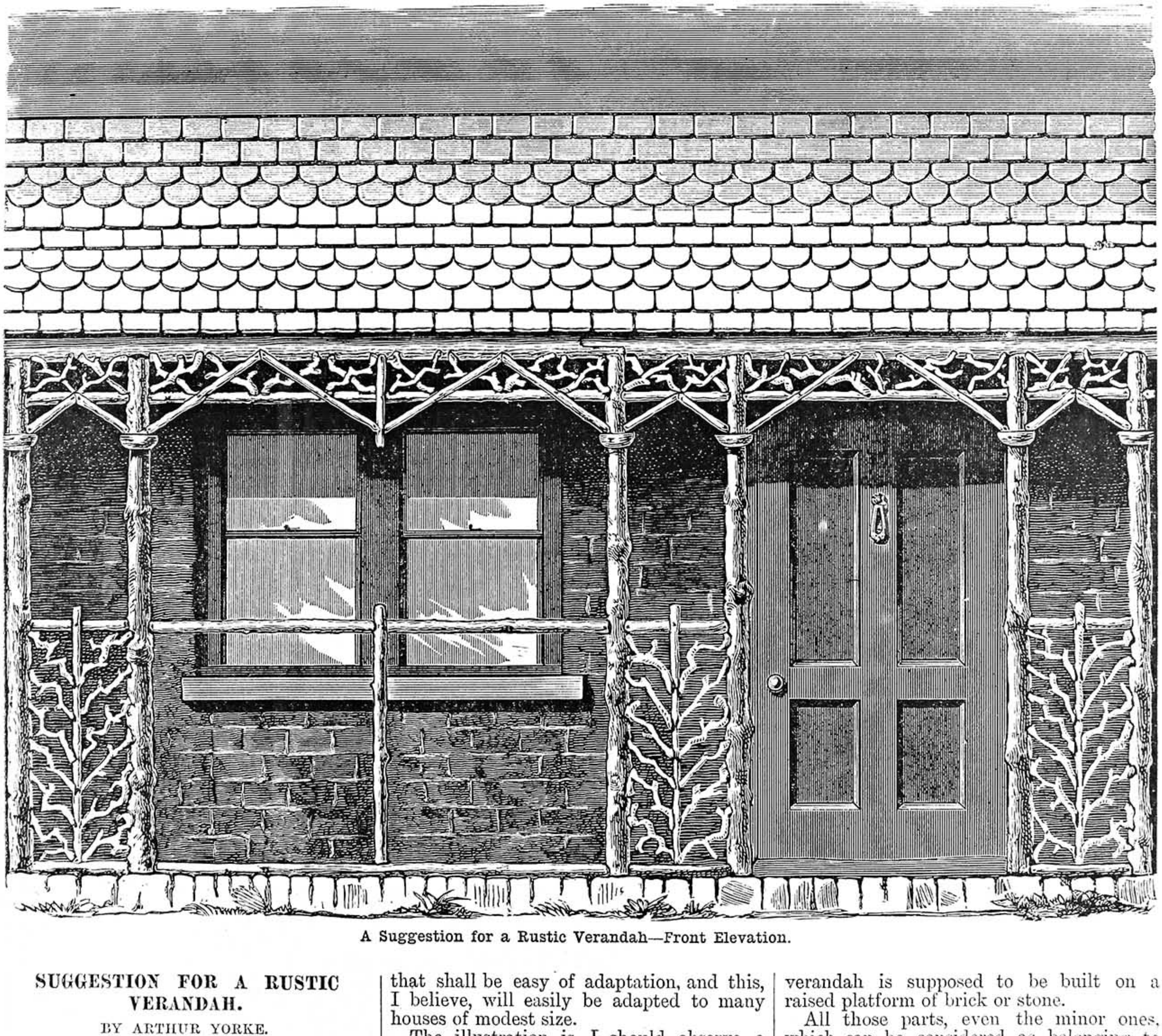
WORK

An Illustrated Magazine of Practice and Theory

FOR ALL WORKMEN, PROFESSIONAL AND AMATEUR.

VOL. III.—No. 117.] SATURDAY, JUNE 13, 1891. [PRICE ONE PENNY.



A Suggestion for a Rustic Verandah—Front Elevation.

SUGGESTION FOR A RUSTIC VERANDAH.

BY ARTHUR YORKE.

GENERAL ARRANGEMENT AND MATERIALS—CONSTRUCTION OF FRONT—ROOFING—LINING OF ROOF.

General Arrangement and Materials.—The above elevation of a rustic verandah I have called a "suggestion" merely, for to arrange any definite plan, or to fix accurate dimensions, for an appendage of this kind demands some previous knowledge of the building to which it is to be attached. All that I can do, therefore, is to give a design that shall be easy of adaptation, and this, I believe, will easily be adapted to many houses of modest size.

The illustration is, I should observe, a front elevation, drawn to a scale of $\frac{1}{2}$ in. to the foot. It is shown as a part only which may be extended to any required length at either end. As to the width, that indicated is $3\frac{1}{2}$ ft. from the wall to the middle of the collar-posts, the eaves having a further projection of 6 in. For a cottage verandah the width given is a satisfactory one. It gives sufficient room for seats on a hot day, or for a promenade on a wet one. The width, as also the height, can easily be increased to suit a larger house. The verandah is supposed to be built on a raised platform of brick or stone.

All those parts, even the minor ones, which can be considered as belonging to the framework, are of straight natural wood, and by choice of larch; whilst the mere filling-in of rustic open-work is of small crooked stuff—probably oak or apple tree. The roof, as drawn, is of tiles; but of this I shall have to speak more particularly further on.

Construction of Front.—It will be seen that the collar-posts which support the verandah are arranged in pairs, so that 3 in. or $3\frac{1}{2}$ in. poles will suffice for them. Their bases are supposed to be dowelled to the

masonry of the platform on which they stand; they are 6 ft. 6 in. high. Except at the entrance or entrances, a sill of half-stuff runs from post to post on the platform. At a height of 3 ft. 3 in. they are connected by a round bar of smaller material, and, again, by a second cross-bar of similar size to the last, at 6 in. from their upper ends. On the tops of the posts rests a lintel of half-stuff of larger diameter—say 5 in. The upper and lower cross-bars come opposite to the middles of the posts, but need not be mortised into them, for if their ends are cut V-shaped, so as to clip the posts, they can be nailed quite firmly. The lower cross-rail is placed at a convenient height for leaning upon. At a height of 5 ft. 6 in. caps are formed by simply nailing four pieces of quartered stuff round each post. The diagonal braces which start from above the capitals will be observed to pass in front of the upper cross-bars, to which and to the lintel they are nailed. The illustration sufficiently shows how the panels between the pairs of posts and the frieze between the upper cross-bar and lintel are filled with open-work of small crooked branches, which contrasts in a pleasing manner with the straight pieces of the framework. This open-work may be made available for, and will be found useful as, a support for climbing plants.

Roofing and Lining of Roof.—In so narrow a structure the rafters alone will suffice to keep all in place, without anything of the nature of a tie-beam being called for. These rafters will be of half-stuff, and for the given width a length of 5 ft. will be enough; this will allow of such a projection beyond the lintel as will give the eaves a width of 6 in.; the pitch will be rather less than a true pitch, but amply steep for the purpose. A piece of half-stuff nailed to the wall will support the upper ends of the rafters.

In forming the roof it is proposed to board over the whole space upon the rafters, and to nail the tiles or other covering upon the boards. For the non-professional workman this is much easier as well as much safer than the use of laths. It will also facilitate giving a neat finish to the inside. It is suggested that the inside should be lined beneath the boarding with rush matting. This is an inexpensive material; its brownish-green hue is pleasing to the eye, and it is so inartificial in appearance as to harmonise well with the natural wood. After fixing the rafters the matting is to be stretched tightly across them before the boards are nailed down. It is probable that the rafters will be arranged with intervals of about a foot between them, and to hold the matting more closely to the boards a strip of split rod may be nailed up the middle of each space, or strips may be nailed so as to form a simple ornamental pattern; an intricate one will not be desirable, as fixing it will be overhead work.

A neat, but less characteristic, ceiling may be formed by, instead of using the matting, painting the boards of a suitable colour and slightly ornamenting them with split strips of rod. In this case the boards should be planed. None will be better for this purpose than ¾ in. flooring boards, and these are commonly sold steam-planed on one side. Other ways of lining the roofs of rustic buildings are discussed in my paper on Summer-Houses, Vol. II., pp. 65 and 197 (Nos. 57 and 65). To these articles the reader can refer, but it must be remembered that a lining suitable for a summer-house may not be sufficiently neat for a porch or verandah.

In the same papers something is also said with regard to roofing materials, thatch being more especially commended in point of taste. A thatched verandah, however, would scarcely be desirable unless attached to a thatched cottage. Practically the choice lies between shingles, metal, and tile or slate. Shingle roofs have been spoken of in the first of the two articles above cited. A metal roof is, undoubtedly, that most easily fixed by an amateur, and should metal be used in this case, I should, as a matter of appearance, rather recommend black sheet iron than galvanised, and to keep it painted; paint stands far better on the black than on the galvanised surface. As a matter of taste, metal looks thin and poor, but it becomes less objectionable when painted; a deep, dull red would be the colour to be preferred. Perhaps, of all available coverings, nothing will look better than tiles, as drawn. Red or buff tiles will in themselves look best, but the choice must, to an extent, be influenced by the general covering of the house. It may be, if that is of slate, that small slates will come in most appropriately; but whichever of these coverings is used, the best finish against the wall will be with a "flashing" of metal, as shown.

FRENCH POLISHING—BODYING IN.

BY D. DENNING.

THE BODY—BODYING IN ON CHEAP FURNITURE—PREPARATION OF POLISH—HOW TO MAKE IT—WHITE POLISH—BROWN POLISH—REMARKS ON THE POLISH OF THE MANUFACTURERS.

IF it can, without conveying the implication that some of the details of French polishing may be performed in a careless manner, be said that one operation is more important than another, the remark applies specially to the "bodying in," as it is technically called, of the work with the polish. In ordinary English, bodying, when applied to the polisher's craft, or rather art, simply means coating the wood with a thin layer of the polish, evenly and smoothly distributed. On the way this is done the appearance greatly, and the durability of the shine or gloss entirely, depend. If the body is thin, the polish—by which is meant the gloss subsequently given to the film—may be beautiful at first, but cannot last, as the polish—this time the material is referred to—sinks or perishes. On the other hand, if the body is too thick, though the gloss may be all right, the work will not look well. It is apt to be "treacly" looking, and give rise to ideas of varnish having been used, besides impairing the pure tone of some kinds of wood. Therefore, let the novice be careful about the way in which he does the bodying, if he wants to excel in his work. It may be well to remind novices, or those who are not accustomed to see good work—or, shall I say? the highest degree of excellence to which polishing is capable of being brought—that many specimens that are seen are anything but good. Only in the best shops or houses, and on the best pieces of cabinet work, can the finest polishing be seen. Polishing on second-rate—even if substantial and sound—furniture is generally on a par with the woodwork. The lower this is in the scale the worse the quality of polish; therefore the gaudy and shiny-looking cheap furniture, which unfortunately is too often seen in all but the very best shops, etc., must not be taken as models to be copied in polishing. To meet the public taste, the price paid for polishing has to be cut down, with the result that inferior polish and less time are spent on the work than would be were excellence the prime consideration. I do not say that even the best materials and the expenditure of even more than the necessary time or labour will ensure good work in unpractised hands; but they are, at any rate, important factors, and amateurs and novices will be wise not to use either inferior materials, or to be unduly discouraged if their efforts are not as successful as might be wished.

With these preliminary remarks—and I am afraid some of my younger readers may think them of comparative unimportance, though they are not so—we may proceed on our course.

Polish.—As the quality of materials has been referred to, a few hints on the polish and its preparation will not be uncalled for, especially as so many readers of WORK are continually asking questions on this subject for answer in "Shop." Those who want a good recipe for polish will find the following thoroughly reliable, and neither I nor anyone else can tell them of a better—no, not even if it has been "in print." There may be cheaper methods of making a given quantity of polish, and there may be many giving more ingredients, but none of them surpasses, or is equal to, the simple mixture of shellac and methylated spirit. If any reader tries it, and does not find his work satisfactory, he must blame something besides the polish, for the fault will not be in it. It is just possible that some novices may think that they could manage better with a polish containing, say, half a dozen different ingredients, all of them weighed out and measured with the utmost nicety. If so, my advice to them is that they should ask any really competent French polisher whom they may meet with what he uses in his polish. If he thinks fit to be candid, he will admit that shellac and spirit form the best; but it is within the bounds of possibility that he will not care to say too much about his methods.

To make a good average polish, neither too thick nor too thin, about 6 oz. of shellac to each pint of methylated spirit will be required. The proportions vary according to the fancy of the polisher, and, perhaps, to some extent according to the nature of the work he is engaged on chiefly. Be that as it may, great exactitude in the proportions is not necessary, and I know more than one good polisher who makes his polish almost by guess-work. Of course, if it turns out too thick, the polish can be thinned by merely pouring in some more spirit, while if it is too thin, the deficiency can be made up by dissolving some more shellac in it. A rough-and-ready way of measuring the proportions is to put some shellac in a bottle, or say, for explanatory purposes, half fill it with the lac, and then fill up with ordinary methylated spirit. This is, perhaps, as good a method as any, so it will be seen there is not much trouble involved.

The shellac gradually dissolves, and the solution is hastened by an occasional shaking or stirring with a stick. As many directions, ostensibly published for the benefit of the amateur, recommend the application of heat—one of them which I read lately actually saying that the mixture should *be boiled!*—let me emphatically say that heat is not necessary, and that an attempt to boil the spirit would probably end in disaster. I prefer, as a rule, not to find fault with what

has been written by others, and I only do so now in order to warn readers that the preparation of polish by heat is dangerous, and should not be practised except with the utmost caution, if at all. In confirmation of this, I may say that I have seen many policies of insurance covering furniture manufactories and shops, where, of course, polish is constantly used, and I think most of them—indeed, I cannot remember an exception—have had a clause to the effect that polish, if made on the premises, must be prepared cold. With this I must leave this part of the subject for the readers' personal consideration. If they are bent on using heat, they do so at their own risk, and must not blame WORK for any disaster which may happen.

Two kinds of polish are used, one of them nearly colourless, and known as "white polish," the other darker, and known as "brown polish," or simply "polish." If unqualified by the word "white," this latter kind is always understood.

The white polish is made by using white or bleached shellac, while the other is made with ordinary shellac, either orange or reddish-brown.

Either polish may be used on any kind of wood, except where great purity of tint is required, and, roughly speaking, the white is to be preferred for all light woods, such as light oak, ash, sycamore, satin, etc., while the brown may be used on darker kinds. Even on these I am inclined to think that white polish is, if not better, at least equally good, the only ordinary furniture wood in connection with which a decided preference might be given to brown being mahogany. It will be understood that, when distinguishing between brown and white polish for dark woods, the higher branches of the polisher's art are being touched on, and under ordinary circumstances either may be used indiscriminately. We all know the old saying about doctors differing, and if the word doctor is taken in its literal meaning of "learned man," it may be conceded that men learned in all that pertains to polishing do differ to such an extent that the present writer, at all events, cannot in his person answer the question, "Who shall decide?" He, nevertheless, states his opinion, for which he has equally good reasons (to himself) as those who differ from him have for theirs. Is there not a couplet which wants to know—

> "Where can all this difference be
> 'Twixt Tweedledum and Tweedledee?"

and many a good polisher may, and does, think that any distinction between white and brown polish on dark wood is equally as unimportant.

However, as white polish may be used on dark, and must be used on light woods, if they are to be kept light when finished, and brown can only be used on dark woods, it will be seen that the white polish is the more useful of the two, so that those who do not care to keep both kinds may confine themselves to it. It costs a little more, from the slightly higher price of the bleached shellac; but the extra cost is a mere trifle—so small that it is hardly worth considering by those who only use small quantities, while those who have occasion to use polish in larger quantities can easily have both kinds.

But it may be asked whether the polish cannot be bought ready made, and if so, whether it is not equally good? The first question must be answered in the affirmative, but the second requires more consideration.

Undoubtedly, it would be too much to say that polish bought ready made may not be equal to that made from the recipe given, for there is nothing to prevent manufacturers using the same ingredients, and I cannot say whether many of them do not. At the same time, from the impossibility of knowing the ingredients in polish which is got ready made, there is always some risk attendant on its use, or perhaps it will be better to say, a degree of unreliability which is not experienced when one prepares his own. From the price at which some polish is sold, it is only a fair inference to suppose that something cheaper than spirit and shellac alone have been used; and without saying that good polish may not be bought, it is better for the user, when he wants something that can be depended on, to prepare his own. He knows then what he is using, and in the other case he does not. The bought polish may have nothing in it to prevent it being thoroughly good in every way—brilliance, clearness, and durability—but the fact remains that those who are best able to judge do, as a rule, prefer to make their own polish when they want to do the best class of work. Possibly there may be a certain amount of prejudice in this preference—and from a manufacturer's point of view this might be attributed as the sole reason—but then we are considering the question rather as consumers than as manufacturers.

Possibly many manufacturers, and some polishers, may even assert that the gums or resins they use in addition to shellac even improve the quality of the polish, when used with knowledge and discretion. I am not prepared to say that such additions—please note I have not called them adulterations—may not do so to a certain extent in certain directions—for instance, one gum may give increased elasticity, while another may harden the film—but for a good all-round polish, which can be relied on, there is nothing to surpass the one named. However, as all may not share this opinion, I hope on some future occasion to give several well-approved and frequently-recommended formulæ for forming other polishes, in order that those who feel inclined to do so may experiment for themselves. It will be found that shellac is the principal ingredient in them all, and that those who cannot polish with shellac and spirit alone will not be able to do any better with them; therefore, I hope no novice will remain under the impression that he will do better by-and-by, when he gets another kind of polish to work with.

WIRE-WORK IN ALL ITS BRANCHES.

BY JAMES SCOTT.

CRIMPING—PROPERTIES OF EXTENDING AND DECREASING—PUTTING TOGETHER—THE "START" FOR THE LATTER—TURNING OVER—SQUEEZING DOWN—VARIOUS MESHES—GUIDING BOARDS—THE SLIDES.

THE salient points connected with Mr. Bellamy's crimping machine consisted of the use of pairs of cog wheels, fixed after the manner shown in Figs. 19 and 20. A coil of wire was supported by the "swift" (described previously) facing the edge of the machine, the worker traversing the length of the shop, pulling the remainder of the wire behind him, which was finally cut up into the required lengths. The "crimps" were regulated according to the size of the wheels and the cogs thereof, and the distance apart from each other that they were fixed. In Fig. 19 the wheels are shown at a certain proximity to each other, and therein is also noted the crimps of the wire as a result of its being drawn through the wheels; while in Fig. 20 are shown the same sized wheels, but with larger cogs, and the same sized wire represented as passing between them, the result, in the latter case, being a longer crimp. If the crimps, however, are deeper or shallower than a certain limit, it will be impossible to place the wires together so that they may hold themselves properly. The wheels are so regulated as to be adjustable to various degrees of distance from each other, for the reason that allowance must be made for the various gauges of wire to be crimped between them as previously explained.

The Mr. Bellamy who carries on the wire trade in London, concerning whom I may be permitted to say a few words later on, has improved upon his father's ideas; but as the patent has been long expired, I cannot consider myself justified in giving either explanatory details or drawings of his improvements; nor, indeed, of seeking his permission to do so, for, were I to adopt the latter course, I feel sure he would, as a friend, hardly refuse, and my conscience then would accuse me of having taken a mean advantage of our mutual acquaintance.

"Putting together" is the technical term for crossing the wires over and under one another. The wires have to be cut into the required lengths by means of the shears, preparatory to being "put together." In commencing, one wire is placed across the bench as in Fig. 21, A. Another is then placed across it *at one end*, as in Fig. 22, B. Still further, a third, C, is fixed across in the same direction as, and exactly parallel to, the first, A. Here care must be exercised in order that the end of the third wire shall be level with the ends of the first and second wires—that is to say, when the wires are all "put together," the tops and bottoms of them shall in each case follow an imaginary straight line.

The fourth wire, D, is next put across in an exactly parallel line to B (Fig. 24). This method is continued until sufficient wires are placed over and under each other to assume an appearance similar to that presented by Fig. 25. This completes what is called the "start."

The usual practice is to place a weight of some sort upon the "start." The "putting together" can then be continued from either end—there is no necessity whatever to work at both sides alternately when the "start" has been completed—until sufficient length has been obtained. The workman can, if he has sufficient wire, make, by these means, dozens of yards of fencing in a comparatively short space of time.

My earnest advice to anyone who thinks he may wish to use this kind of work for some purpose or another is, unless he makes sufficient at the beginning, to always keep the "start" by him. When he has completed a length to suit himself, he should undo from the remainder the wires which constitute the "start," and lay them by for another time. It apparently appears a comparatively easy and simple matter to make the "start," but, in truth, this is a very difficult affair indeed—the continuance of "putting together" is decidedly very easy labour when considered in connection with "putting together" the "start."

Fig. 26 shows a section of crimped wires when "put together," and from this diagram it should be plainly comprehended how each wire crosses over and under its companions. It is essential, when making the "start," to

Fig. 35.

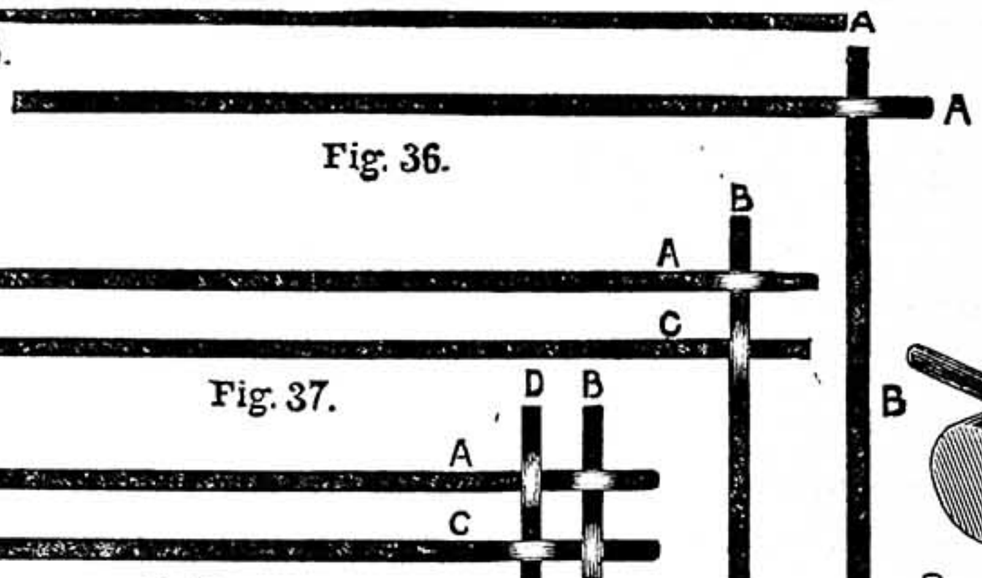


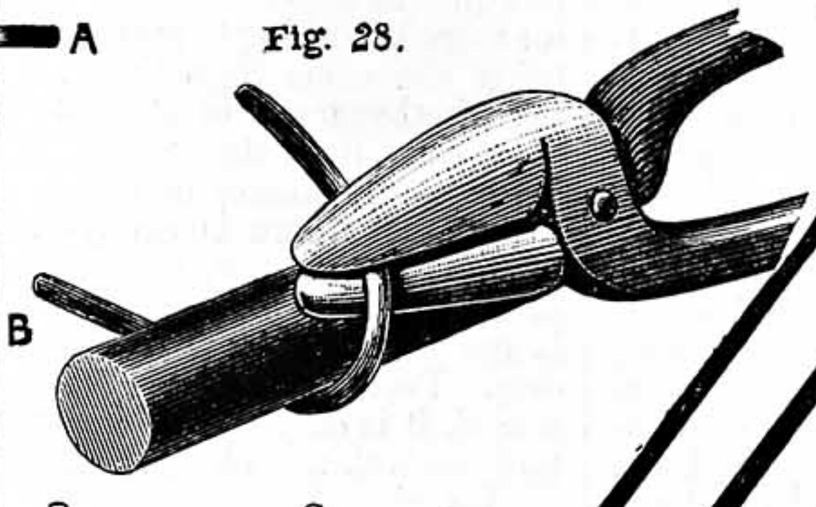
Fig. 36.

Fig. 37.

Fig 26.

Fig. 38

Fig. 28.



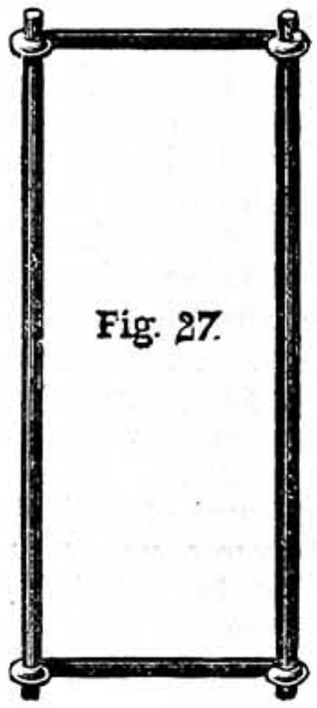


Fig. 27.

Fig. 21.

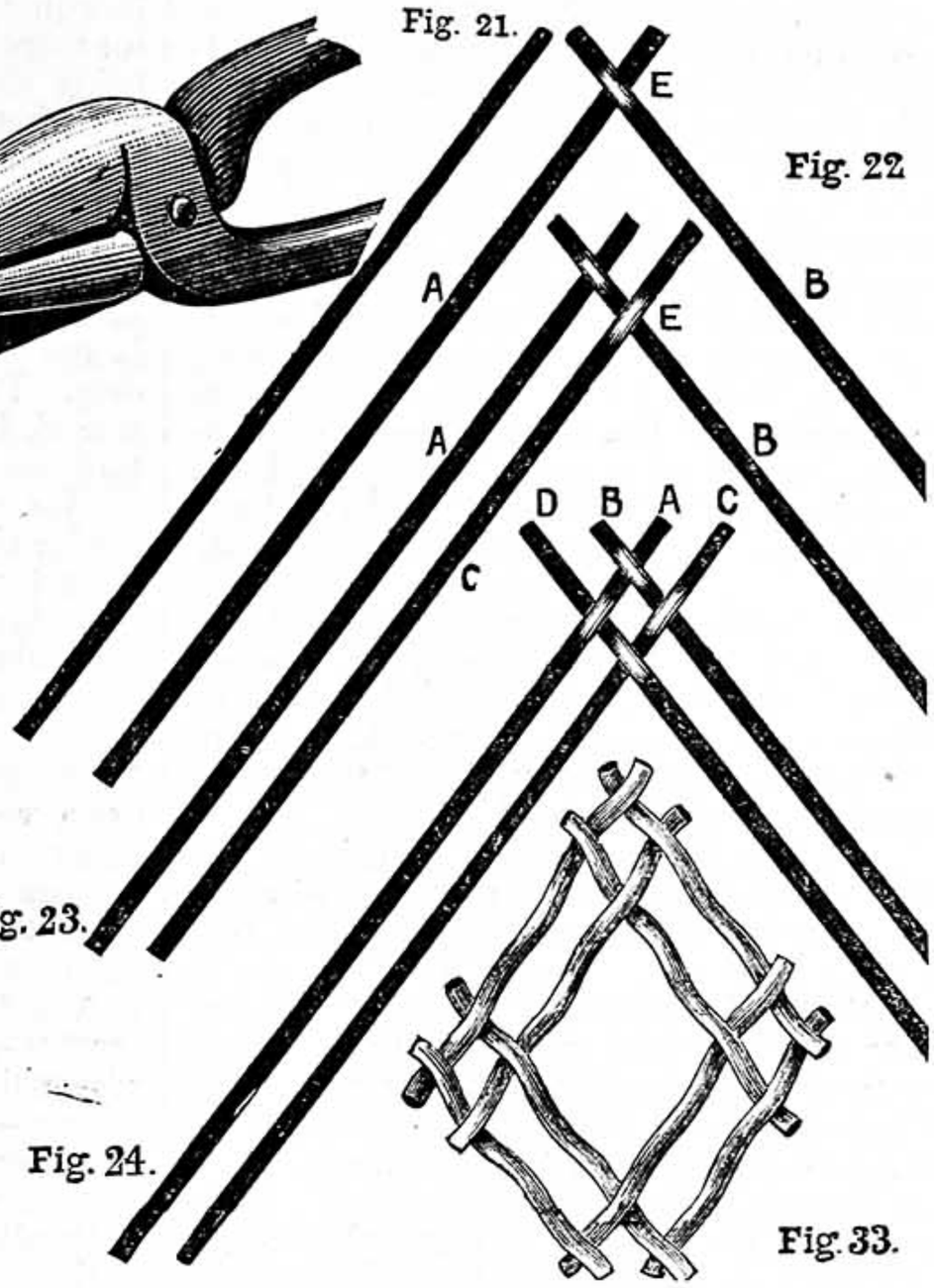


Fig. 22

Fig. 23.

Fig. 24.

Fig. 33.

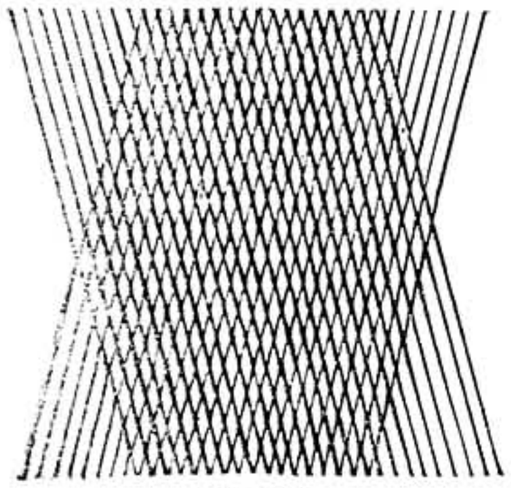


Fig. 31.

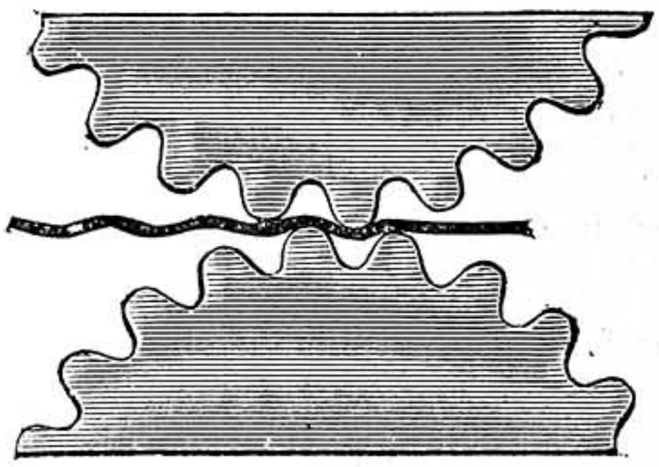


Fig. 19.

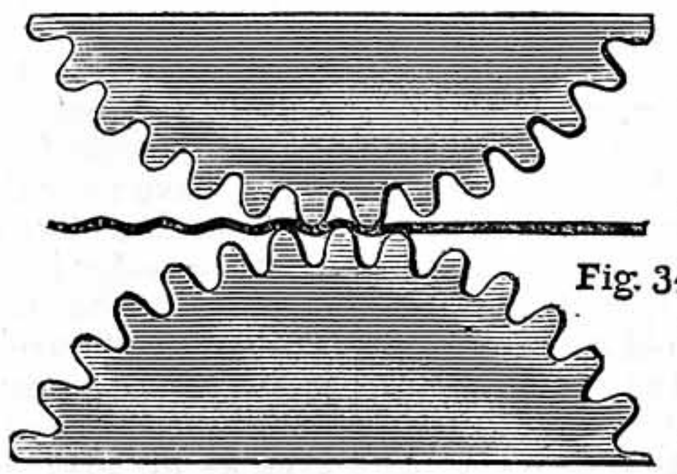


Fig. 20.

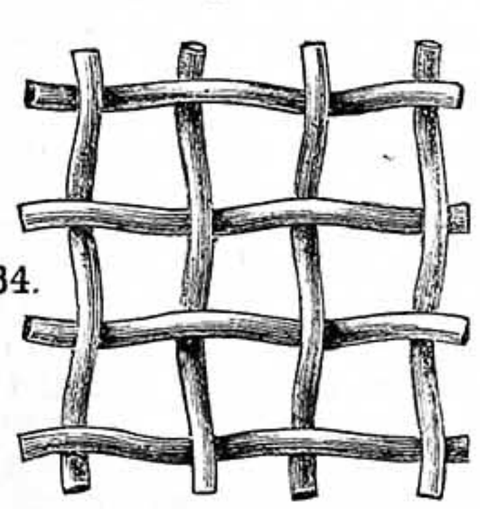


Fig. 34.

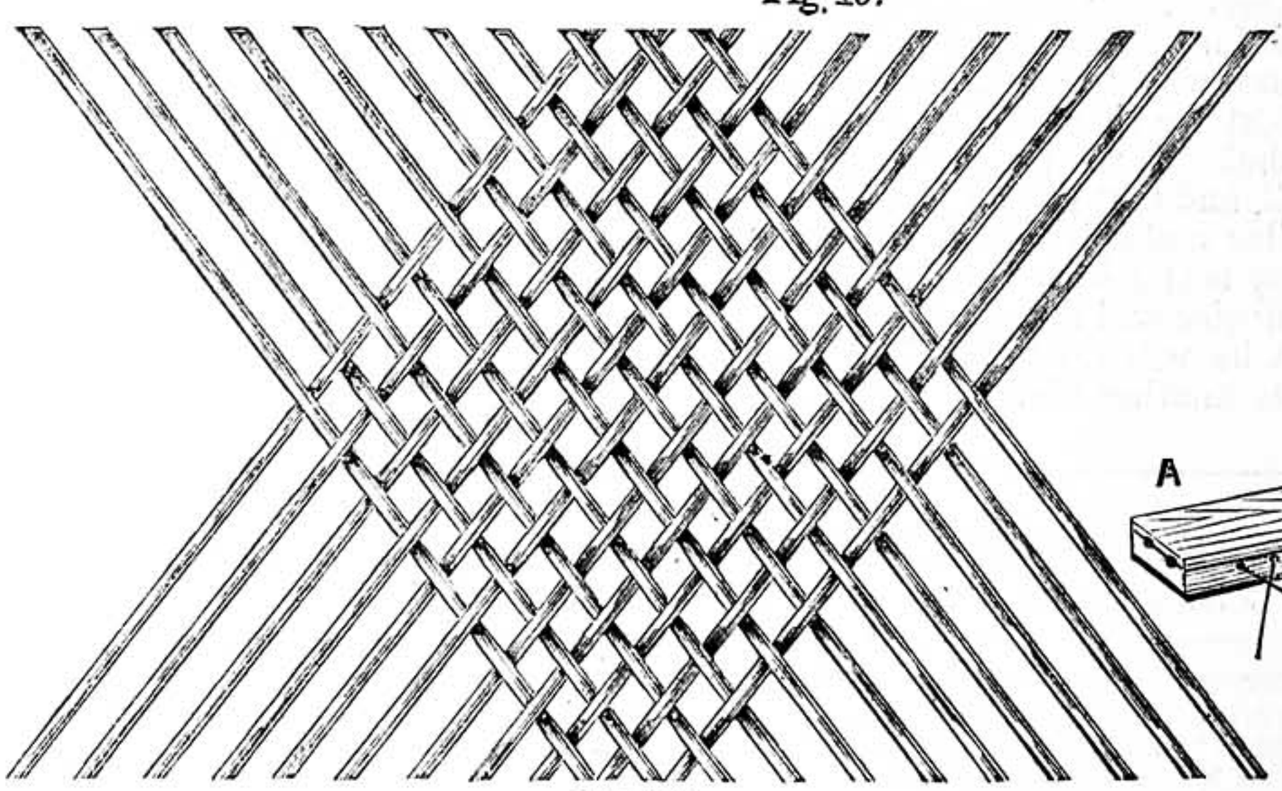


Fig. 25.

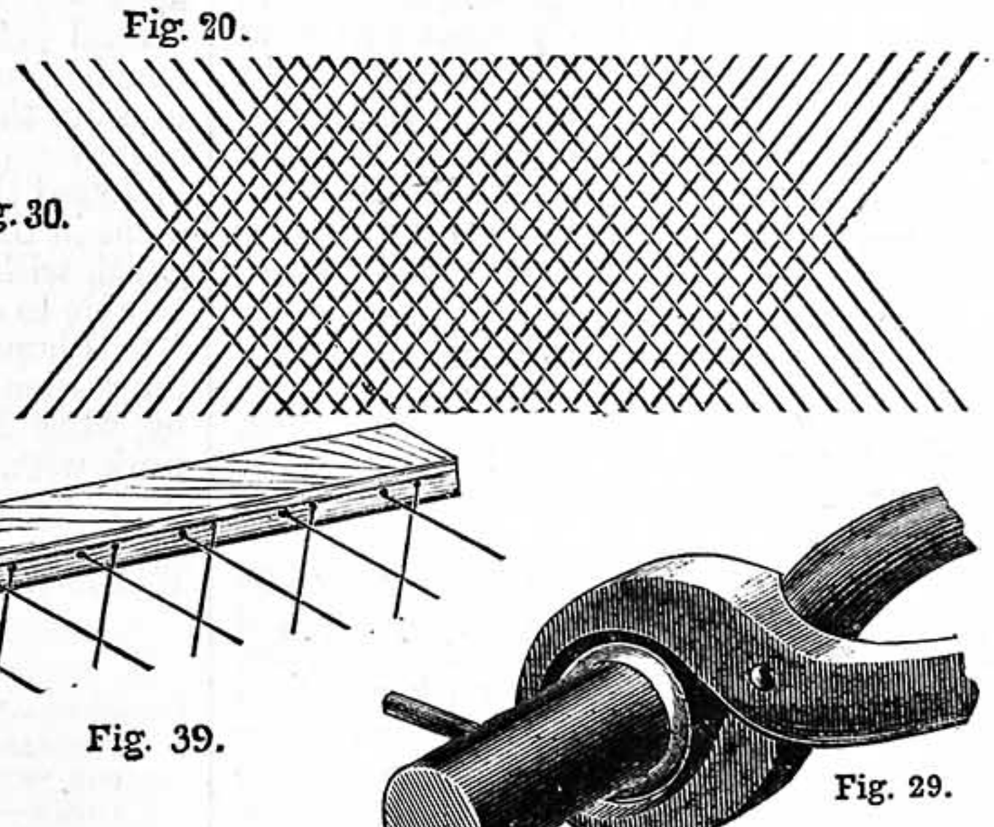


Fig. 30.

Fig. 39.

Fig. 29.

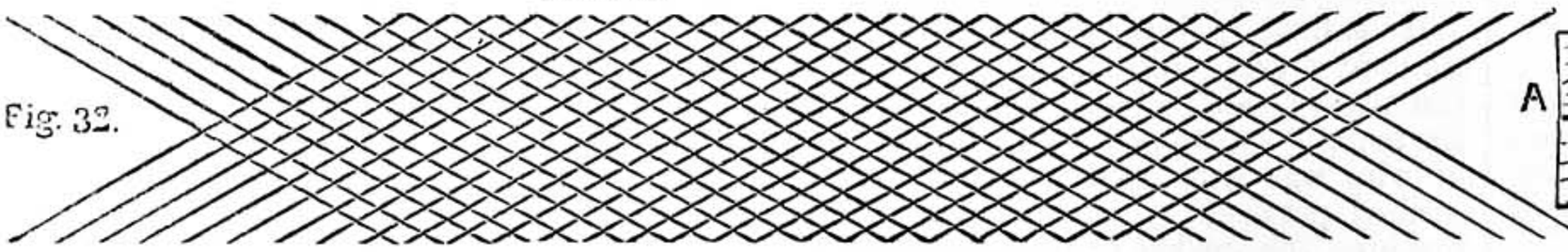


Fig. 32.

Fig. 40.

Figs. 19, 20.—Diagrams showing how Wires are crimped. Figs. 21, 22, 23, 24.—Diagrams showing Methods of "Putting together." Fig. 25.—The "Start," a Result of the Continuation of "Putting together," as in Figs. 21, 22, 23, 24. Fig. 26.—Section of Crimped Wire Mesh. Fig. 27.—A Frame. Fig. 28.—"Turning Over." Fig. 29.—"Squeezing Down." Figs. 30, 31, 32.—Diagrams showing how a Number of Wires when put together can be lengthened or shortened in Distance bodily. Figs. 33, 34.—Two more Forms of Crimped Wire Meshes. Figs. 35, 36, 37, 38.—Method of putting together Square Meshes; it is preferable to work from the Reverse Position to that in which the Wires are here placed. Figs. 39, 40.—Guiding Boards: Wires supposed to be crimped, but shown straight to avoid confusion.

allow the wires to project a distance beyond the points at which they cross each other (E, Fig. 22). The reason for doing this is that there shall be sufficient length to enable the worker to "turn over" the wires—*i.e.*, when the put-together piece is attached to a frame, the parts of the wires which come in contact with the frame (Fig. 27) should be bent over it by means of the pliers (Fig. 28).

When attaching the wires to a frame, temporarily secure them by "turning over" a wire here and there on each side. Then turn each wire up and partly over in consecutive order, and clip off, by means of the nippers, what may be considered superfluous. Finally, "squeeze down" each wire with the aid of the nippers or pliers, whichever may be considered the most convenient method. The use of the nippers for this latter part of the work will be found to be the best for the larger sort, but the pliers are to be preferred for the smaller descriptions. Fig. 29 represents "squeezing down."

It will be noticed that when crimped wires are put together they are capable of being stretched bodily to a great length and also closed together. The best illustration to name to most appropriately explain this stretching and diminishing is to allude to the groundwork upon which we remember to have been pleased, in our younger days, to have fixed imposing wooden soldiers, and of which the same idea is made use of extensively in connection with window blinds, etc. Fig. 30 shows a number of wires as when first "put together," and Fig. 32 the same wires when stretched, or, more properly speaking, extended; while Fig. 31 gives an idea of the same when closed together.

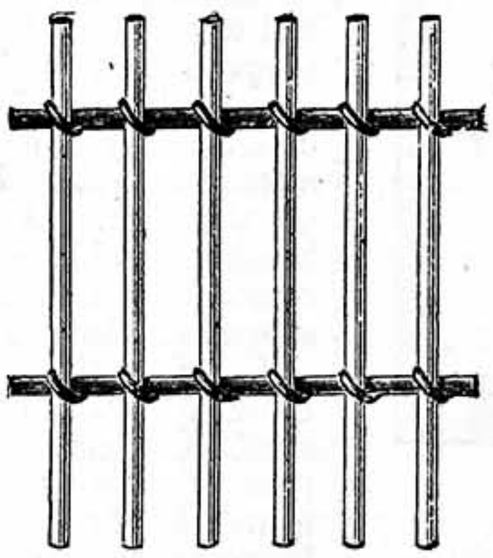


Fig. 43.

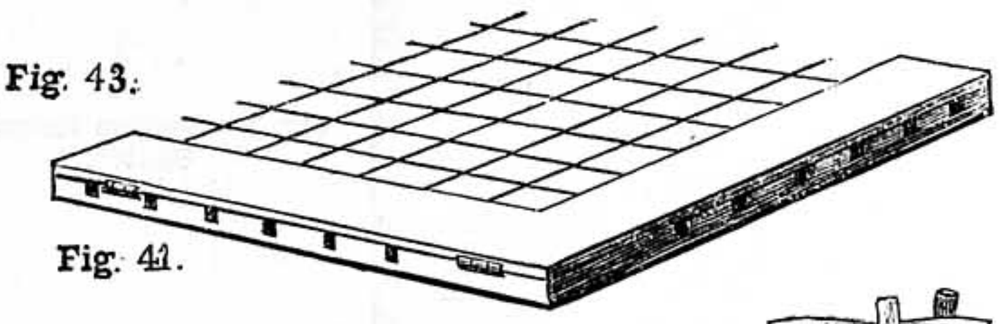


Fig. 41.

Fig. 42.

Fig. 44.

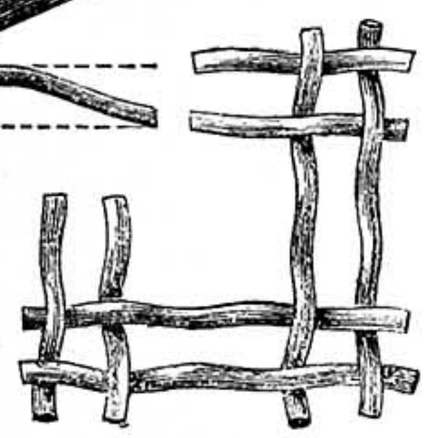


Fig. 45.

Fig. 41.—Guiding Board, Wire Straight instead of Curved. Fig. 42.—Section of Crimped Wire to explain use of Guiding Boards in Figs. 39 and 41; Fig. 40 is a Plan (open) of Fig. 39. Fig. 43.—Section of Laced Work. Fig. 44.—"Slide" used in making Mesh, shown in Fig. 43. Fig. 45.—Another Pattern for Interlacing Crimped Wires.

Sometimes the wires are fixed "two-and-two," as in Fig. 33. To do this, when the first and second wires are laid across each other, another wire has to be placed, in each case, on the outside of them, parallel, as in Fig. 24; the work is then continued in a similar manner as in the single wire mesh, allowing two or more crimps to intervene alternately.

Another mesh is the square one shown in Fig. 34. The only difference between the construction of this and the diamond mesh consists in the laying of the wires at right angles across one another, as shown in the progressive diagrams, Figs. 35 to 38, they being placed over and under each other in the same way as those composing the diamond mesh.

Sometimes "guiding boards" are used to assist in "putting together," but my practical friend does not advise their adoption, as they are sometimes rather awkward to handle, and when the worker has learnt to "put together" wires by their aid, he will wish he had striven to perform the work without any such assistance on the part of accessories, as the time occupied by a man in constructing a piece of work by these means will be far in excess of the time occupied by a workman in making the same sized portion by merely trusting to his dexterity of hand, without any "guiding boards." But these things may be considered by some to contain a mite of usefulness, so I must take this reason as my excuse for proceeding with a brief description of them.

In Fig. 39 is shown a section of one for use in connection with the diamond mesh. It is merely two boards, an inch or so in width, of a length considered desirable, and about ½ in. thick, together, with holes bored through it in the manner shown in Fig. 40. They would be hinged together, and secured with a hook and eye at each end. The wires are placed through this from the side marked A, either in the order already described—*i.e.*, across each other progressively—or else one set of parallel wires fixed first, and then the cross wires connected with them in the opposite direction. For the square meshes, a rectangular board, as shown in Fig. 41, could be used, also hinged, and with hooks attached to the ends.

The holes in these guiding boards should be, in width, the same as the gauge of the wire; but they should be in depth just sufficient to receive the crimps of the wires; by this I mean that the space occupied by the crimping, as indicated in Fig. 42 by the dotted lines, should be the same as the depth of the holes (Fig. 41), in order that the wires may be held in their proper position, instead of the crimps laying upon their sides, as they are apt to when being "put together" in the usual manner.

An extensively-used mesh is that shown in Fig. 43. The wires forming it are "put together" by the humble aid of an accessory which rejoices in the appellation of "slide." This appliance, I must say, is a very handy one, and its use is, contrary to that of the guiding boards, recommended. It is a very simple affair, and a sketch of it is given in Fig. 44. It is but a strip of metal or wood, with holes through it, and is secured to the bench. In "putting together" a piece of work of the pattern shown in Fig. 45, the long wires are placed through the slide, allowing the front ends of them to project for a short distance, and to them, at this part, is temporarily fastened a cross wire, which latter is finally laced to the long wires. The latter are then drawn partly through the slide, and cross wires laced at equidistant and, of course, parallel points to the first. When the first cross wire has been fastened, proceeding with the work is almost the same as if the wires were in a frame, for the opposite ends to those to which the first cross wire is laced being in the "slide," they are there restrained from closing together, or otherwise becoming inconvenient to handle.

It is a usual practice, with this description of work, to lace the alternate wires in an opposite way to the others, *i.e.*, the first, third, fifth, and so on, would be laced from left to right, whilst the second, fourth, sixth, etc., would be secured by the lacing wire travelling from right to left. Sometimes the middle one or two only, according to whether an odd or even number of cross wires are used, are laced in a reverse direction.

I said, a short while ago, that perhaps I should be permitted to say a few words concerning Mr. Bellamy, one of the sons of the inventor of crimped wire.

My many readers must certainly recall the fact, now I come to mention it, that in my numerous contributions to WORK during the past, I have never recommended or made allusions to anyone by name. This was not on account of my not wishing to do so, but for the sole reason that I was entirely ignorant of, and unacquainted with, anybody connected with wood-work who was worthy of more consideration than his fellows in that craft or trade. I do not mean to say that I do not know any good workmen, for I should be telling an untruth were I to declare so; for my trade acquaintances consist of both good and bad workmen—although I believe honestly that the majority of them belong to the former class. They are good "workmen," and good "men" without the "work"; and I must add, that although I think they are good men *without* the "work," I also think, paradoxically, perhaps, that they are *better* men *with* the WORK. Therefore, if recommendations were due to one, they were likewise due to the remainder; and to name the whole was entirely out of the question.

But, with regard to wire-work, I am placed in a different position, for I am only acquainted with the family of Bellamy and the workpeople whom they employ; therefore, I deem it not out of place to mention his address. I do not promise that he *will* satisfy everyone, nor do I say that he will satisfy *anyone;* but I *do* say that my belief is, that anyone and everyone who may apply to him will not meet with disappointment.

This is meant for those who may wish for any articles made in wire, and who do not care to construct them personally. His address is 40, Penton Place, Pentonville, London, N. I do not know that he would supply crimped wire in small quantities, but I have no hesitation in saying that reasonably large quantities would be attended to. It does not require an abundance of intelligence to understand this. In a shop where several people are at work, there is a chance of their time being lost, to a certain degree, if they are called from a large job to perform comparatively small ones.

The same with finished articles; if but one or two are required, I may advise the reader to communicate with me through

the Editor (with his permission), and I will see what I can do through the influence of a relative of Mr. Bellamy, who is in his employ, and who is always willing and ready to do a little "overtime."

Of course, straight wire can be obtained from several places; and, indeed, I do not think that any wire-worker, who may be in the same locality as where the reader may chance to reside, would refuse to supply him with crimped wire, for every wire-worker must have a crimping machine; the only difference being that that belonging to Mr. Bellamy contains a few improvements upon the others capable of saving his and his workpeople's time to a certain extent. But I see no reason why any reader should not "knock up" a pair of wheels to answer the purpose. In a former paper, I have given what I consider to be a sufficient description of the crimping machine.

A SIMPLE BRACKET FROM SOUTH KENSINGTON MUSEUM.

BY URQUHART ARNOLD.

SMALL THINGS AT SOUTH KENSINGTON MUSEUM—ART WORK—PLAIN BRACKET—DECORATION OF BRACKET.

THE remark that there are many wonderful things in the Museum at South Kensington may seem on an equality for triteness with that of the philosopher who assured his audience that he "admired Shakespeare's works because there was a good deal in them." Of course, we all know that nowhere in this country, at any rate, if in any other, are there so many art treasures collected together as at South Kensington. Naturally I take, perhaps, more interest in the wood-work there than in anything else, and, no doubt, so do many of the readers of WORK; but I could not help thinking, as I was mooning away a few hours—as I am very fond of doing when I have an idle evening in London—that one sometimes misses many a lesson by neglecting the comparatively unimportant objects. I was started on this train of thought by noticing a small bracket something like that shown by Fig. 1. I only jotted it down roughly on a scrap of paper, and the drawing is principally from memory. It is such a very simple thing that it might appear to be too insignificant to say anything about it, and being from memory, as said, it may not adequately represent the original. It is, however, just on account of its simplicity that it is worthy of some notice; for we are rather too apt to exclusively devote our attention to the great masterpieces of work—such, for instance, as the Boule wardrobe in the Jones collection—instead of keeping our eyes open all round.

The bracket which occasions these remarks has not even the merit of being "very old"—a qualification which to many seems a necessity if a piece of art work is to be admired; neither is it costly, so that there is nothing, apparently, about it which distinguishes it in any way, or places it above the lowest level of mediocrity. That it is unique I do not say. It is even commonplace, if you like to call it so—nothing more than the application of artistic principles in the production of an ordinary little bracket, which can be made by any joiner with the commonest tools from a few bits of pine boarding.

When we talk of art work, or the production of anything artistic, are we not rather inclined to conjure up visions of æsthetic (I use the word in its popular or derisive sense) looking individuals, with sad-coloured garments, and a general air of uncouth angularity, mentally struggling to bring forth something fearfully and wonderfully devised? I do not say anything new when I say that the simplest thing may, and ought to be, a piece of art work in the widest acceptation of the term. Decoration is not, in itself, a necessary feature of art workmanship. Lavish ornamentation is apt to be anything but artistic, unless applied with skill, which all of us do not possess. On the other hand, by due attention, most of us can produce things which, if not in the highest form of art, as applied to our several crafts, shall yet be artistic and true. My conception of art may be different from yours, but I hold that any article, if it be designed with due regard to its intended purpose, and be carefully made, is in the truest sense a work of art—I do not say a great work of art—and worthy of regard. The little bracket, I venture to think, fulfils these conditions. A bracket is to support something. Is not this one evidently designed to do so? Is it well made? The answer depends on the worker. If he is careless with the work it will not be.

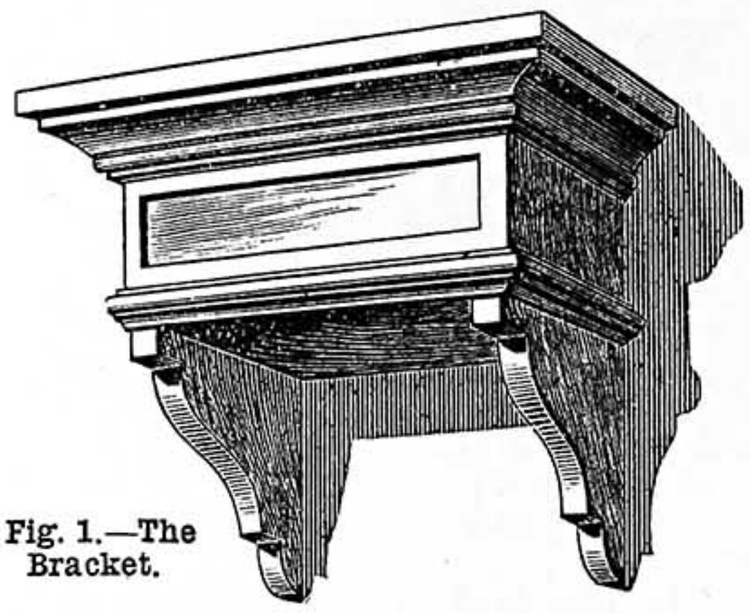


Fig. 1.—The Bracket.

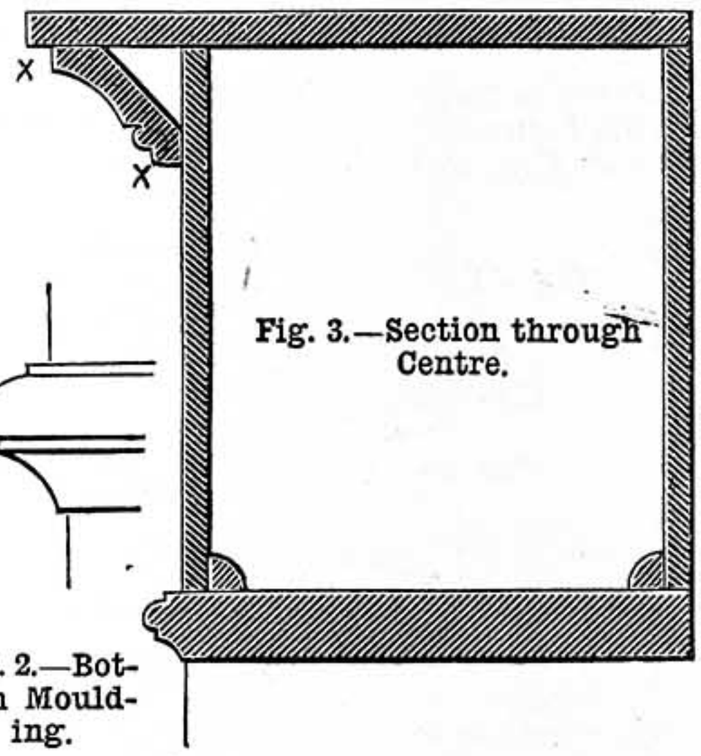


Fig. 2.—Bottom Moulding.

Fig. 3.—Section through Centre.

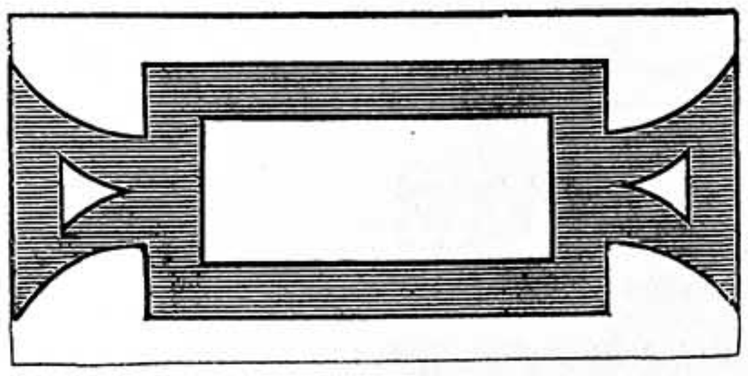


Fig. 4.—Gilding on Front.

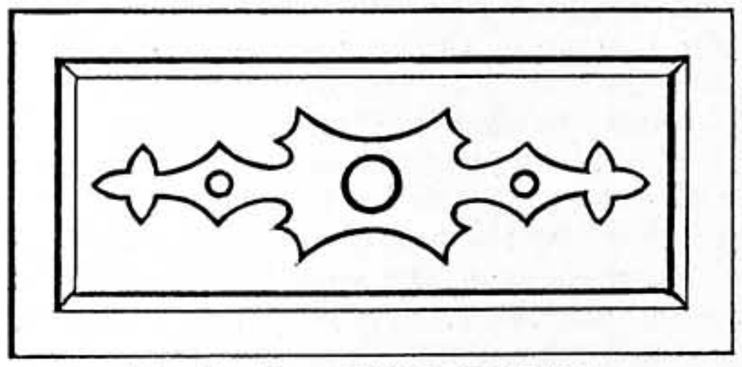


Fig. 5.—Suggestion for Inlay.

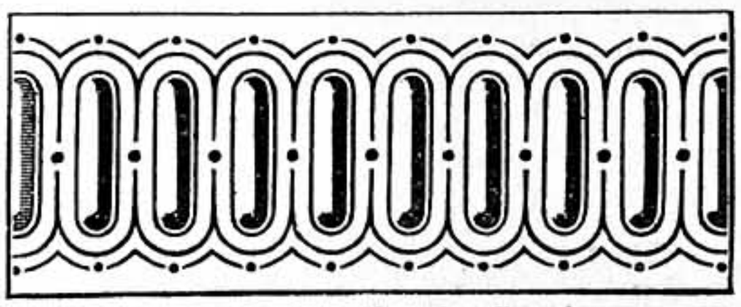


Fig. 6.—Suggestion for Carving.

Now I have done with my little homily on art, and we may turn to the actual making of the bracket, or rather, give a few hints about it. The construction is so simple that any boy almost could manage it; so that those who aspire to work in wood but do not know how, or have not the skill nor the tools to do anything big, may succeed with it. If they like to decorate the bracket afterwards, there is no reason why they should not do so.

Now, I do not pretend to say that the bracket in the Museum is made in the way I am about to suggest—I have had no opportunity of examining its construction, so that I cannot tell what it is—but there is no reason to suppose that it differs widely from that suggested here. The size, also, is a matter of secondary importance, for that can be altered or arranged to suit the requirements of the user. As shown in Fig. 1, the bracket is oblong on top, but there is no reason why it should not be square if that shape suits better.

The first thing will be to make a box, minus top and bottom, of, let us say, ½ in. stuff. On front and two ends of the upper part of this, plant a simple moulding, mitred at the corners. The bottom of the box extends beyond the front and ends, and is moulded at these edges, as shown in Fig. 2. On a line with the ends of the box, brackets are to be screwed, or otherwise fastened, to the lower side of the bottom, to which the box may be fastened from above with blocks of wood glued into the angles. The top may then be nailed on. If the appearance of the nail-heads be objected to, dowels may be used instead, and, by being inserted in the ends first, need not come through. An alternative plan is to make the part I have called the box without back, and then to fasten the top on with blocks, as suggested for the bottom.

Fig. 3 represents the construction in section from back to front, and is so clear that comment is superfluous.

The bracket will look well finished in almost any way; but it may be interesting to state that the original is black, relieved with gilt lines on the parts marked × in Fig. 3. The front of the box also has gilt lines instead of a panel, as indicated in Fig. 1.

Another bracket (there are several of them of the same design, but varying in size) has the front of the box part decorated with gilded lines, as shown in Fig. 4, which at once suggests that a piece of overlaid fret of the same pattern may be used, the corners being mitred for the sake of neatness. A small inlay of bold design, and surrounded by a neat moulding, would also look well, and it is needless to say that if the front is carved, as it easily may be, in a suitable style, the value of the bracket will be increased.

As suggestions for what may be considered appropriate, without entailing much or difficult work, Figs. 5 and 6 are given for inlay and carving respectively.

Alterations and variations from the

original might be suggested at almost indefinite length, till by the process of evolution something totally different in style and design results. It would be interesting to illustrate this; but as there are other subjects besides wood-working which require the space which would be occupied in doing so, and enough has probably been said to enable those who wish to contrive for themselves, I must—at any rate, for the present—take leave of the unpretending little South Kensington bracket.

TO PREPARE FRESH-BURNED CHARCOAL IN SMALL QUANTITIES.

BY E. W.

GENERAL OBSERVATIONS—HOW TO MAKE—THE WOOD TO USE—CULINARY USES.

General Observations.—Although charcoal is cheap, and everybody that has frequent need to use it may avoid a complete exhaustion of their stock by a timely renewal, yet it will not unfrequently happen that many, especially amateurs, who only occasionally have any use for such, cannot so conveniently get it in the time of need as could be desired. Perhaps only a small quantity is wanted for some special purpose; it may be for a small job at brazing, or perhaps a supply of fresh-prepared carbon for chemical purposes. In cases like these it will often be far better to make than to buy.

How to Make.—If there is clay at hand, and a thin coating placed around a piece of wood, a small puncture hole being left for the escape of steam and gases, and the whole placed in a good fire, the wood will quickly become charred, but not consumed, and when taken from the fire separates readily from the burnt clay. It is desirable, however, when time permits, to let the clay dry slowly before burning.

A better arrangement is to place the wood inside a tin box or canister that is provided with a lid. With a bradawl or nail, punch a hole as vent, and burn. These tins are now lumber in every household, and a few usually find their way into every workshop and amateur's laboratory. Mustard, coffee, cocoa, paints, and innumerable other articles of every-day use, are now sold in such tins, and I apprehend that no one within touch of civilisation would have the slightest difficulty, if occasion required, in collecting a cartload of such discarded tins in a very short space of time. The paths trod by the pioneers of civilisation across the vast prairie lands of America are distinctly marked by the presence of such, and far in the depths of the Australian bush have I seen the camping grounds of carriers and travellers strewn with the rejected empties. For our purpose, those tins that are connected at the side and bottom by welt-seam joints are preferable to those that are soldered.

The Wood to Use.—A non-resinous wood is best, and oak is as good as any. It is advisable to have the wood as small as the purpose for which it is required will permit; and a close fire, as that of a kitchener, is better than an open one, as the heat is more intense.

Culinary Uses.—Housewives and cooks, who know the value of charcoal for culinary purposes, are also likely to find this useful in connection with the preparations of the kitchen.

KNOTTING, SPLICING, AND WORKING CORDAGE.

BY LANCELOT L. HASLOPE.

HITCHES AND BENDS.

TWO HALF HITCHES—BUILDER'S KNOT—DOUBLE BUILDER'S KNOT—TIMBER HITCH—KILLICK HITCH—MAGNUS HITCH—FISHERMAN'S BEND—ROLLING HITCH—TOPSAIL HALLIARD BEND—RACKING HITCH—SLIPPERY HITCH—CARRICK BEND—SHEET BENDS—BLACKWALL HITCH—MIDSHIPMAN'S HITCH—MARLINESPIKE HITCH—REGULATING LASHING—STATIONERS' KNOT.

WE now come to a somewhat different class of fastenings, though it is very difficult to discover where knots end and bends and hitches begin; indeed, a tie that, under certain circumstances and made a particular way, is called a "knot," differently constructed, and under dissimilar conditions, is called a "bend" or "hitch," though the result is the same in both cases. As an illustration of what I have been saying, we may take two half hitches (Fig. 25), which, if made in another way round a pole, is called a "Builder's Knot." If my readers will analyse the knots I shall set before them, they will find several other similar instances occurring amongst them. A, Fig. 25, is a single hitch: it is merely a loop formed in a rope. This is readily done by holding the rope in the left hand, and giving it a twist with the right; the loop then forms itself, as it were. When a tightly laid piece of cordage is twisted, these loops are apt to arise of their own accord; they are then called "kinks." They are very objectionable, as the cord is sure to part at the kink when a strain is put on it. It is still worse in the case of wire, which breaks readily when once kinked. Tight, hard cordage should always be well stretched before it is used, to avoid kinking. Two half hitches (Fig. 25) form a very useful knot for a great variety of purposes, as they are very quickly made, and will not slip, no matter what strain is put upon them—indeed, the more they are hauled upon the faster they hold. There is no better or easier way of making a rope fast to a hook. First one hitch is slipped on, and then the other on the top of it, and the rope is fast in less than a couple of seconds. This knot is used by surgeons in reducing a dislocation of the thumb joint. Fig. 26 is the builder's knot, which, as said before, is merely two half hitches, but as it is used in places where it is impossible to pass the hitches over the ends of the timber, it is made by holding one end in the left hand, passing the rope round the pole, under the end, round the pole again, above the first part, and under its own part; from its non-liability to slip laterally this knot is always used to fasten one pole to another in fitting up scaffolding, from which circumstance it has acquired its name. If, instead of making the commencement of the knot as shown in Fig. 26, we pass the end, after it has gone round the pole, two or three times round the other part, as in Fig. 2 (page 65), the remainder of the knot is rather more readily made, as it holds itself taut, and will not slip while the end is put round to complete the fastening.

A "Double Builder's Knot" is made the same way exactly as the builder's knot, but the end goes round again, as before, and underneath its own part. This makes it much stronger. When a builder's knot is made on a rope for the purpose of securing a small line tc a stout rope, it is called a "clove hitch."

The "Timber Hitch," Fig. 27, is a rough and ready way of securing a piece of timber or any similar thing, and comes in handy on a great many occasions. It is made by bringing the end of a rope round the timber, then round the standing part, and then, taking two or more turns, round its own part. The pressure of the coils one over the other holds the timber very securely, and the more it is hauled on, the tighter it holds. It can also be cast off very readily.

Fig. 28 is a modification of the timber hitch, called the "Killick Hitch." It is much used to fasten a stone to the end of a rope. After making a timber hitch and hauling it taut, a single hitch is made, and slipped over the end of the stone alongside of it. Some of the best fishing grounds are on rocky coasts where an anchor would not hold; and if it did, there might be considerable risk of losing it altogether, from its jamming in the crevices of a rock. In these places a killick, or large stone, slung as shown in Fig. 28, is used, which holds the boat by its own weight, without any risk of getting fast to the ground.

Fig. 29 is a "Magnus Hitch," a good strong method of securing a rope to a spar, as there is little tendency to slip endways along the spar. In making it, take the end of the rope twice round the spar, in front of the standing part, round the spar again, and then through the last bight.

The "Fisherman's Bend," Fig. 30, consists of two round turns round a spar, and a half hitch round the standing part, and through the turns on the spar, and another half hitch above it, round the standing part. It is used for bending studdingsail halyards to the yard, and, in yachts, for bending on the gaff topsail halliards.

A "Rolling Hitch," Fig. 31, is made by taking three round turns round a spar, and then making two half hitches round the standing part of the rope, and hauling taut.

The "Topsail Halliard Bend," Fig. 32, is another bend, used chiefly on board yachts. It is made by bringing the rope twice round the spar, then bringing it back round the standing part, under all the turns, over two turns, and under the last. This hitch is shown open for the sake of clearness, but in practice we jam the coils close together, and haul them all taut.

Fig. 33 is a "Racking Hitch," for hitching a rope on to the hook of a block. Make two bights in a rope, and turn the bights over from you two or three times, and put the two loops on to the hook. This is sometimes called a "cat's paw."

Fig. 34 is a "Slippery Hitch," the value of which consists in the readiness with which it can be cast off in case of emergency; at the same time, it holds securely while there is a strain on the rope A. If the mainsheet of small boats is made fast at all, which is always a more or less risky thing to do, a slippery hitch should always be used as a start. A sharp pull at the end of the rope lets the sheet go at once.

Fig. 35 is the "Carrick Bend." Lay the end of a rope over the standing part, thus forming a loop; then take the end of another rope, and put it under the bight over the standing part at A, under the end at B, over the rope again at C, under its own part, and over the rope B, and haul taut. The parts A and B form the first loop made. This is generally used for binding hawsers together, to increase their length to warp or tow with. This method of binding ropes together has the great advantage of being readily undone without the aid of a pricker or marlinespike, which would have to be used for many knots, after they had been in the

water. As in the sailor's knot, we have but to grasp the ropes just outside the knot, and push the loops inwards, and the knot comes adrift at once.

Fig. 36 shows the clew of a sail, and the method of bending the sheet on to it. This is termed a "Sheet Bend." The sheet is not, as some of my readers might fancy, a part of the sail, but is a rope used in setting a sail, to keep the clew or lower corner of the sail down to its place. In making a sheet bend, the end is passed up through the clew, round the back of it, under its own part, and over the clew again. The end is generally stopped to the standing part with rope yarn or other small stuff. The knot thus formed is exactly the same as the weaver's knot, Fig. 10 (page 65). Fig. 37 shows a method of giving additional security to this knot. This is done by passing the end twice round the back of the loop before putting it under its own part. This knot is very much used by fishermen in bending a line on to a loop of gut. Fig. 38 gives another and somewhat more complicated method of bending a rope on to a loop; B is the standing part, and A the end of the rope to be bent on a loop already formed. Pass the end down through the loop, round over its own part, and through the loop, round the back of it, and through its own bight. When hauled taut, this holds more securely than either of the other methods, but, on the other hand, takes longer to make.

The "Blackwall Hitch," Fig. 39, is a ready way of temporarily securing a rope to a

Fig. 25.

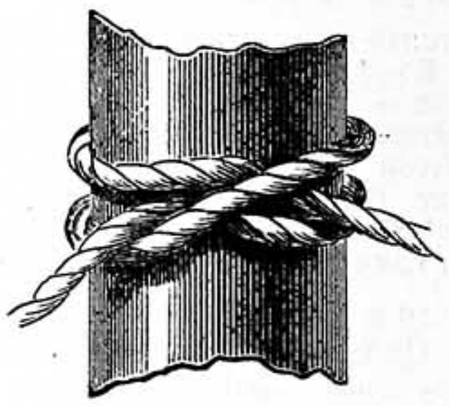


Fig. 26.

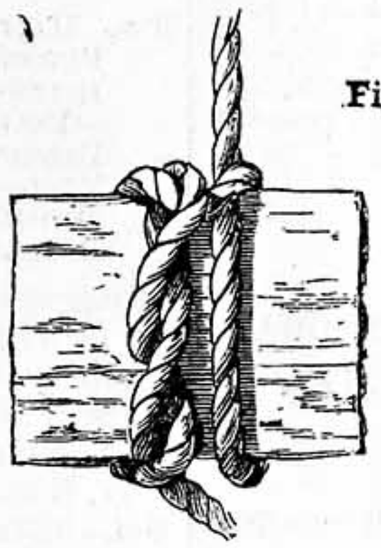


Fig. 28.

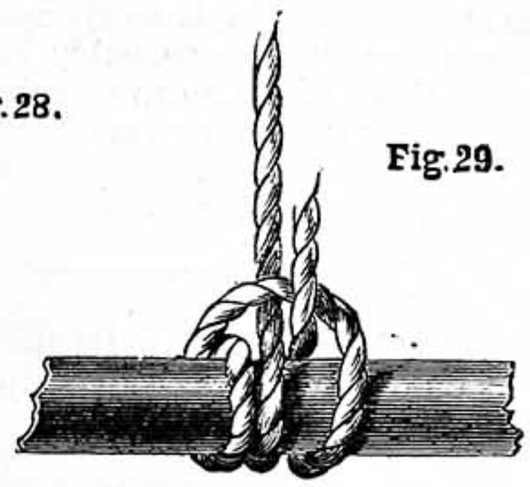


Fig. 29.

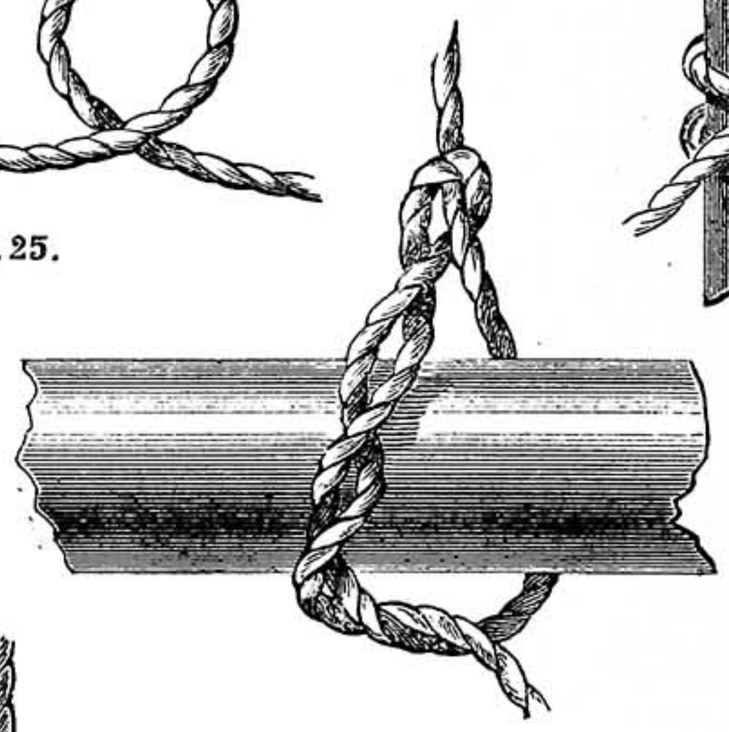


Fig. 27.

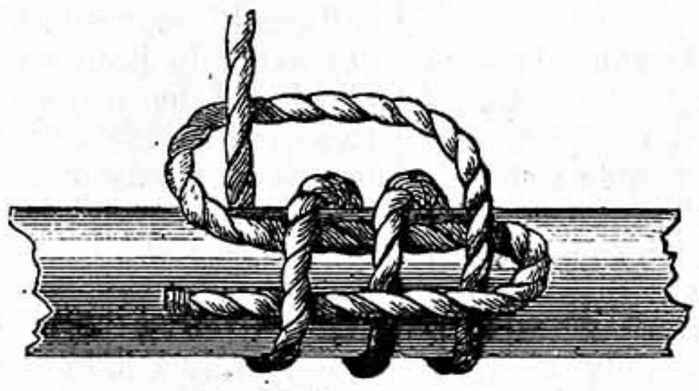


Fig. 32.

Fig. 33.

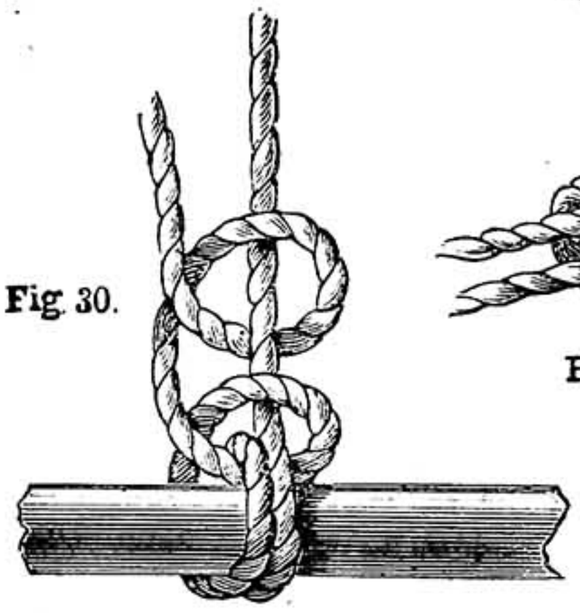


Fig. 30.

Fig. 37.

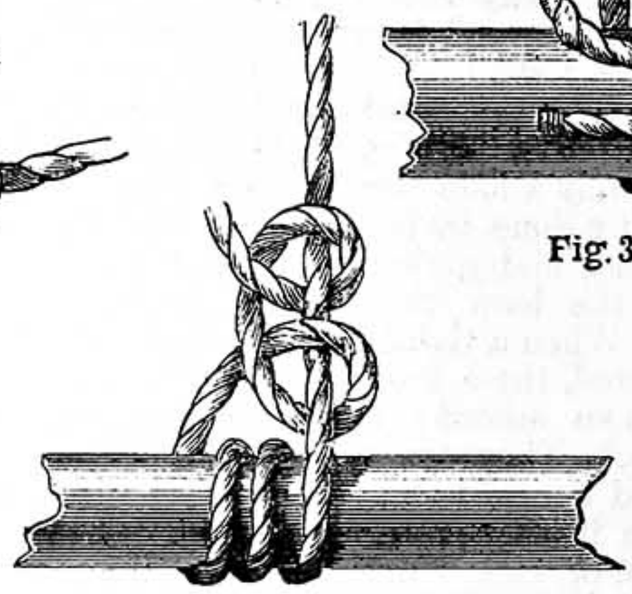


Fig. 31.

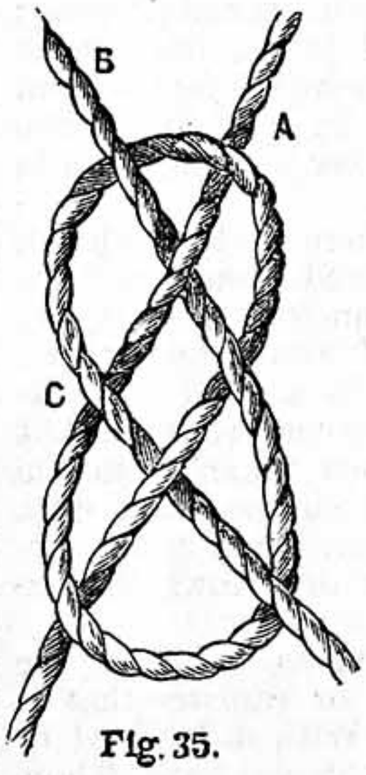


Fig. 35.

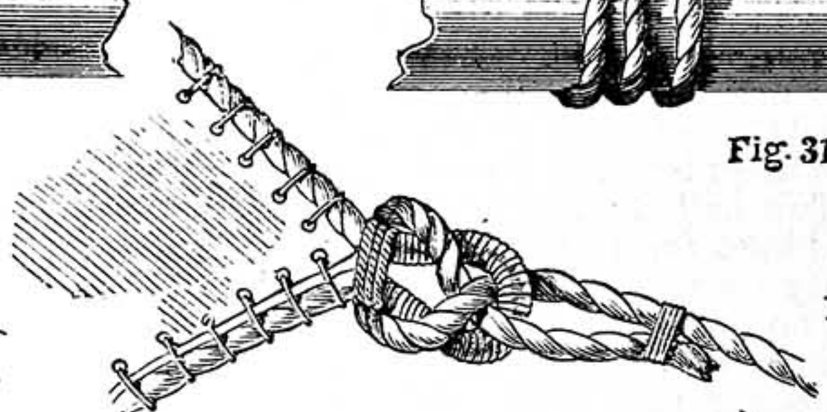


Fig. 36.

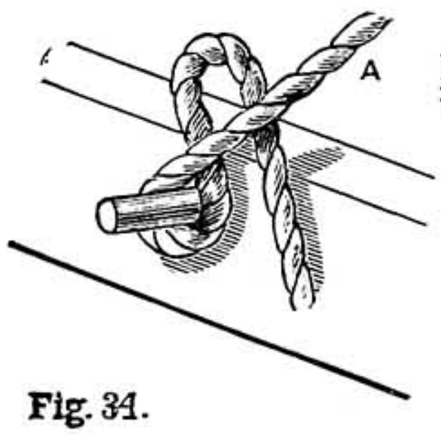


Fig. 34.

Fig. 39.

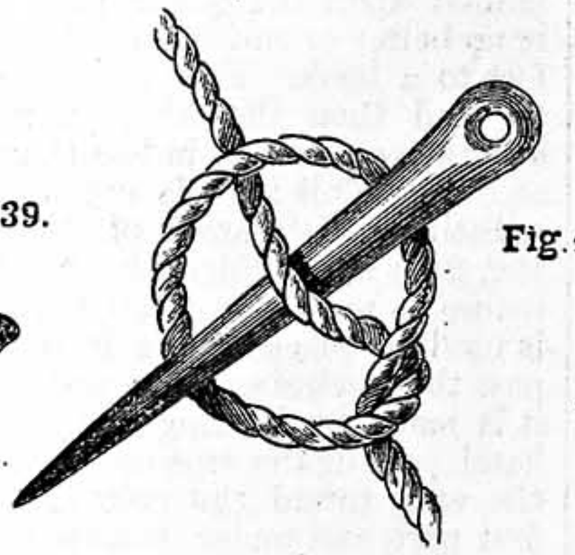


Fig. 40.

Fig. 39A.

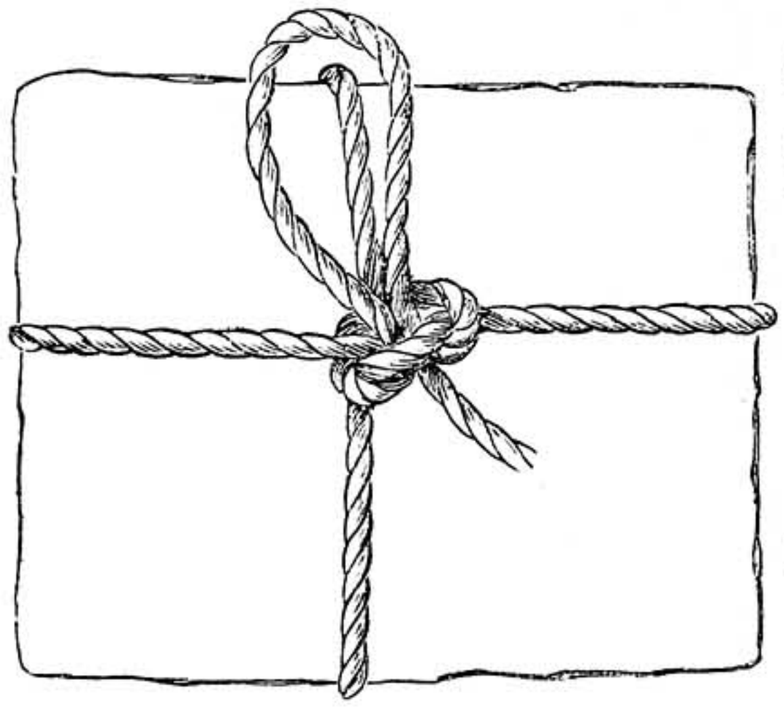


Fig. 42.

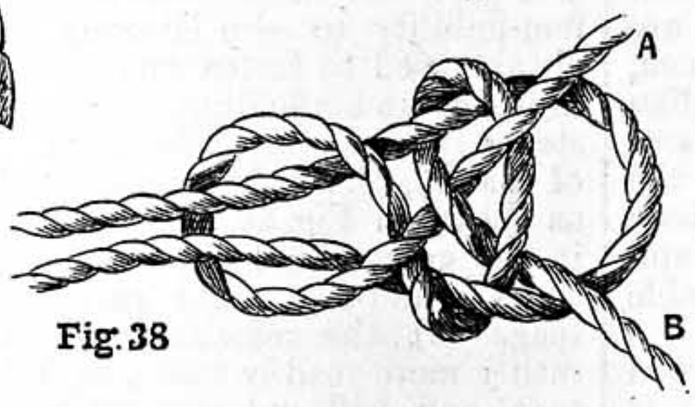


Fig. 38

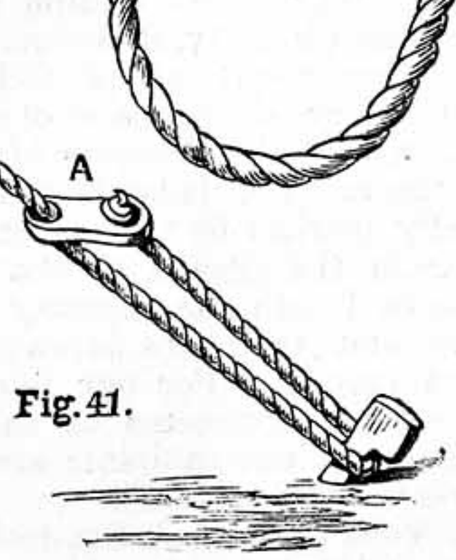


Fig. 41.

Fig. 25.—Two Half Hitches. Fig. 26.—Builder's Knot and Double Ditto. Fig. 27.—Timber Hitch. Fig. 28.—Killick Hitch. Fig. 29.—Magnus Hitch. Fig. 30.—Fisherman's Bend. Fig. 31.—Rolling Hitch. Fig. 32.—Topsail Halliard Bend. Fig. 33.—Racking Hitch. Fig. 34.—Slippery Hitch. Fig. 35.—Carrick Bend. Figs. 36, 37, 38.—Sheet Bends. Fig. 39.—Blackwall Hitch. Fig. 39 A.—Midshipman's Hitch. Fig. 40.—Marlinespike Hitch. Fig. 41.—Regulating Lashing. Fig. 42.—Stationer's Knot.

hook. The way of making it is evident from the illustration. As the standing part when hauled upon jams the end against the back of the hook, it holds much more firmly than would be supposed at first sight.

The "Midshipman's Hitch" is an old-fashioned hitch, used for attaching a tail-block to a rope. A round turn is first made over the standing part, and the end is brought up, passed twice round above the first hitch, and then passed out underneath its own part.

The "Marlinespike Hitch," Fig. 40, is used for getting a purchase on the seizing stuff when serving a rope, so as to leave the turns taut. Make a bight in the seizing stuff, and bring it back over the standing part; pass the marlinespike under the standing part, and over the sides of the bight. This is practically identical with the running knot, Fig. 15 (page 137).

Fig. 41 is a "Regulating Lashing," used when the tension of a rope requires altering from time to time. Tent ropes are secured this way, as they require easing in wet weather, and tightening in dry. This is readily effected by slipping the piece of wood A upwards or downwards along the cord, the friction of the cord against the sides of the hole fixing it sufficiently.

The "Stationers' Knot," Fig. 42, is very handy for tieing up a parcel, as it can be made very rapidly, and undone with great ease. Make a running noose at the end of a piece of twine, and bring it to the centre of the parcel; take the twine round the parcel again at right angles, round the noose, and making a bight, slip it under, as shown in the figure. A pull at the end releases the knot instantly, as will be found on making the experiment.

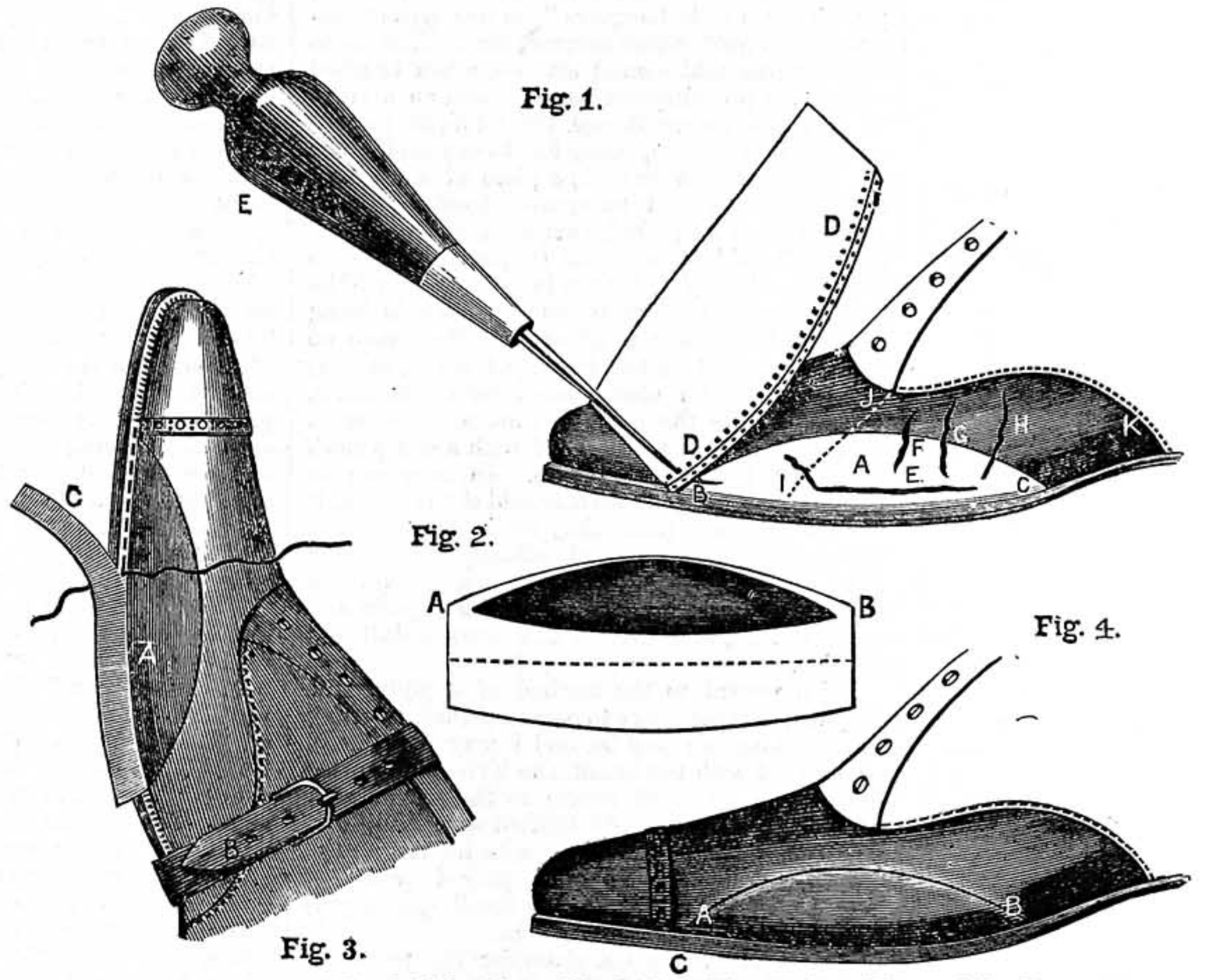


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 1.—Repairing Worn or Cracked Leather with Patch. Fig. 2.—New Piece of Leather. Fig. 3.—Mode of tucking Patch into Crevice. Fig. 4.—Mode of sewing of Patch.

BOOT AND SHOE REPAIRING.

BY WILLIAM GREENFIELD.

PATCHING.

HOW TO CLOSE IN A PATCH, WITH THE SEAM INSIDE, AND THE WAY TO FASTEN IT DOWN TO THE SOLE.

Now it often happens that when a pair of boots or shoes want soling and heeling (and sometimes before), the uppers want some repairing, such as stitching or patching. I shall, therefore, in this and the following paper give some of the principal methods of repairing such defects, with the way also of fastening such patches as need it down to the sole.

If the boot wants a patch, and does not need soling, it can be fastened down to the sole by sewing, as I shall soon describe; but if the boot has to be soled (and it is not handsewn), the sole (or welt, as the underneath sole is termed in machine-sewn) can be prised from the upper as far as the patch is coming to, and the patch tucked under, as the original leather is; and when it is smooth, with no foulness, the under sole can be tacked down with a few small tacks, to secure it till the sole is put on, when a few longer rivets (say, every other one at this part) than those you are using to nail the sole on with will make it as solid as it was at first.

One of the neatest and solidest ways to put in a patch is to close it in. This is done by cutting away the whole of the worn or cracked part of the old leather, as shown at A, Fig. 1. The cut should not have more curve than is possible, for the straighter the cut (that is, from B to C), the easier the piece will be to sew in. In cutting out the piece, be careful not to cut the lining (for by doing so, you put an unnecessary strain on the piece, as then it has no protection from the weight of the body in wear), and at the bottom cut it away right close to the sole. Now take the piece you cut out, and lay it on a piece of new leather of good quality (if the old leather is calf, use calf again, or if it is horse, krup, or porpoise, use calf, but as near the substance as possible; for any other leather it should match, such as kid, patent, etc.), and cut the new piece full large to it, as shown by Fig. 2, of which it will need to be the full size, if it is to be tucked under; but if it is to be sewn down, it will only want to be as large as the dotted line. It will be noticed here that the new piece has not quite so much curve as the old. This is done to give a fulness to the piece equal to what the foot has made in the old leather. The cut from A to B must be even and smooth, and, on the wrong side, holes must be made, as D, D (Fig. 1). This is done by placing it face side down on a board, and about $\frac{1}{16}$th from the edge, make a hole with a closing awl, E (Fig. 1), letting the point come out in the edge of the piece, about four-fifths of the way through, or really as near the face as possible without going through. This you continue the whole way across, putting about fourteen stitches to the inch.

It can now be closed to the boot, first slightly wetting the edge of the old leather. Do not start to sew at quite the end of the new piece, or, when turned over, it will be deficient at the corner. The old leather must not be split, but the awl put right through, and near the edge, so as not to make a hard seam.

For calf or any stout leather, the thread (wax-end) will have to be made with three cords of fine flax, and have bristles on each end. The way to make threads I shall explain in due course. For kid, or any light leather, twist, or stoutish black-thread, will do; a tapered end to either of these is easily made by untwisting them for about an inch and a half, scraping them gently between the thumb and a blunt knife. Then wet or wax them, and twist them back, holding each one separately in the left hand about four inches down, and twist the end on the right knee with the right hand, not too hard, as you may twist off the fine taper that is wanted on to receive the bristle.

In stitching the patch (in fact, all stitching or sewing), each stitch should have the same tension put upon it, being, at the same time, very careful not to pull too hard on the stitch that is to lie on the old leather.

When you have sewn the patch right across, wet the edge again, and scrape off the rough edge, rub it down, and turn the patch down to its right side. Put a last inside, and rub the seam down lightly, but well, on the right side. This can be done with the handle of a table knife, or anything hard and smooth.

Should the vamp be cracked in several places, as E, F, G, and H (Fig. 1), then it will be best to put in a new wing. It can be closed in as described above, from I to J, and blind-stabbed from J to K. In a case like this, it is well to have the top edge a little larger all round, to hide the old holes, and it must be skived a little thinner at this part, about a $\frac{1}{4}$ in. wide, on the wrong side. After you have rubbed this kind of seam down (if it is not a leather that has the grain side out), it will make the seam much neater if it is lightly buffed, or scraped, across from A to B (Fig. 4), and then rubbed down again. In fact, if this sort of patch is put in well, it can scarcely be seen after it has been blacked with blacking.

Previous to sewing the patch down to the sole, the crevice under where the old piece was cut off must be slightly opened with

a chisel, or piece of tapered wood or bone, and the patch tucked in, as shown at A (Fig. 3). This is to enable you, in sewing the patch down, to get the stitches as far back and as much out of sight as possible.

For sewing it to the sole, a sewing awl must be used: it is similar to the closing awl, only a stouter and wider blade.

The thread for ordinary work will need to be about ten cord of No. 9 Patent (price, 2d. per ball), and the awl, although it has to carry the two ends, should only be the substance of one.

The boot will need to be put on the knees, patch side up, and if the piece is on the side shown in either of the above figures, it must lay on the lap, toe from you, as Fig. 3. It must be held very firm on the knees, by means of a strap or stout piece of cord being placed round it, as B (Fig. 3), and passing under the ball of your foot. By this means, it can be held as tight as you please by simply pressing down your toe.

The stitching must be started from A (Fig. 4), the point of the awl being put in on the welt side A, and pushed through to the bottom of the sole, wriggling it a little, that it may find (or make) its own way through at C.

The bristle on the left side is put in first (in all sewing, stitching, or stabbing), and the one on the right side put in underneath it, so that when the stitch is set, it shall be between the thread (on right side) and the patch. This will not only help to lay the stitch back, but, if borne in mind each time, will make the stitches look even and lay flat.

The stitching must, of course, be continued right across to B (Fig. 4), setting about five stitches to the inch, and well tucking the patch under before each stitch is taken.

This done, and the ends cut off, the stitches on the patch side must be rubbed down with the bone, and hammered down lightly with a hammer on the sole side. The surplus of the patch can now be cut off level to the edge of the sole, as shown at C (Fig. 3). The edge can be blacked with ink or blacking, and then rubbed down. A little weak paste on the patch will, if let dry, make it smooth to receive the blacking; and when the whole is blacked and polished, will not only be a neat, but a very solid seam.

OUR GUIDE TO GOOD THINGS.

*** *Patentees, manufacturers, and dealers generally are requested to send prospectuses, bills, etc., of their specialities in tools, machinery, and workshop appliances to the Editor of* WORK *for notice in "Our Guide to Good Things." It is desirable that specimens should be sent for examination and testing in all cases when this can be done without inconvenience. Specimens thus received will be returned at the earliest opportunity. It must be understood that everything which is noticed, is noticed on its merits only, and that, as it is in the power of anyone who has a useful article for sale to obtain mention of it in this department of* WORK *without charge, the notices given partake in no way of the nature of advertisements.*

30.—Smith's Tables and Memoranda for Mechanics, Engineers, etc.

This useful little waistcoat-pocket *vade mecum* for all who are engaged in engineering and the building trades has reached its fifth edition. Its nature and contents may be easily inferred from its title, which, when given in full, runs thus: "Tables, Memoranda, and Calculated Results, for Mechanics, Engineers, Architects, Builders, Surveyors, etc." The matter that it contains was first selected and arranged by Mr. Francis Smith, to meet the daily requirements of men engaged in various mechanical trades some ten years ago; but, in order to keep pace with the advances of science in every direction, the original matter has been carefully revised and enlarged; and a new section has been added, comprising numerous electrical tables, formulæ, etc., which renders the book of special value to electrical engineers. Its price is 1s. 6d., and it is published by Messrs. Crosby Lockwood & Co., 7, Stationers' Hall Court, Ludgate Hill, London, E.C.

31.—Hartley & Co.'s "Kristaline" and New Cold Lacquers.

I have much pleasure in calling the attention of metal workers, photographers, and others to whom such specialities may be useful, to the excellent lacquers prepared and supplied by Messrs. J. E. Hartley & Co., Electricians and Electro-Metallurgists, St. Paul's Square, Birmingham. I received samples of these lacquers, and specimens of metals and photographs treated with them, some time ago; but I have purposely withheld my notice until lapse of time should bear its testimony to their endurance, and, therefore, to their commercial value and utility. The samples of lacquers to which I refer were one of a pyroxilin dip lacquer, called "Kristaline," by Messrs. Hartley & Co., and two others of "Improved Hard Cold Lacquers"—a transparent lacquer and a gold-colour lacquer, for application to metals when cold—small articles, when brushed with these preparations, being placed on a stove to dry, but larger things, too large, in fact, to be placed on a stove, being left to dry cold. The specimens sent were: (1) a piece of steel, part lacquered with cold *transparent* lacquer; (2) a piece of brass lacquered, part with cold *gold*, and part with cold *green bronze* lacquer; (3) a piece of brass, silver-plated, then lacquered with Kristaline on one half of it, and afterwards hung over sulphur fumes to show that they have no tarnishing effect on the lacquered part; and (4) a photograph on opal, coated with Kristaline, which protects the gelatine film, and allows of dust or dirt being wiped off with a damp cloth without injury to the photo. In reference to these, I may say that what is said of the photo. is correct in every particular, while the lacquered metals are as bright and untarnished as they were on the day they reached me, though the *unlacquered* portion of the steel shows specks and spots of rust, and that of the brass is dull and clouded.

With regard to the method of applying the lacquers, it is necessary to point out that, although the cold lacquers may be, and I may say should be, applied with the brush, the Kristaline cannot be brushed on work owing to the pyroxilin it contains. Articles to be treated with it must be *dipped* in it; and if the articles be too large to be dipped, the lacquer must be poured or ladled over them, as in this way a small quantity is sufficient for a very large article.

Messrs. Hartley & Co. claim for the pyroxilin lacquer Kristaline: (1) that it is practically indestructible, as neither gases, acid fumes, nor sea air affect it; (2) that it is waterproof; (3) that it is perfectly transparent; and (4) that it is absolutely colourless. For the cold lacquers they claim: (1) that they can be brushed on cold metal, and on the largest articles, with as much facility as on the smallest; (2) that they have more body than ordinary lacquers; (3) that they leave no brush-marks nor treacly appearance; (4) that they can be applied by others than skilled lacquerers; (5) that as there is no loss from evaporation, one gallon goes as far as two gallons applied with heat: and, as skilled lacquerers are unnecessary, they are far more economical than other lacquers; and (6) that they resist atmospheric action longer than other lacquers. Messrs. Hartley & Co. have submitted the names of leading firms by whom Kristaline is used for lacquering silver and gilt ware, gilt and silvered navy buttons, brass foundry and opal photos.; but these, for obvious reasons, I cannot insert, as the names are mentioned for my own information only. The cold lacquers are used generally by brass founders, chandelier makers, engineers, electricians, bicycle and tricycle makers, steel workers, range makers, and for large work, where lacquers applied with heat are wholly inapplicable. I feel sure that Messrs. Hartley's specialities in lacquers will be appreciated by those to whom they are as yet unknown, and who may be led by this notice to become practically acquainted with them—as fully appreciated, indeed, as they seem to be by all who already use them. Messrs. Hartley & Co. will, I am sure, readily forward to any applicant their price list, which will supply all information with reference to prices, and which contains a few remarks on the pyroxilin lacquer, and describes the method of application at greater length than I can do here.

32—"Geometric Turning Simplified."

Many readers of WORK are, I am inclined to think, enthusiasts in turning, and especially in the higher branches of the art. To such as these, if they are not already acquainted with it, I venture to recommend a thin octavo volume of sixty-two pages, entitled "Geometric Turning Simplified," written by Mr. W. H. Northcott, C.E., the well-known author of "Lathes and Turning," and published by Messrs. E. & F. N. Spon, 125, Strand, W.C. The price of the book I do not know, but information on this point may be easily obtained by application to the publishers, or to the London Lathe and Tool Company, 37, Pomeroy Street, New Cross, London, S.E., by whom all the apparatus to which reference is made in the volume is made. The object of the writer is to show how geometric and ornamental turning may be practised without the need of the expensive lathes and apparatus hitherto thought necessary; and, in fact, the work described is done by the aid of a simple instrument devised by the author, which permits the operator to practise geometric turning of several sorts in any light lathe, however simple its construction, and in any light milling machine. The work is profusely illustrated with engravings of the apparatus employed, and the patterns that may be produced, each pattern, from those of simple form to others most complex and intricate in appearance, being accompanied by a description of the position of the tool, and the manipulation required in order to produce it.

33.—Colours for Marbling Purposes.

The following is taken from "Instructions for the Use of Colours for Marbling Purposes," to produce colours for extra shades and tints, issued for their customers by Messrs. George Royle & Son, Bookbinders' Tool Cutters and Material Dealers, Manufacturers of Marbling Colours, etc., 6, Lovell's Court, Paternoster Row, London, E.C. To produce a single colour from an assortment—yellow and carmine or dark red produce *scarlet* or *vermilion;* carmine and blue, *deep lilac, violet*, and *purple;* carmine, yellow, and black, *rich brown;* yellow and black, *bronze green;* carmine and white, *pinks of any shade;* azure blue, white, and carmine, *deep tones of lilac;* violet and white, *pale lilac* or *lavender;* Chinese blue and white, *pale blue;* Chinese blue, indigo, and yellow orange, *any tone of emerald green;* pale yellow, chrome, and carmine, *amber;* burnt umber and scarlet lake, *red brown;* burnt sienna, shaded with lake, *light brown;* burnt sienna and orange, shaded with white, *salmon.* The following are combinations of colours which harmonise well—scarlet, red, and deep green; light blue and deep red; orange and violet; yellow and blue; black and light green; dark and light blue; carmine and emerald; red, yellow, and blue; orange, black, and light blue; light salmon, dark green, and scarlet; brown, light orange, and purple; dark brown, orange, yellow, and blue; crimson lake, green, yellow, and black; black, green, dark red, and sienna; scarlet, dark green, lavender, and black; azure blue, vermilion, light green, and lilac; sienna, blue, red, and black. In order to give the desired effect for marbling purposes, the finest colours are required. Messrs. Royle & Son supply in 1 lb. tins, at prices ranging from 2s. to 26s. per lb., the following assortment of colours: finest drop carmine lake, second carmine, common lake—light or dark, indigo, yellow, orange, Chinese blue, drop ivory black, indigo black, burnt umber, azure blue, sienna, dark and light green, ultramarine. These will be found quite sufficient for all purposes, the instructions given above being such as will enable any marbler to mix his own shades. THE EDITOR.

SHOP:

A Corner for Those who Want to Talk It.

*** *In consequence of the great pressure upon the "Shop" columns of* Work, *contributors are requested to be brief and concise in all future questions and replies.*

In answering any of the "Questions submitted to Correspondents," or in referring to anything that has appeared in "Shop," writers are requested to refer to the number and page of number of Work *in which the subject under consideration appeared, and to give the heading of the paragraph to which reference is made, and the initials and place of residence, or the nom-de-plume, of the writer by whom the question has been asked or to whom a reply has been already given. Answers cannot be given to questions which do not bear on subjects that fairly come within the scope of the Magazine.*

I.—Letters from Correspondents.

Instruction Classes. — Rev. W. Wade (*St. Peter's Vicarage, Fulham, S.W.*) writes:—"Will you allow me to appeal to one or two of your readers who have a few hours' leisure at their disposal in the week? I am most anxious to start industrial classes for the boys of the children's guild connected with this parish. Unfortunately, the ordinary clerical training does not include instruction in any form of mechanical art, and my own fingers can do little else beyond wielding a pen. However, I hope this poor skill will stand me in good stead now if you will allow these lines to appear in your Journal. I should be most grateful if any gentleman, who could devote an hour or two in the week to the instruction of about a dozen boys (by way of a beginning) in one of the minor arts and crafts—such as wood carving, or the bent iron work now so popular—would communicate with me."

Dry Battery.—J. A. M. (*London, N.W.*) writes to H. E. (*London, N.W.*):—"In reference to your note in Work (No. 111, page 110) on how to make a dry battery, I have correctly and closely followed your instructions, and found them to be a failure. Thinking perhaps the quantities were not sufficient, I afterwards tried double quantities, and, after letting them stand for three or four days, I did not find the slightest result. If you will kindly furnish me with further instructions on this, or tell me of any other method of how to make a dry battery, through Work, you will oblige."

Decoration in Applied Art.—The Secretary of the City and Guilds of London Institute for the Advancement of Technical Education (*Technical College, Finsbury*) writes:—"An important meeting of representative men in the painting trade met recently at the above College, to consider what means could be taken to improve the quality of the workmanship in their trade. The chair was taken by J. D. Crace, Esq. A paper was read by Mr. Wm. Fourniss, Instructor in Decoration in the Applied Art Department of the College. A discussion followed, which resulted in the following resolutions being carried unanimously:—1st, That it is expedient that trade classes for painters should be established for the benefit of the trade. 2nd, That the Guilds of London should be respectfully requested to establish trade classes for painters at the Finsbury Technical College. Some discussion occurred in reference to the question whether or not certificates should be offered and given for proficiency in the painting trade, in which Mr. J. Shaw took part. No resolution, however, was come to in respect to this. Dr. Silvanus P. Thompson, Principal of the College, and J. D. Crace, Esq., chairman of the meeting, gave their entire concurrence with the objects of the meeting."

Mail-Cart Springs.—The Victor Cycle Company write:—"Several of your readers have written us, at various times, respecting springs for mail carts. We have now arranged to supply these as well as wheels."

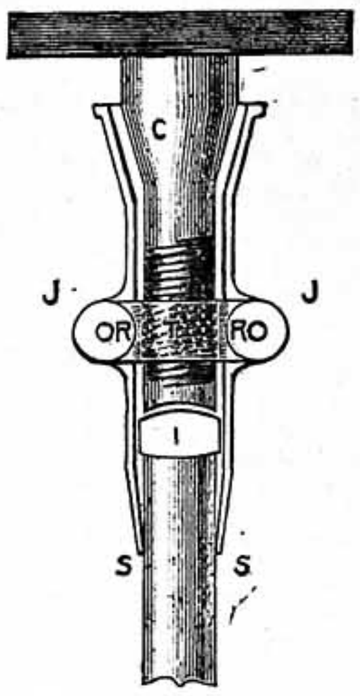
Small Tin Boxes.—A. G. (*Sheffield*) writes:—Mr. A. Truelove's address (see No. 112, page 126) is 111, Carver Street, *not* 14, as stated."

Cold Water on Saws.—A. R. (*Scorrier*) writes:—"In No. 113 of Work, page 139, W. H. R. (*London, N.W.*) writes in reference to trueing circular saws when buckled. A saw may run wild, as W. H. R. terms it, through undue heating, and by freeing the timber from the saw, and letting it run a little while, even if there is no water thrown on it, the saw being properly packed, it will run true again. A saw may run wild through unfair usage, and consequently become buckled; but if the plate is once buckled, throwing cold water on it will not take out the buckle. I have had to do with saws a number of years, but never threw as much as a pint of water on a saw to get it to run true. When I see men throwing water on a saw to try to get it to do its work, I am quite satisfied that there is something wrong. I know it is an old practice, but men in these days should get beyond such a system of working. In Vols. I. and II. of Work, there are several reasons given why saws run as stated by W. H. R.; and I would advise all readers of Work, who have not the above numbers, to get them. I think the price of each Vol., ready bound, is 7s. 6d."

Patents.—A. B. L. (*Newbury*) writes:—"I wish some one of your readers, conversant with the Patent Office, Patent Agents, and Patent Law, would consider the subject of a concise treatise to throw the fullest light upon all appertaining to Patents."

II.—Questions Answered by Editor and Staff.

Billiard-Cue Tips.—T. R. (*Belford*).—The tips of billiard cues are pressed in by a screw working in a socket which holds on to the cue the tighter the screw is applied. I send a rough sketch, useful to cue-makers; but most of these workmen have their own devices to ensure a close-down fit of rubber to the wood. The diagram is a sectional elevation sketch. A cross-handled key or screw-pin with a coned shoulder (C) fits into an expanding double-jawed gripper (J, J), which is formed of two blades of iron or brass slightly segmental, to fit the screw-pin and end of cue. These blades are jointed to a solid ring by lugs hinged to projections from the ring. The middle hole in the ring is threaded to take a screw on the pin (T). The extremities of the blades (S, S) furthest from the cores grip the cue by the action of the cone shoulder forcing open the opposite ends of the blades, acting as a vice on the cue, holding tighter the more the rubber is pressed down by screwing the pin on to it at I.—J. C. K.



Billiard-Cue Tip.

Flower-Box for Bay Window.—R. G. (*Streatham Hill*).—A very handsome-looking flower-box may be made for your bay window in the manner I am about to describe, and which I hope you will understand by the rough sketches given. Instead of making your flower-box in one piece as you suggest, and putting the tiles in the front of it, you will do much better to have the tiles in a separate front; it can then be lifted away from the sill when required, or the boxes can be removed for gardening operations if necessary. In Fig. 1 you have a sketch of the arrangement when in position. The front board containing the tiles should be about 2 in. back from the edge of the window-sill, and three boxes made to fit the spaces between it and the front and side windows. Fig. 2 shows a section through the front and the box. To get at the exact sizes of the wood, you must first purchase your tiles and then make the fittings to suit them; but, for the sake of example, I will suppose that they are 6 in. square: the backboard on which they are laid would thus be 8 in. wide, and would have a batten 1 in. wide, and just the thickness of your tiles, nailed along the top and bottom edges and down the ends of each of the three pieces of the front; the tiles are then laid in their place, and a 1½ in. moulding, of whichever pattern pleases you best, mitred round them. The ends of these front panels are now bevelled to fit each other, and held together by a pair of backfold engines at each joint; these hinges admit of the ends being folded flat to the front when the panelling is removed from its position, as, if rigid, it would be awkward to handle. To steady it when in its place, a hook and eye at each end may be used, the hook being on the inner side, and the eye either in the wall or on the woodwork of the window, whichever answers best. A piece of ⅝ in. wood runs along the bottom of the panelling, and a similar piece on the top, which is bevelled towards the front to throw off the water. Yellow deal should be used both for the front and for the boxes; the moulding you can buy ready for use at almost any timber yard. I think a few minutes' study of Fig. 2 will make the foregoing instructions clear to you, and Fig. 3 will show how the ends are meant to be hinged. The boxes should be made of ⅞ in. wood, and may be lined with zinc if preferred; they will, however, last a good many years without lining, and a pipe should be run from near the bottom of each out over the window-sill to carry off the drainage. Another plan is to dispense with boxes altogether. Make your front panels as described, and when in position put your flowers in pots behind them; this is a very good arrangement, as it lessens the labour involved in carpentering, and also admits of changing the plants whenever required, thus enabling you always to have a good show of flowers at your window. A number of minor details and modifications may suggest themselves to you as you proceed with the work, and if you find any difficulty write again. That drawing attached to your letter was of the utmost service in giving me an idea of exactly what you wanted, and I wish all querists would adopt a similar method (where possible) when writing to Work for information; it would so simplify the task of answering, and tend to their getting the requisite replies. I may just add that if you still think of making three boxes, and not using a front as described, the details given for the panelling of the front will equally apply to the panelling of the boxes.—G. le B.

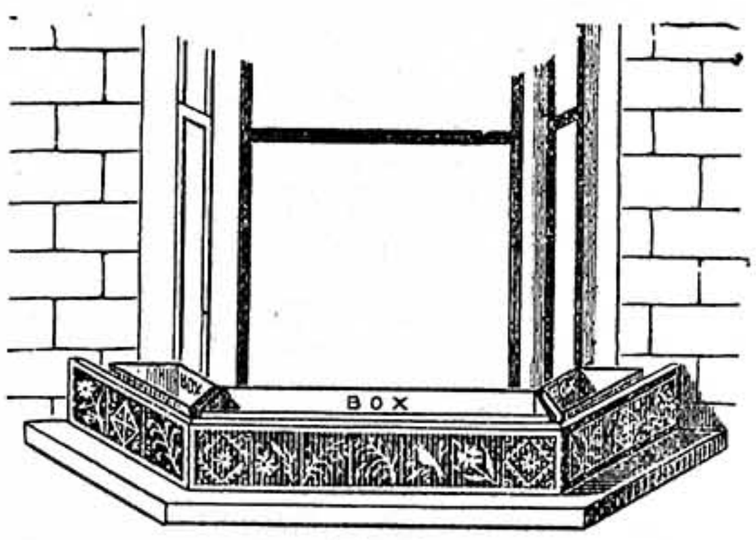


Fig. 1.

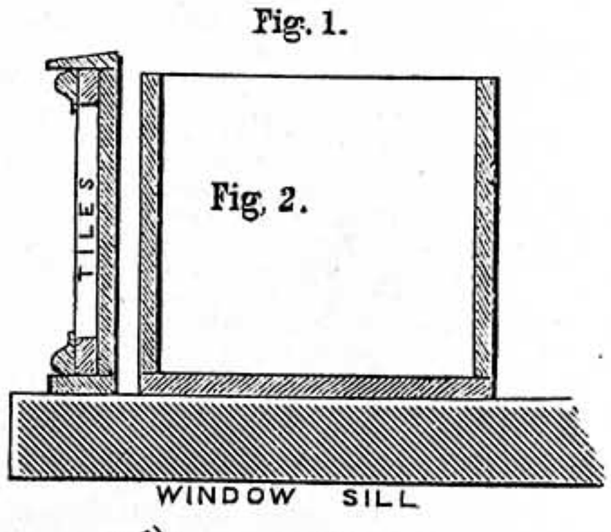


Fig. 2.

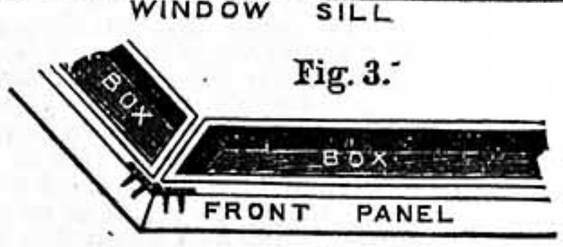


Fig. 3.

Flower-Box.

Electric Belt.—W. W. J. (*Great Broughton*).—Any size of wire may be used to connect the discs on the belt described on page 827, Vol. II. You may use brass wire uncovered if you cannot get silk-covered copper wire, or you may use uncovered copper wire. Fine wire braid is best, because more flexible than any other. By watching the replies to others in "Shop," you may learn much more about these belts.—G. E. B.

French Polishing.—V. S. (*Sheffield*).—By the time this appears in print you will no doubt have noticed that a series of articles on French Polishing has commenced in the present volume of Work—the first in No. 105, the second in No. 108—to be followed by others. These will, I feel certain, suit your purpose better than any book I can recommend. As regards your failures to obtain a level body of polish, perhaps you work your rubber too straight (this will get the work into ridges), instead of circular, as shown on p. 54, No. 108, Vol. III. of Work. A good saying of an old master of mine was, "Keep round the outside edges and well into the corners; the middle will take care of itself." This rule applies well in the case of narrow slips and panels; on a larger surface it will be necessary not to trust too much to the middle taking care of itself. Again, the shape and pliability of the polish rubber have much to do with success. You cannot get into sharp corners and close to the edges of sunk panels, etc., with a round or badly shaped hard rubber. The best shape is one resembling a pear cut in half. It will assist you in keeping the surface level if, when bodying up, you give the work a few slight taps occasionally with a little fine pumice powder tied up in a piece of rag. Use this with caution at first; many amateurs court failure by a too liberal use, thereby breaking up instead of levelling the surface.—Lifeboat.

Stain for Cabinet.—J. W. (*Tranmere*).—Fretwork is at all times difficult; it requires tact that can only be got by practice. This difficulty is rendered doubly so by attempting to do it with new rubbers. If you practised first on some flat surfaces, it would place you in possession of rubbers which would save you a lot of trouble, besides giving you such an insight into the *modus operandi* that will enable you to do your cabinet more satisfactorily to yourself. If it is light oak and you wish it simply darkened, this can be best accomplished by shutting it up in an air-tight box or cupboard, on the bottom of which has been placed an open dish of liquid ammonia; or if required darker, or walnut colour, it may be wiped over with a stain made as follows: One pennyworth of nut galls, ½ lb. American potash, 1 pennyworth of vandyke brown; 1 gallon of water; or a little vandyke brown and brown umber, and just a dash of black, made into a thin paste with liquid ammonia, and then thinned down with water till you have the required shade. But do not apply any liquid stain swimmingly; the less they are used on fretwork the better, owing to their tendency to cause it to twist. It is best to use a small sash tool to enable you to get into the interstices, which must not be omitted. Particulars of "How to French Polish" and "The Rubber in French Polishing" have appeared in Nos. 105 and 108, which please read.—Lifeboat.

Horse-Power.—F. C. B. (*Lambeth*).—One horse-power is the unit employed for expressing the rate of working a machine, and is equal to 33,000 foot-pounds per minute. This may be explained thus: If I lift a weight of 10 lbs. to a height of 3 ft., I do a certain amount of work; if I lift 20 lbs. through 3 ft., or 10 lbs. through 6 ft., I do twice that amount of

work, and so on. To measure this work, we take the amount of work done in raising 1 lb. to a height of 1 ft. as unit, and call this a "foot-pound." Thus, if I lift 15 lbs. to a height of 4 ft., I do 15 × 4—*i.e.*, 60 —foot-pounds of work: if a carpenter urges his plane forward through 3 ft. with a force of 11 lbs., he does 33 foot-pounds of work; or if a weight of 360 lbs. be raised through a height of 150 ft., the work done is 54,000 foot-pounds. But when we wish to measure the work done by powerful engines, etc., the figures become so large as to be confusing, and so another unit is adopted in the same way that a pound is used as the unit for weight, and we say an article weighs so many "pounds"; but when thousands of pounds are to be used, another unit, a ton, is adopted, and we speak of so many "tons." Watt estimated that an average horse could, in one minute, do an amount of work equivalent to raising 33,000 lbs. through 1 ft., and this amount of work—viz, 33,000 foot-pounds—has been adopted as the unit of work for engines, machines, etc., and is called a "horse-power" (H.P.). A 4 H.P. engine, therefore, is one that can do four times this amount of work, or, in other words, can do 132,000 (*i.e.*, 33,000 × 4) foot-pounds of work per minute. The rate at which a man does work per minute is taken at 3,300 foot-pounds, or one-tenth that of a horse.—F. B. C.

Electric Belt.—J. L. D. (*Downham Market*).—In making the belt as advised to G. F. R. (page 827, Vol. II. of WORK), have a metal clasp at the ends, such as that on boys' and cricketers' belts. Solder a fine insulated wire to, say, the left-hand half of the clasp, and to the first disc of copper or of zinc on the belt; if to the copper, then connect the opposite disc of zinc to the next disc of copper, and so on throughout the belt. This will leave a disc of zinc unconnected at the right-hand end of belt; connect this to the other half of the clasp. When the belt is off there will not be any action, but when it is fastened around the body by the metal clasp the circuit will be completed through the clasp, and the battery will be in action.—G. E. B.

Manchester Motor.—W. J. S. (*Glasgow*).—As you got the castings for this motor and the instructions for winding it from Mr. Bottone, I think you ought to have made complaint direct to him at first, instead of writing to us. You must have misunderstood Mr. Bottone's instructions altogether. I do not think he could have ever led you to expect a ¼ horse-power from your motor when worked with current from twelve quart cells. You could not reasonably expect more than $\frac{1}{38}$ horse-power from the motor with such small battery power. It ought to move, however, with the current from this number of cells; and I suspect the cause of its failure to lie with your own workmanship. You have either wound it badly and caused the coils to leak, or connected the coils wrongly to the terminals, or got the brushes in a bad position. Try a different angle for the brushes until you get the best effects. Alter the connections. You may try the coils in parallel, but I do not think you will get over the difficulty in this way. Test the winding for insulation, as directed on page 676, Vol. II. of WORK. If you find this imperfect, you will have to unwind the wire, find out the faults, insulate the bare spots afresh, and re-wind the machine. When you have thoroughly overhauled the machine and tested every part, connect up three of your quart cells to the terminals with two short lengths of No. 16 wire: see that all connections are clean. Then move around the rocker until your brushes are at the proper angle, and I will warrant you will get the armature to move, if *you* have properly done your part. I suspect that you can find somewhere among your instructions from Mr. Bottone a letter telling you to use a battery of thirty-five quart cells to fully develop ¼ horse-power with the motor he instructed you to make, since it will take quite this number of cells to send 5 ampères of current through the machine; and this will be needed to develop ¼ horse-power after providing for waste in the machine.—G. E. B.

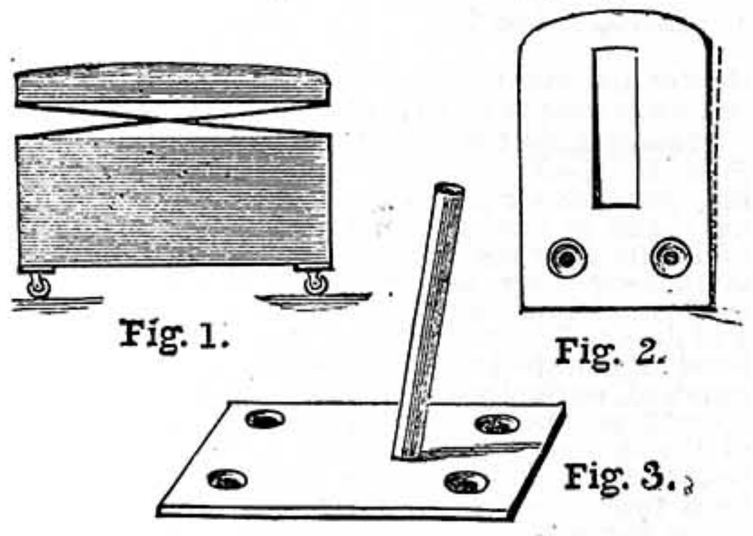
Photo Frames.—H. H. (*Basingstoke*).—Frames are sometimes fitted with glass and sometimes not. Those of small size, say up to 8½ in. by 6½ in., are frequently without; larger sizes are usually provided with glass. The only purpose it serves is to lessen the risk of breaking the negatives, which increases with the size of the plate. Stout plate glass is commonly used.—D.

Photographing.—A. S. W. (*No Address*).—Carefully read any elementary handbook on the subject. One by Capt. Abney is very reliable. The chemicals may be purchased at any photographic material dealer's. Chemists and druggists can generally supply all that are required.—D.

Camera Bellows.—G. P. (*Elgin*).—The buckram, as sample, will do, but rather thinner would be better, as the paste and American cloth add considerably to the substance. Set off the size at each end, and draw lines from the corners at the broad end to those of the narrow end, and fold accordingly; if this is properly done the result will be straight. Make a pattern in brown paper by folding a sheet in a conically shaped tube of the right dimensions, and joined at the corners; you will then at once see how to shape the material to the best advantage. If the folds are equal the result cannot fail to be right.—D.

Lantern Slides.—J. A. (*Leeds*).—The enclosed specimen seems to be all that the introducer claims for it. With regard to non-liability to breakage, there is no doubt it is much less fragile than glass. The specimen sent was, however, broken, with a clear, sharp fracture; but anything that will stand the test of postage without protection is of necessity particularly tough. The ordinary exigencies of lantern exhibitions would probably be insufficient to cause damage. The very thinness would be apt to give rise to difficulties in passing them through the lantern, unless mounted in some way to add to their substance, but the cardboard mounts may supply this.—D.

Ottoman Couch Lid.—J. (*Portsmouth*).—*Re* the hanging of couch lid, so that it opens either way. It might easily be effected by webbing it on the underside of the lid in the same manner that a clothes-horse is webbed. Of course, a better class of webbing should be used: about the same as is used on Butler's tray stands. It should be tacked firmly on the edge of the box, and then carried across the box to the other edge, and tacked firmly to the underside of the lid; now tack another piece on the opposite edge of the box (and in such a position that it will come close to the side of the first piece), and carry it across the box to the underside of lid; the other end of the lid must be done the same, and if done properly the box will open from either side. Of course, the webbing must be strong, and firmly fastened to box and lid with at least ¾ in. tacks, put in neatly, so as not to split or be unsightly. Perhaps Fig. 1 will explain itself. Another way would be to get four brass plates made with slots in them, and four plates with pins fixed in them: these should take the form of Figs. 2 and 3. Supposing the box



Ottoman Couch Lid. Fig. 1.—End of Ottoman Couch with Lid raised (out of Position), to show Method of attaching Webbing. Fig. 2.—Brass Plate. Fig. 3.—Plate and Pin.

to be made of ¾ in. stuff, the illustrations are full size. The plates (Fig. 2) should be screwed down to the edge of the box, allowing the slot to project to the inside, about 3 in. from each end; the pins (Fig. 3) on the lid should be screwed down in such a position that the lid will come level all round. The best way to get the right place to put them would be to place a tack, point upward, on the slot plates, exactly where we want the pin to come, and then placing the lid on carefully. A little pressure will cause the tacks to stick, and we shall know where to put the plates; however careful we may be, we may expect to have to move them before we get them exactly right; for this reason, only one screw should be put in each plate, till we are sure the plates are in the right position. If a tape is securely fixed to keep the lid from going right back (in the centre), it will be all right. Choose which way the lid is opened.—H. H.

Electric Belt.—T. P. J. (*Manchester*).—When I penned the reply to G. F. R. (*Woolwich*), which is printed on page 827, Vol. II. of WORK, I thought I had rendered all things as clear as could be desired in the small compass of a reply in "Shop," and I think G. F. R. must have been satisfied, for he has not complained. One cannot go into all the details in a reply, or it would take up too much space. In your letter you have shown that you fully understood the instructions, as you yourself supply the details omitted. I hope others will do the same. Yes, the silk-covered wire to connect the discs are "to be cut into several lengths according to the number of discs, and connected by soldering from one disc to another, and so finish off at the extreme end ones, where it is then complete as an electric belt." The soldering can be easily done with an ordinary soldering iron or soldering bolt when the discs are on the belt. Or you may solder the connections, and work them in as you proceed in sewing the discs to the belt. Take a zinc disc, for instance, to form the extreme disc at the left-hand end of the belt. Clean it bright with emery-cloth, drop a mere trace of spirits of salts on the centre of the inside; bare and clean one end of a length of silk-covered wire; dip this into killed spirits, then solder it to the prepared spot on the zinc. Sew on the zinc disc, pass the insulated wire out through a small hole made in the belt, and solder its other end to the inside of the copper disc to form one of the next pair; then sew this on the belt. The two discs to form one pair (outside and inside the belt, exactly opposite to each other) will not be thus connected, as the current will pass from one to the other through the thin flannel to which they are sewn when this is moistened with the sour sweat coming from the body, or moistened with vinegar. I may mention here that the copper discs will be more effective and lasting if they are thickly electro-plated with silver. Now, when the whole number of discs have been connected as above directed, you will find one zinc left out at one end of the belt, and one copper at the other. Connect the copper to one part of a metal clasp sewn on the belt at one end, and the zinc to the other part of a metal clasp sewn on the belt at the other end. The clasp may be made of any metal you may choose, and the two parts may be connected by a short piece of chain if you wish to let out or take in the belt; but they must be thus connected by a metal connector of some sort to complete the circuit around the body. When the discs are all sewn on, you may cover the whole with thin flannel, and thus form a belt of triple thickness. The belt should be worn next the skin. Whether a current of electricity thus continuously passing around a person's loins has any beneficial effect on the liver and kidneys, or not, is more than I can say. A belt made as I have directed in No. 103, page 827, Vol. II. of WORK, will generate a current of electricity when the belt is moistened between the discs with sour sweat or with vinegar. This is all I can undertake to prove.—G. E. B.

French Medical Coil.—F. G. B. (*No Address*).—The coil of which you send a sketch is a compact form of medical coil, enclosed in a box together with a Marié Davy battery of two cells, a receptacle for bottles, and another for the various electrodes employed with medical coils. The battery cells are fitted with carbon plates at the bottoms; over these is spread a layer of sulphate of mercury. The cells are filled with water, and the zinc plates lie in a horizontal position just beneath the surface of the water. At the right-hand side of the cell, next the letter N, the zinc plate rests on a platinum lug; and this is connected with the bushed hole marked N. This is the positive plate of the battery and its negative pole. The carbon plate at the bottom of this cell is connected to a platinum lug in the next cell, on which one end of the next zinc plate rests. The carbon of this cell is connected to the bushed hole marked P; and this is the positive pole of the battery. To connect this with the coil, make some brass plugs to fit in the bushed holes, and attach flexible connecting cords or lengths of insulated wire to the plugs. This done, connect the battery by means of the plugs and wires to the terminals of the primary coil (one going to the break pillar), and the coil should then work. The intensity of the current is regulated by sliding on or off the two outside coils; when these are on, and the wires are attached to the bushed holes in the coil ends, the maximum effects are experienced. In this way you may get the powers from either one or two coils. The handles are made of wood to insulate the medical practitioner from the current whilst employing the selected electrode on his patient.—G. E. B.

Hot-Air Engine.—R. S. H. (*Calne*).—A friend of mine has a hot-air engine of two man-power at the brake; it indicates five man-power, so it uses up three man-power to work itself. It has a piston 9½ in. in diameter, stroke 7¼ in; its fly-wheel is about 3 ft. diameter, and the centre of shaft about 5 ft. high. This will show you what a bulky affair it is; also it requires water to cool the cylinder. You must have a tank, or a continuous current through the casing, to keep it cool. A hot-air engine advertised as two man-power would very likely have a 7 in. piston, and give out one man. They are very easy to manage, very convenient, except that they take so much room, soon started, say, in fifteen minutes, but they are expensive. Messrs. Bailey, of Salford; Hayward, Tyler & Co., Queen Victoria Street, London; and Messrs. A. E. and H. Robinson, of Albert Square, Manchester, make hot-air engines. —F. A. M.

Repairing Accumulators.—W. J. D. (*Manchester*).—If the plates are all in good condition, and the cells are tolerably free from patches of paste from the plates, you may remove the old acid, and re-charge the cells in the following manner: First charge the plates up to their full capacity, to prevent injury to the paste by air action. Then draw off all the acid by means of a syphon made out of 3 ft. or more of ⅜ in. or ½ in. vulcanised indiarubber tube. Fill the tube with dilute acid, stop both ends with the thumbs of each hand, lower one hand below the surface of the liquid in the cell, and hold the end of the pipe there whilst both thumbs are withdrawn at the same instant. When the syphon has started drawing the acid, lower the inner end to near the bottom of the cell, so as to draw off all the old acid. This done, fill it up at once with the new acid, and thus finish each cell before emptying another. If the plates need repair, the whole set must be lifted out of the acid for the purpose, and replaced when repaired in the fresh acid. We cannot oblige by answering letters "next week," as next week's paper is made up and in the press when letters arrive.—G. E. B.

Medical Batteries.—DERNAX.—The following are makers of electro-medical apparatus. From them you may select one to suit your requirements. Messrs. Woodhouse & Rawson, 88, Queen Victoria Street, London, E.C.; Messrs. O. Berend & Co., 61, Fore Street, London, E.C.; Messrs. Eidsforth & Mudford, Jackson Road, Holloway, London, N.; Messrs. G. Cohen & Co., 60A, Market Street, Manchester; Messrs. Salt & Sons, 21, Bull Street, Birmingham. Batteries are made and sold by Messrs. Cathcart & Peto, 57B, Hatton Garden, London, E.C.; F. C. Allsop & Co., 165, Queen Victoria Street, London, E.C.; and Messrs. T. Gent & Co., Faraday Works, Leicester.—G. E. B.

Rolling Curtain for Optical Lantern.—NOVICE wishes to know how the wooden frame for the rolling curtain is attached to the stage plate. It will generally be found sufficient if the frames simply slide stiffly on to the supporting pillars of the slide stage, as it will then be an easy matter to remove them if necessary at any time. If you particularly wish them to be a fixture, you can drill a couple of holes through the stage plates in such a position that a short screw can be driven into the side of each frame from the back, as shown at A in the accompanying diagram. Care must, however, be taken to see that the screws do not interfere with the sliding of the curtain shutter along the grooves in the frame. In order to attach your portrait combination to the draw-tube of the lantern front, you will require to braze

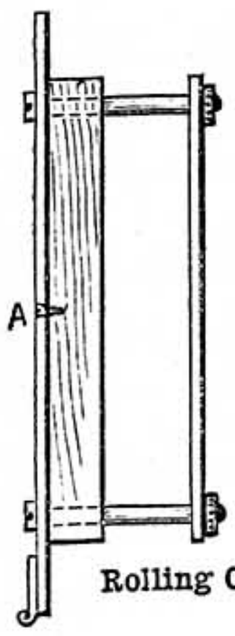


Fig. 1.

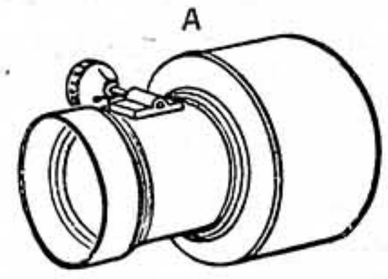
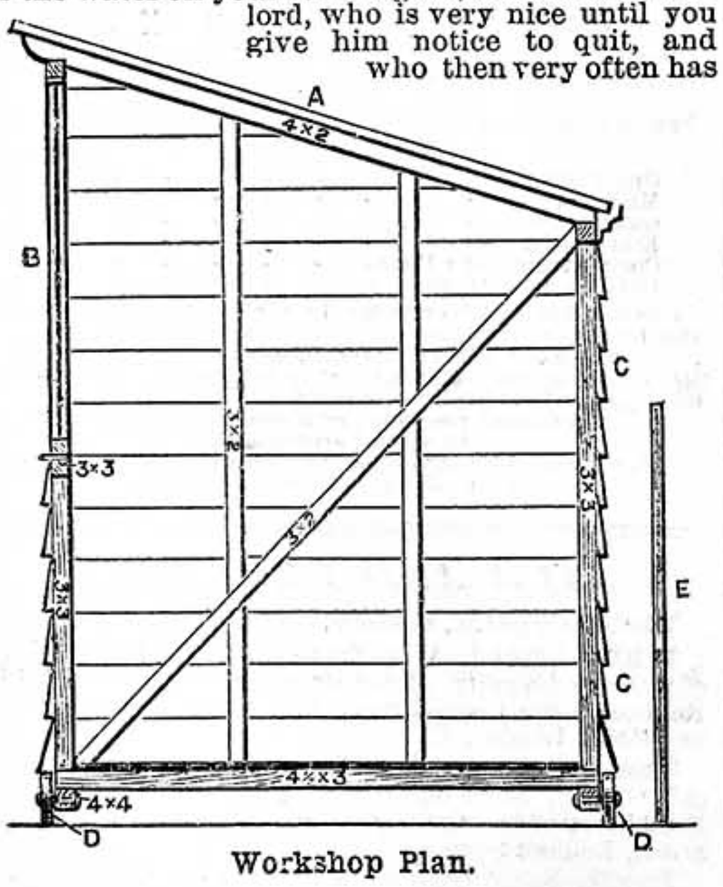


Fig. 2.

Rolling Curtain for Optical Lantern.

an ordinary O.G. brass flange (to be obtained from any lantern manufacturer) on to the end of the draw-tube, as shown at A in Fig. 2. The opening in the flange must, of course, be furnished with a suitable thread to take the thread of the lens mount; or, better still, the thread can possibly be removed from the present flange of the lens, and then soldered into the flange of the lantern front. If you do not possess a lathe, you could possibly get a job like this executed by Mr. Platt, Birkbeck Works, Kingsland, N.E.; or Messrs. O. Noakes, of Nelson Street, Greenwich.—C. A. P.

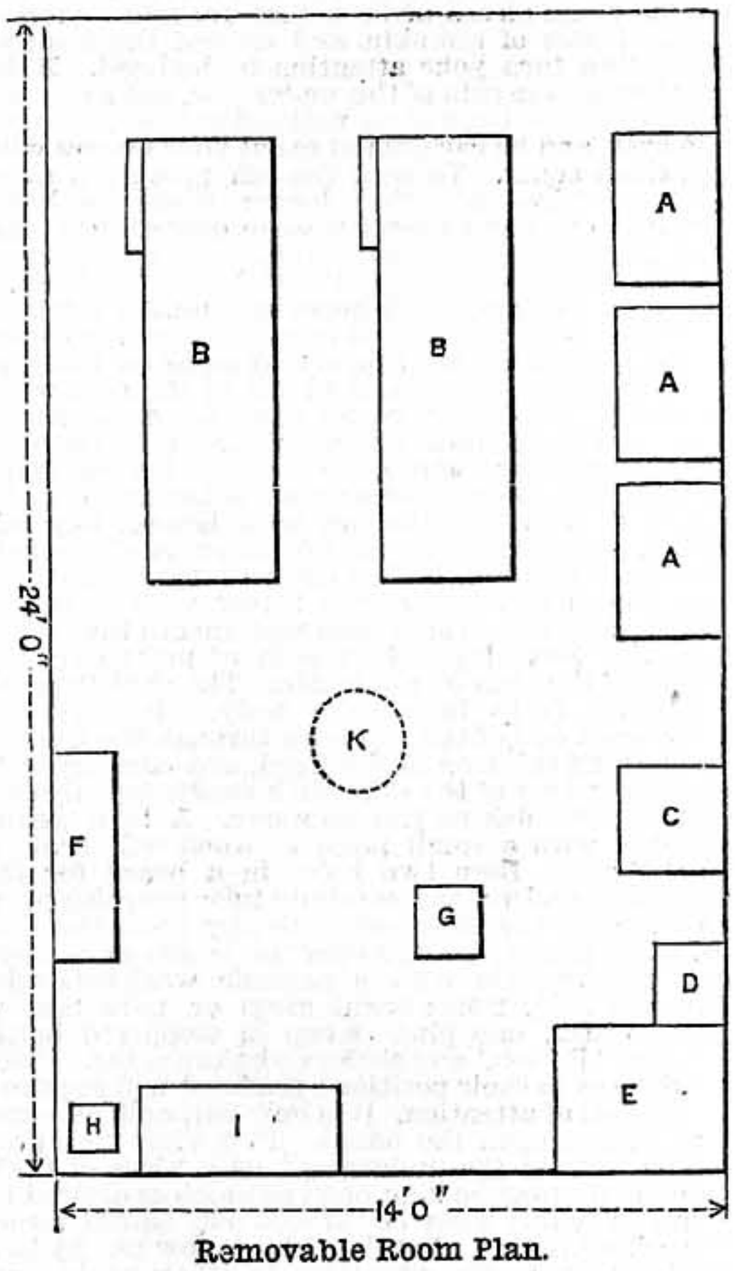
Workshop Plan.—N. M. (*Norwich*).—If, as you state, you wish to be able to remove your workshop in the event of moving, I certainly should not utilise the garden palings for part of the height, and most decidedly not let uprights into the ground. There are several things to be considered in matters of this kind; the first and most important for the time being is that very nice person "the next-door neighbour," who has a knack of determining for his own satisfaction the proper angle of light he is entitled to. Not but what he would have a very just cause for complaint if you did as your sketch shows you are inclined to do—viz., make his garden the receptacle for the water off your roof. Again, there is the landlord, who is very nice until you give him notice to quit, and who then very often has



Workshop Plan.

the same propensity for considering his own interests, and for keeping on his property anything to which he has the least claim, or may be beneficial to him, and causing to be taken away anything that may be the reverse. Below you will find a section based on the same lines as your own, showing what I should advise. I think this will at once explain itself. The two most important points are:—Firstly, the gutter, which you should lead down with a down-pipe to deliver on to your own property, and let it empty itself if possible into a gully, or else form a tank let into the ground; you will notice that I put the structure upon wheels, much after the style of a contractor's office. If you build it up a few feet away from its intended position, and then wheel it into its place, it would then, I think, take a very long stretch of imagination to call it a fixture. When you have it in its place, I should advise you to lever it up one corner at a time, and block it, keeping the wheel off the ground, having previously thoroughly greased with tallow the wheels and bolts, so that should you wish to demonstrate to anyone at any time that the structure is not a fixture, it would be an easy matter. This will give you a good air space underneath, and prevent your floor from rotting. You would find having tongue-flooring a great boon, as it would keep out the draught; and I should recommend some coarse wire netting between the sleepers and ground, to prevent cats from getting under. As to the cheapest material, the most suitable thing is sound yellow deal. If you frame the carcase together, and secure the tenons in the mortises with coarse screws, I do not think anyone will be able to prevent you from taking it away, and you will likewise be thoroughly independent. Should there be anything you do not understand, do not hesitate to ask again. I am very pleased to hear you have made a lathe out of an old machine stand, as not only does it show great ingenuity, but I am sure you must find it very useful.—E. D.

Removable Room.—J. C. (*Scarborough*).—Below you will find sketch plan of what you wish. You will notice that I have not given any more space between the lathes, benches, etc., than is absolutely necessary, and have allowed no room for materials, plant, or vice (which latter I think you would find almost indispensable), and yet your room has attained quite formidable proportions—viz., 24 ft. by 14 ft. In fact, there are some people who would call it a factory. I should advise your



Removable Room Plan.

making inquiries as to insurance, etc.; and if after this you still adhere to your original intention, kindly send rough plan of house and grounds, showing site upon which you propose to erect room. State likewise the stipulations laid down by insurance and surveyor—that is, if it comes within the jurisdiction of the latter. I shall then have much pleasure in going into details. Casually I may say that on the face of it it seems to me that brick or concrete and iron, not match-lining and iron, should form the foundation, etc., of the structure. I think you will agree with me that these particulars are a primary consideration.—E. D.

Bamboo Canes.—INQUIRER.—Bamboos may be bought in London from F. Westbury, 183, Gt. Dover Street, S.E.; from Benjamin & Co., 168, Great Dover Street, S.E.; from W. and T. Elmore & Sons, 16, City Road, E.C. London is the chief market for this material, and perhaps INQUIRER will do as well by sending his order there, though a Manchester or Liverpool directory would doubtless give him the name of a nearer dealer. In Vol. II., page 177, No. 63, he will find full details as to varieties, sizes, prices, etc.—M. M.

Sable Writing Pencils.—SOUTH AFRICA.—A reliable maker is J. B. Smith, 117, Hampstead Road, London, N.W. But makers are not always so expert at selecting as experienced users of pencils, who can tell their fitness with such critical accuracy. As you may want only a few selected ones of a sort—sable for writing, camel for lining, ox-hair, fitch, ichneumon, for other uses—you might try a selecting factor: in London, C. Witham, 22, Grove Street, Lisson Grove, N.W.; in Paris, Walter Lodia, 21, Avenue de l'Opera.—J. C. K.

Cartridges.—R. E. A. (*Sheerness*).—You do not say if ball or blank cartridge. If blank, the Martini cartridges answer. A Sheerness gunsmith will get what you require, if in small quantities; if large, Adams & Co., New Oxford Street, W.; Eley Brothers, London; or Kynoch & Co., Witton, near Birmingham. Prices vary for large or small quantities.—J. C. K.

Arches.—G. S. W. (*Walford Heath*).—If you refer to page 364, No. 75, and page 428, No. 79, of WORK, you will see the methods of drawing five different forms of arches, from which you will see how the radius is found. The centres are formed of ribs made of 1 in. boards, as shown in Fig. 1; the ribs are fixed 2 ft. or 3 ft. apart, and laths 1 in. or 1¼ in. thick nailed upon them, on

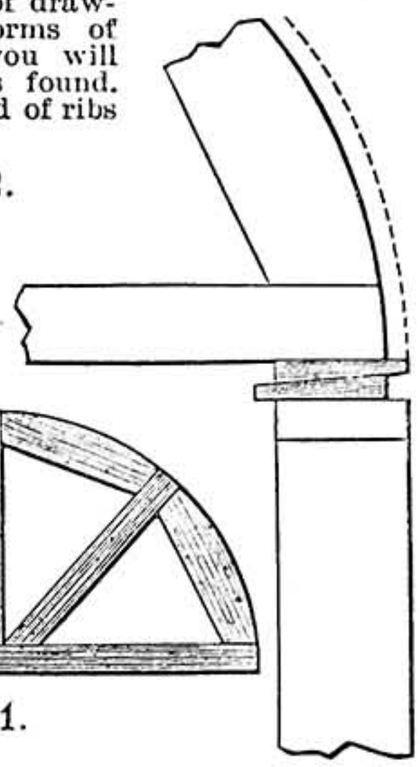


Fig. 2.

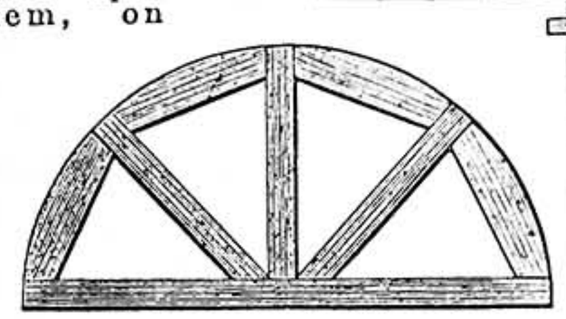


Fig. 1.

Arches. Fig. 1.—Rib for Centre. Fig. 2.—Method of fixing Centre.

which the arch is turned. They must be fixed on strong supports with double wedges under each rib, as shown in Fig. 2. These are for arches up to 8 ft. or 10 ft. span. If wider than this, the centres must be made correspondingly stronger, and bolted together.—M.

Buckled or Bent Hand Saw.—W. C. (*Stone*).—You should have stated how and in what place his saw was bent. As you have not done so, I give a rough sketch or two, showing, by hammer marks, how and where the saw should be struck, should it be as represented in either of the annexed sketches. W. C. must be very careful, and not deliver heavy blows. The plate of a hand saw being thin, requires a much lighter blow than saws of stout

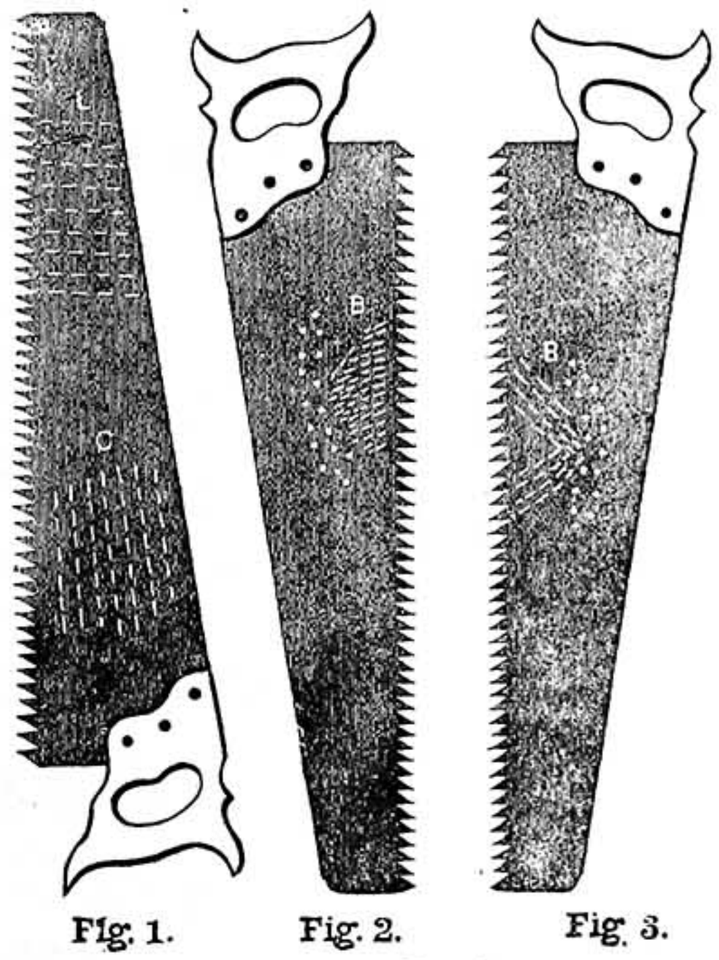


Fig. 1. Fig. 2. Fig. 3.

Buckled Saw Repairs.

gauge. If the blows are given too heavy, they will indent the plate, and at the same time stretch it more than is needful, and in consequence, a bad matter will be made worse. Fig. 1 represents a saw undulating, or wavy, lengthways of the plate at L, and bent or seamy across the plate at C. It will be seen that at L the blows are delivered across the plate, and at C lengthways of plate. The hammer to be used should be a cross-faced hammer. Figs. 2 and 3 represent a saw that has a bend at the edge; in this case the cross-faced hammer should be used on the convex side, as at B, Fig. 2, and on the concave side, as at B, Fig. 3; after which, it should be struck very lightly with the dog-head hammer, as indicated by round marks on both sides. In place of the dog-head hammer, the ordinary carpenter's hammer will answer the purpose by grinding the head a little convex.—A. R.

III.—QUESTIONS SUBMITTED TO CORRESPONDENTS.

Electric Gas-Lighter. — ELECTRIC SPARK writes:—"Can any contributor to 'Shop' inform me how to make the above on most approved form?"

Galvanometer. — GALVANIC writes:—"Would anyone kindly give me full instructions how to make a cheap, but good, galvanometer for experimental purposes? The Tangent, recently described in WORK, is too complicated; one of simpler construction would interest many readers."

Photography.—BOY-SORTER would like to know "(1) where is the best place to buy a camera for about 10s. 6d.; (2) also the simplest book for beginners; (3) which are the best dry plates to use?"

Battery Troughs.—M. H. M. (*Hull*) writes:—"Can any reader inform me if a small hole, sufficient to allow one cell in a trough battery to fill from another, would short-circuit the cells to the weakening of the current?"

Autographic Ink.—ON-TIME writes:—"How is an autographic ink made for draughtsman's drawings, from which reproductions can be made at letter-press machine?"

Spring Mattress.—APEX writes:—"Some time since, very good instructions for making a spring mattress were given. Will someone kindly inform me where I can obtain the springs, fibre, etc?"

Soldering Pewter.—APEX writes:—"Will some practical hand let me into the secret of soldering this metal? With all others I have been fairly successful, but have utterly failed in this."

Wax.—CARVER writes:—"I am at a loss to know where to get wax suitable for modelling a panel previous to carving in wood. I shall be glad if any reader could inform me through 'Shop.'"

Treadle Knife.—CUTTER writes:—"Would any reader kindly furnish me with particulars of a contrivance for attaching to a treadle grindstone (stone 25 in. in diameter) for the purpose of grinding a guillotine knife 20 in. long? Drawing would oblige."

Braces.—W. B. (*Preston*) will thank any reader to inform him where he can purchase wholesale quantities of indiarubber web, rivets, and rings for brace-making.

Sewing Machines. — SEWING MACHINE asks where he could get a book entitled, "The History of the Sewing Machine," by N. Salaman, who is also the writer of "Elias Howe's Biography" (London, 1863). Also Green's translation of Dr. Herzberg's work (1864) on the sewing machine.

Draught Table.—M. P. (*Manchester*) will be obliged for design, with size and working drawing, for draught table, suitable for two gentlemen.

Sealing-Wax.—J. C. (*Chelsea*) writes:—"Will any reader inform me the way to make white sealing-wax? Also, is there any white stain that will sink into hard wood and bone, and where I can get it?"

Quartz and Grindstone. — SINE CERA writes:—"Will any reader of WORK kindly inform me where I can obtain crushed quartz? It is required for covering buffing bands for buffing up spokes, etc. Also could you inform me the proper speed at periphery of grindstones?"

IV.—QUESTIONS ANSWERED BY CORRESPONDENTS.

Clay Mixture.—M. (*Bishop Auckland*) writes, in reply to HEATHFIELDS (see page 110, Vol. III.):—"These are called cob walls, and are built of a mixture of clay, loam, and chopped straw. The walls are made about 2 ft. thick, and are built on stone or brick foundations 2 ft. above the ground level. The material is kneaded into a stiff mass, and is built in layers, one layer being allowed to stiffen before another is laid on. The face of the wall is pared level with a sharp spade or parer, and is coated with plaster. The top of the wall must be well protected from rain. In some places it is built in frames similar to concrete walls (see page 60), small gravel being mixed with the clay, and is called Pisé work."

Gas Engine.—M. (*Bishop Auckland*) writes, in reply to H. R. P. (*Nottingham*) (see page 142, Vol. III.):—"You can obtain working drawings of these from Mr. A. Holmes, 127, Clowes Street, Hyde Road, Manchester. I do not know whether he supplies the castings, but if you write him he will tell you."

Teasing Hair.—E. W. C. (*Leicester*) writes, in answer to A. A. (*Edinburgh*) (see page 142, Vol. III.):—"There is, I believe, no machine that will tease horse-hair at the rate mentioned. There is a machine made by a Manchester firm called a 'devil,' which is made with a large wooden drum studded with steel points, but it is useless for hair. As everybody knows, the beauty of horse-hair is its length and curl. The machine I have mentioned breaks it into short bits, but is very useful for wool and flocks. The only way to open new hair is by hand, which is the best way for all kinds of hair; but for old hair there is what are called 'cards,' which consist of two boards covered with a kind of leather, and studded with a sort of square wire staple, with the points bent to an angle of about 45°. The bottom board is fixed, and the top one is worked with the two hands, by the aid of which from twenty to thirty lbs. of hair per hour can be accomplished. These 'cards' can be obtained from any upholsterer's warehouse in Old Street or Curtain Road, London. If A. A. thinks it will pay him to make one—which I doubt—I will send more particulars."

Scrap Leather.—G. P. (*Fulham*) writes:—"If A. F. W. (*Oldham*) (see page 829, Vol. II.) will offer his scrap leather to Geo. Ives, Wakefield, Yorks., I think he will get a much better price than from the two firms mentioned on page 46, Vol. III., by J. M. (*Manchester*)."

Fish Stuffing.—F. H. (*Streatham*) writes, in answer to F. M. (*London, N.W.*) (see page 110, Vol. III.):—"I would advise F. M. to practise upon a tough-skinned fish, such as the perch or a pike. First note all the peculiarities of shape and colour; it is a good plan to make a water-colour drawing of the subject. Select the best side of the fish, and cover it with tissue-paper or muslin; this keeps the scales fast in their seats during the skinning. You must be sure to keep the fish damp during the operation. Lay the fish the worst side uppermost on a board, then cut the skin from head to tail in a straight line; cut through the large bone beneath the gills with a strong pair of scissors. With a broad knife in one hand, and holding the skin lightly with the other, with a scraping motion of the knife carefully separate the skin from the flesh. Be careful at the fins; cut them deep, leaving a part of the flesh on. Work towards the tail, and remove the skin round the tail with the fingers; cut the bone and flesh completely through with the scissors about 1 in. from the last joint of the vertebra. Now work the skin off round the head, and with a knife sever the bone near the head. The skin now being free from the body, scrape away all the small pieces of flesh that are still adhering to the inside of the skin, and around the fins and tail. Now turn your attention to the head. Make a cut along the side of the under jaw, cut away the gills, clear the head of all remaining flesh, take out the eyes, and be careful not to cut your fingers with the small bones. To stuff the fish, procure a thick piece of wire somewhat longer than the body, bending one end to form a large oval-shaped loop, to be placed into the head, the other end to be pointed to push into and support the tail. This wire is to form an artificial back-bone, and must be such a length as to allow one end to go through the centre of the bone in the tail; form two loops on the wire to support the body on the back of the case when finished. Now wrap round the wire some paper, tied with string, until it is a little less than the body that is taken out, and make it somewhat the shape of the fish without head or tail. When this is done, cover it with tow tied on with hemp. Lay this down, and thoroughly anoint all parts of the fish. Stuff out the now hollow sides of the face, gums, and the underneath of the throat with putty, of which push some thick pads underneath the root of the tail. Next lay a thin skin of putty over the whole of the skin on the inside. The next thing to be done is to insert the body. Pushing the sharpened end of the tail wire through the bone of the tail, fix the loop in the head, and commence to sew the edges of the skin with needle and thread, shaping the fish as you go along. A little gentle tapping with a small piece of wood will bring it into shape. Bore two holes in a board for the supporting wires, and carefully turn your fish over, to examine the show side. Gently press the skin with the hands; now go over the whole of the outside of the skin with a carbolic wash:—Glacial carbolic acid, 2 oz.; burnt alum or pure tannin, 1 oz.; water, one pint. Keep in stoppered bottle labelled 'Poison,' and shake up before using. Place all the fins in their position; the head will require a great deal of attention. It is now flat, and, perhaps, drops down upon the board. To obviate this, prop the nose from the underneath by a piece of cork. The mouth may be kept open as much as desired by wire. The fins must be 'braced out' on flat pieces of cork with pins. Let the fish be now put by in a moderately warm situation to thoroughly dry. When it is thoroughly dry, the skin will be like leather, with no colour in it at all, and must, of course, be subsequently coloured up according to nature—the eyes put in with wax. The fish should now be varnished with spirit varnish, and mounted in a case with appropriate water-weed. The fish should be coloured with oil-colours, such as are used by artists, thinned with turpentine."

Mandrel Head.—TURNER writes, in reply to H. M. (*Maiden Newton*) (see page 142, Vol. III.):—"Whatever you do, do not on any account run your mandrel in cast iron. I worked a lathe for three days running, in hot June weather, which had cast-iron bearings all over, and I might just as well have been on a tread-mill. The cast iron gets hot with the friction, and, consequently, the mandrel 'binds.' Brass bearings would do, but hardened steel is the proper thing, though troublesome to true up. I am now myself engaged on a new lathe spindle of my own design, hard steel wearing parts so arranged that you may take all play out, and yet have it run freely. I hope to have it finished a fortnight hence." [TURNER may send in his drawing and description on approval.—ED.]

V.—BRIEF ACKNOWLEDGMENTS.

Questions have been received from the following correspondents, and answers only await space in SHOP, upon which there is great pressure:—A FRETWORKER; W. H. W. (*Great Yarmouth*); QUÆSITOR; J. B. (*Manchester*); T. A. (*St. Helens*); F. D. B. (*Newcastle-on-Tyne*); O. M. (*Barrow-in-Furness*); A CARTWRIGHT; G. H. (*Camberwell*); LEGHORN; H. R. (*Clapham*); R. W. (*Bow, E.*); H. J. (*Rochdale*); TEVIOT; H. E. B. (*Cheshire*); BICYCLE BUILDER; A. T. B.; A. W. (*Paisley*); J. H. (*York*); F. P. (*Swansea*); C. D. (*Glasgow*); INCUBATOR; H. R. M. (*London*); J. N. (*York*); A. M. (*Putney, S.W.*); ARTIST NOVICE; B. F. E. (*Carlisle*); ANXIOUS; RAYNOR; P. P. (*Harrow*); TOXTETHIAN; R. H. M. (*Yorks.*); H. McG. (*Kilmarnock*); T. B. B. (*Manchester*).

WORK

is published at La Belle Sauvage, Ludgate Hill, London, at 9 o'clock every Wednesday morning, and should be obtainable everywhere throughout the United Kingdom on Friday at the latest.

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