PRACTICAL MECHANISM.

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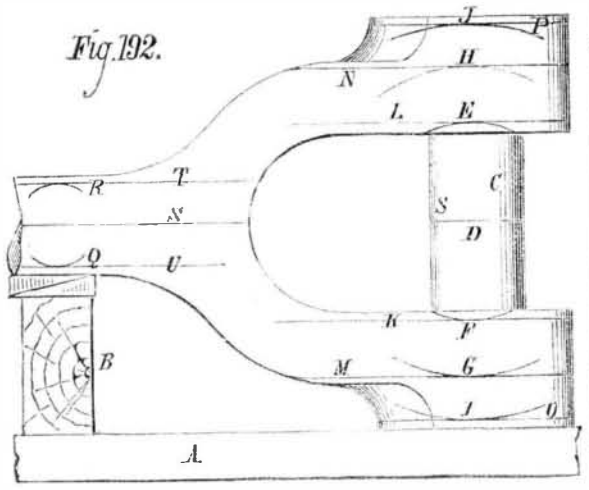
NUMBER XL.

LINING OUT A DOUBLE EYE.

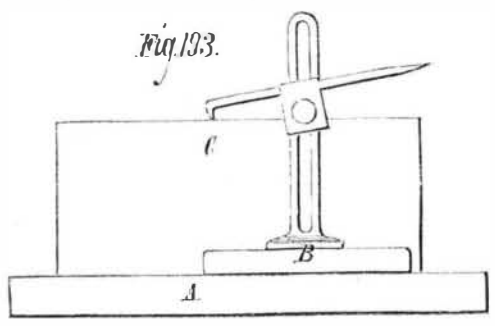
After measuring the dimensions of a double eye to ascertain if there is, upon the outline, surplus metal sufficient to permit of its clearing up all over, we apply an L square upon the outside surfaces, and a T square, with the blade between the jaws, to test if the inside and outside faces are at about a right angle to each other, or if the marking will have to be thrown to one side of the work to accommodate a want of truth in the latter. Presuming that, as is usually

Fig. 192.



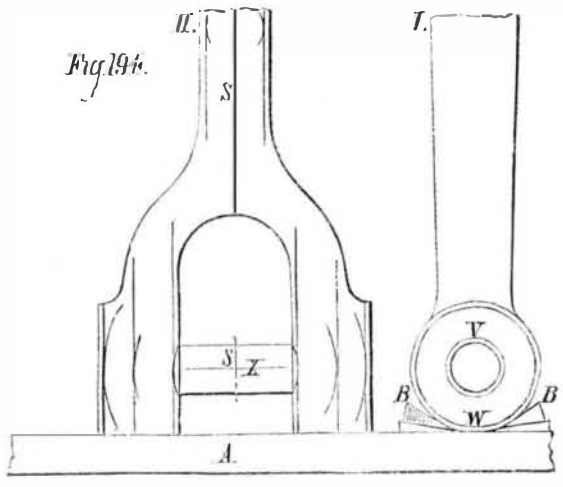
the case, the work is reasonably near to being true, we proceed as follows: Placing the double eye upon the marking-off table, as shown in Fig. 192, we block up the stem end with the pieces of wood, B, so that the horizontal faces of the work will stand about true with the surface of the table, the manner of testing the same being shown in Fig. 193, A representing the marking-off table, and B the scribing block, with the needle placed so that the point of the

Fig. 193.



bent end barely touches the surface of the work. The operation is to move the scribing block from end to end of the work and on both sides of it, packing it up until the upper surface is level, and taking care, if the work does not lie level and steady upon the table, to insert wedges in the necessary places so that the work will lie firmly and not move during the operation of marking. If there are projections upon the face of the work which rests upon the table, as is the case in our double eye, it is necessary to pass the scribing block along the under as well as the upper surface of the work; and if the two vary much, we may choose the one that is most true with the other surfaces of the work and set it true; or if, in such case, there would not be enough metal to clean up the work on both sides, we must divide the difference between the two. We then put between the jaws of the double eye, the center piece, C, and find the center of the jaws, as shown by D; then, setting a pair of compasses to half the required width between the jaws, we scribe upon both the jaws the segments of a circle, E and F, using D as a center; then opening the compasses to allow for the requisite thickness of each jaw, we mark the segments of a circle, G and H; and again setting the compasses to the requisite thickness of hub, we mark the segments of

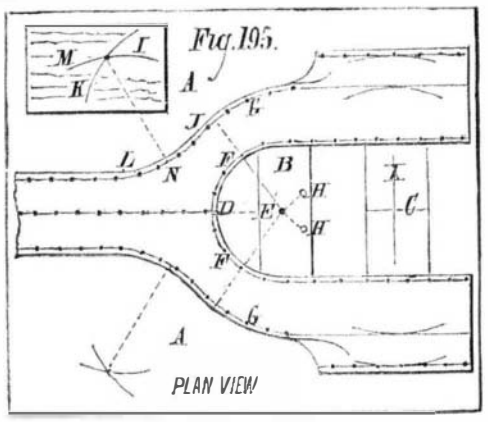
Fig. 194.



a circle, I and J. We now take a scribing block, and, setting the point just to intersect the extreme diameter in each case, we draw the lines, K and L, M and N, and O and P, thus defining the widths and thicknesses of the jaws and hubs. We then set the scriber point even with the center, D, and then draw the line, S S, which should run a long way up the stem of the double eye, because the shortness of the other lines, running parallel to it, renders it difficult to set the work true by them, and S S is made long to supply the deficiency. After setting the compasses to half the required thickness of the stem, we mark, using the line, S S, as a center, the segments of a circle, Q and R, and from them mark the lines, T and U, which define the required thickness of the stem or rod of the double eye. Our next operation will be to mark off the hole and the circle of the hub, which is done as shown in Fig. 194. Setting the eye upon the marking-off table, A, we wedge it upright, as shown in view 1, by the wedges, B; applying the blade of an L square to set the line, S S (in view 2), true by, we mark off on each side of the double eye the center of the boss or eye, and from that mark off the circles, V and W, denoting the finished sizes of the hole and the eye; then setting the scribing block needle point even with the center from which the circles, V and W, were struck, we mark on the center piece, (shown in view 2) the line, X.

We have now to complete the marking-off of the face shown in view 2, Fig. 194, which could not have been done before, because there was nothing determinate wherefrom to mark off the half circle of the outline between the jaws. Placing the double eye upon the table, as shown in Fig. 195,

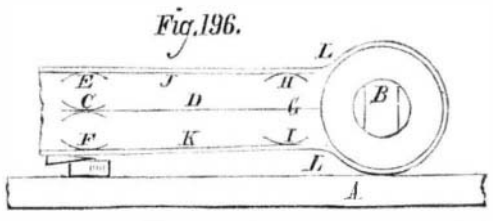
Fig. 195.



and blocking it up so that it lays level with the face of the marking-off table, and with the face that has been marked off uppermost, we insert between the jaws the center piece, B. We next mark from the center, C, the requisite distance of the crown of the curve, between the jaws, thus obtaining the center mark, D, from the center, C; and setting the compasses to half the required width between the jaws, we use D as a center, and mark upon the centerpiece, B, the center, E, and strike the half circle, F F, which completes the marking between the jaws. Our next procedure is to mark off the segments of circles, G, G, which are struck from the centers, H, H, respectively. Then taking the block of wood, I, which should stand at about the same hight from the marking-off table as does the body of the double eye, and setting the compass to the required radius, we rest one point on the circle, G, at about the point, J, we strike the mark, K; then placing one leg of the compasses at about the point, L, we strike the line, M, the junction of the lines, K and M, forming the location of the center from which the segment of a circle, N, is marked. Placing the block of wood, I, on the other side of the double eye, we repeat this latter operation, and the marking on that face is complete.

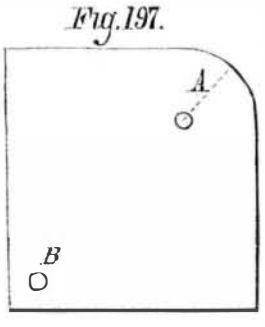
After defining the outline of our work by light center punch marks, we pass it to the machinist's hands to be turned and cut down to the lines, after which we place it upon the marking-off table in the position shown in Fig. 196, A representing the table. At each side of the double

Fig. 196.



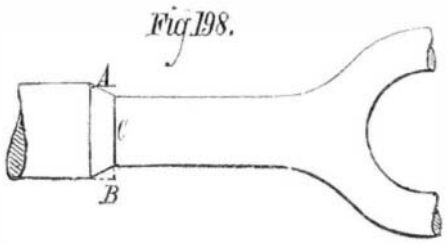
eye we place a center piece, B, and mark thereon the center of the hole with the compass callipers. We then find the center of the shank, C, and, wedging that end up with wood as shown, we set the needle of the scribing block even with the center of the hole, and so adjust the double eye with wedges that the needle point will strike the center of the hole marked on B, on each side, and also the center, C, whereupon we may mark the line, D; then setting the compasses to the requisite distance, we mark from the center, C, the segments of circles, E and F, and from the center, G, the segments of circles, H and I: and resetting the double eye so that the needle point of the scribing block will intersect the extreme outline of H and E, we draw the line, J; repeating the operation on the under side, we produce the line, K, and the operation is complete. The curves, L L, are made to a gage, such as is shown in Fig. 197; it is made of sheet iron about one sixteenth of an inch thick, the outline being carefully marked out and filed up neatly, the corner, A, being made of the necessary sweep, and the hole, B, being used to hang the gage up by. It is well to have an assortment of such gages for use in lining out, as well as for use as guides to the machinist in cutting out the curves or sweeps

Fig. 197.



When a double eye is forged separate from the rod, the intention being to weld it to its rod after the finishing is complete, which method is adopted for ease in handling the double eye, and because it can then be operated upon in a small lathe or shaping machine, the end of the cut on the stem should be beveled off, as shown at A, in Fig. 198, and

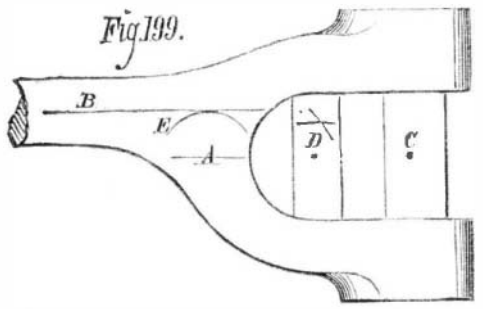
Fig. 198.



not left square, as denoted by the dotted lines at B, because, if the corner be left square, the jar of the blows given in welding the double eye to its rod would cause the metal to bend in the neck, C, and the resetting with the blacksmith's flatter would be liable to jar the eyes or jaws of the double eye out of true one with the other. Furthermore, if the body of the rod is intended to be forged down to the finished size, and either left rough or merely ground and polished by the grindstone and emery wheel, leaving the corner sharp (as shown at B) would cause the forging to leave a mark round the body of the stem, at C, giving it the appearance of being cracked.

To assist the operator in marking out, the centers from which all curves and circles on detail drawings are struck should have a small circle in red ink marked around them, and a dotted red line marked from the center to the circle or segment of circle struck from it, as shown in Fig. 195. If the double eye is, however, intended to have an offset, as shown

Fig. 199.



in Fig. 199, we draw from the centers, C and D, the line, A; and setting the compasses to the amount of the offset, we draw the segment of a circle, E, using the line, A, as a center; and from the extremity of that segment, we draw with the scribing block the line, B, which will represent the center line of the stem of the double eye, the rest of the operation being as shown in Fig. 192, and described in the accompanying explanation, from the point at which the line, S S, in that figure was drawn.

Rising in the World.

Experience continually contradicts the notion that a poor young man cannot rise. If we look over the list of rich men, we find that nearly all of them began life worth little or nothing. To any person familiar with the millionaires of the United States, a score of examples will occur. On the other hand, the sons of rich men, who began life with the capital which so many poor young men covet, frequently die beggars. It would probably not be going too far to say that a large majority of such moneyed individuals either fail outright or gradually eat up the capital with which they commenced their career.

And the reason is plain. Brought up in expensive habits, they spend entirely too much. Educated with high notions of personal importance, they will not, as they phrase it, stoop to hard work. Is it astonishing, therefore, that they are passed in the race of life by others with less capital originally, but more energy, thrift, and industry? For these virtues, after all, are worth more than money. They make money, in fact. Nay, after it is made, they enable the possessor to keep it, which most rich men pronounce to be more difficult than the making. The young man who begins life with a resolution always to lay by part of his income is sure, even without extraordinary ability, gradually to acquire a sufficiency, especially as habits of economy, which the resolution renders necessary, will make that a competence for him which would be quite insufficient for an extravagant person. It is really what we save, more than what we make, which leads us to fortune. He who enlarges his expenses as fast as his earnings increase must always be poor, no matter what his abilities. And content may be had on comparatively little. It is not in luxurious living that men find real happiness.

THE Belgian *Moniteur Industriel* says that an engineer, having a piece of very hard bronze of large diameter to turn in the lathe, could not succeed in cutting it with a tool of any kind or temper, until he kept the tools constantly moistened with petroleum, when they cut with readiness. He says, that by using a mixture of petroleum and spirits of turpentine, steel with a straw-colored temper can be worked perfectly well. The experiment certainly can be easily tried, say in turning chilled car wheels.

The Hon. George Bancroft told a reporter of the Philadelphia *Item* recently that the coming Centennial Exhibition would in every respect excel any international exhibition ever before given. He thinks it will drive away hard times and encourage immigration to an astonishing extent.