PRACTICAL MECHANISM.

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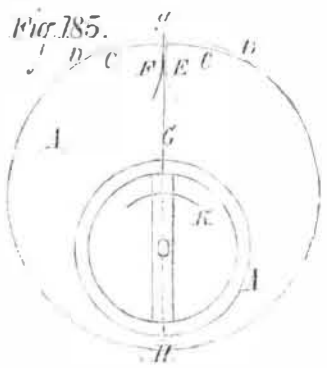
NUMBER XXXIX.

LINING OUT AN ECCENTRIC.

In measuring an eccentric to ascertain if it has sufficient stock to allow it to be cleaned up all over, it is not sufficient to measure the thickness of the outside diameter, and the size of the bore only, because those measurements do not take the amount of the throw into consideration, and we have therefore to proceed as follows:

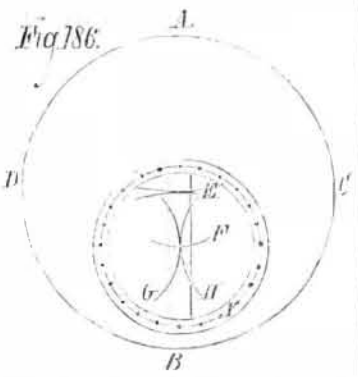


In Fig. 185, A A represent an eccentric, into the bore of which, on the hub side, we place the center piece, and mark upon it the center of the hole. We then take a pair of compasses, and set them so that, when one point is resting in the center of the hole, the other point will reach to within about a quarter of an inch of the extreme diameter of the eccentric, as shown above by the line, C C. We then, with a pair of compass callipers, find the center of the line, C C, by resting the calliper leg of the same against the periphery of the eccentric, at one of the points where the line, C C, meets it; and then with the compass leg of the compass callipers, we mark the line, E; and repeating the operation at the other end of the line, C C, we mark the line, F. We next take a straight edge; and placing it so that its edge is even with the center of the bore of the eccentric and with the center between the lines, E and F, we draw the line, G *g*, upon which we may make our measurements as follows: After setting a pair of compasses to the amount of throw required by the eccentric, we place one compass leg in the center of the bore, and with the other mark (on the line, G) the line, K, which will represent, at its intersection with G, the center of the finished diameter of the eccentric, providing we mark off the whole eccentric true with the hole. Then we take a rule, and measure from the center, K, to the ends, H *g*, of the line, G, which ends should be equidistant from K, if the amount to come off the surface of the casting in the hole is to equal that to come off the outside surface. It very frequently happens, however, that there will be more to come off the eccentric on one side of the diameter than on the other, especially when the eccentric is put together in two halves; because, in facing up the two halves, preparatory to putting them together, and to make them bed well one to the other, it does not always happen that the same amount of metal is taken off each face. Again, the quantity so taken off is not always that allowed on the pattern for the purpose; so that, in practice, an eccentric casting rarely marks off true with its rough outline.

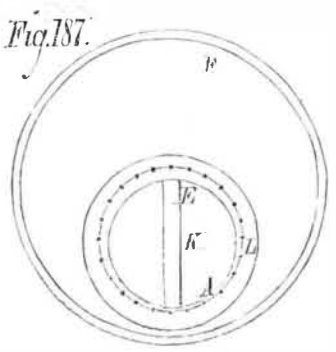
Here, then, arises the consideration as to in what direction we shall throw the lines. Shall it be to bore the hole true, or to turn the outside diameter true, with the casting? The latter plan is always preferable; because, if in turning up the outside diameter the first cut does not true it up, the tool point will scrape over the sand, after leaving the cut and before it strikes it again, to such an extent as to rapidly destroy the cutting edge, necessitating not only frequent regrinding of the tool, but also that its cutting speed be very materially reduced. After having roughly ascertained, in the manner described (which process will take but a few minutes to perform), that there is surplus metal enough to clean up the eccentric, we may proceed to mark it out.

It is much easier to mark off an eccentric on its plain side than on the side on which the hub stands, because of the projection of the hub; and, furthermore, the marking for the hole and for the diameter can be performed at one operation, which is impracticable on the hub side. But if this plan is not adopted, it necessitates that, at the first chucking, either the hole only shall be bored, in which case there will be no face true with the hole, and hence no guide whereby to set the eccentric at the next chucking: or else, in turning off the outside face after the hole is bored, the marks for the second chucking will be effaced. The main consideration, however, is that there is only one way to chuck an eccentric to insure its being turned as true as possible; and the marking off must, therefore, be made to accommodate the chucking, the method and reasons for which are as follows: The eccentric must be chucked at the first chucking nearly true with the outside diameter, and with the plain face outwards, so that that face may be trued up. The next chucking must be that for boring the hole and for turning the hub and that face of the eccentric; and the third chucking will be done with the face of the hub bolted to the chuck plate by as many clamps as may be necessary to hold it, but none of them exerting any pressure save to clamp the face of the hub to the chuck, or rather to the face plate. By this method, the outside of the eccentric will be turned true with a face that has been turned at the same chucking at which the hole was bored; while the eccentric will stand sufficiently far from the chuck to permit of the strap being tried on when it is necessary. And, moreover, the skin of the metal will have been removed on three out of the four faces before either of the working parts (the bore and the outside diameter) is finished; and as a consequence, the work will remain true, and not warp in consequence of the removal of the skin. Furthermore, upon the truth of the last chucking only will the truth of the whole job depend; and if the face plate of the lathe is a trifle out of truth, the eccentric will only be out to an equal amount. It is not an uncommon practice (but a very reprehensible one) to face off the plain side of the eccentric, and to then bore the hole and turn the outside diameter, with the plain face clamped in both cases to the face plate. The fallacy of this method lies in the fact that, by such a procedure, the eccentric will be, when finished, out of true to twice the amount that the face plate is out of true.

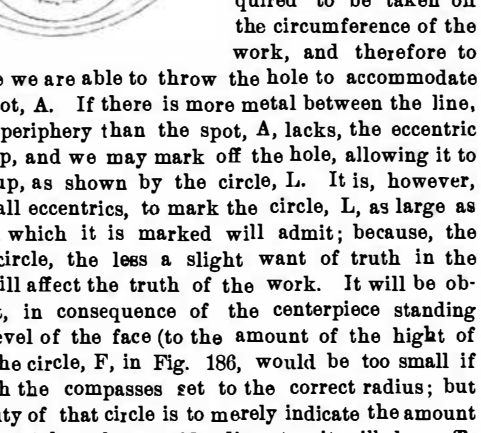
Taking all these considerations into account, we may mark off the lines for the hole and thickness of the hub, in the manner shown in Fig. 185, or we may adopt the plan shown in Fig. 186, which is perhaps the better of the two.



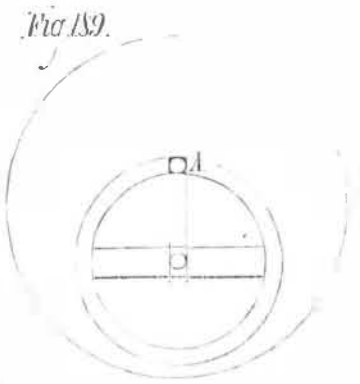
From the four points A, B, C, and D, we mark off, on the hub side of the eccentric, the center of its diameter, E; we then, setting a pair of compasses to the amount of throw required for the eccentric, mark off from the center, E, the line, F; then, with a pair of compass callipers, placed in each case with one end against the bore of the casting, we mark the lines, G and H, the junction of the lines, F, G, and H, being the required center of the hole. We therefore strike from that center, around the face of the hub, the line, I, and mark it lightly with a center punch, as shown. If, however, it should be found that there is not sufficient metal to allow the hole to be cleaned up if marked off true with the circumference, we must throw the hole a little in the requisite direction, endeavoring (for the reasons already stated) to keep the diameter of the eccentric as nearly true for the throw as possible. For instance, in Fig. 187, if we suppose that is an insufficiency of metal in the hole, at A (E being the center of the diameter of the eccentric, and K the amount of the throw), we first set a pair of compasses to the required radius of the diameter; and from the center, E, strike the circle, F, which will show the amount of metal required to be taken off the circumference of the work, and therefore to what degree we are able to throw the hole to accommodate the scant spot, A. If there is more metal between the line, F, and the periphery than the spot, A, lacks, the eccentric will clean up, and we may mark off the hole, allowing it to just clean up, as shown by the circle, L. It is, however, best, on small eccentrics, to mark the circle, L, as large as the face on which it is marked will admit; because, the larger the circle, the less a slight want of truth in the chucking will affect the truth of the work. It will be observed that, in consequence of the centerpiece standing above the level of the face (to the amount of the hight of the hub), the circle, F, in Fig. 186, would be too small if marked with the compasses set to the correct radius; but since the duty of that circle is to merely indicate the amount of surplus metal on the outside diameter, it will be sufficiently correct on ordinary eccentrics, to mark it as directed, making a slight allowance of increase in setting the compasses to draw that circle. If, however, it should happen that the quantity of stock is so scant as to make it questionable whether the work will true up: then the center piece may be lowered in the hole to the level of the surface of the metal on which the circle, L, is marked, and the compasses may be set to the correct radius.

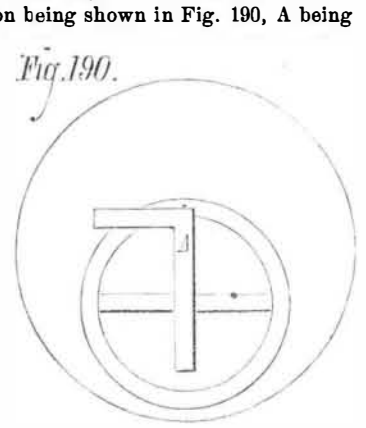


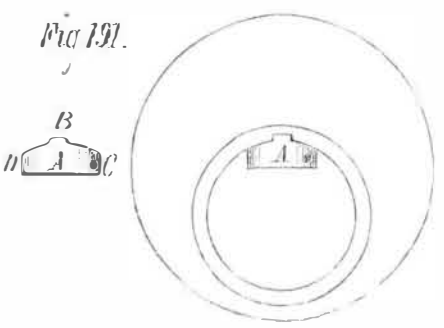
The hole being marked, no further marking should be performed until the eccentric has had both sides finished and the hole bored, when the diameter should be marked upon the plain side of the work, as shown in Fig. 188. After inserting the center piece, and marking off upon it the exact center of the hole, we mark the line, C C; and finding the center of its length, as already described, we strike the line, D; then we mark on the line, D, the amount of the throw, measuring from the center of the hole, and we thus obtain the center, F, from which we mark the circle, G G, which is only intended to be employed in setting the work, and need not, therefore, be made of any particular size. The marking will thus be completed, and it will be noted that the thickness of the eccentric and the hub, and the hight of the latter, have not been dealt with at all, the reason for the omission being that it is entirely unnecessary to regard them, since (providing of course that there is spare metal enough to clean them up) they may safely be left to the turner, who may accommodate the amount taken off the first side faced, according to the smoothness of the second cut, or a variety of other conditions which need not be here enumerated. If the eccentric has no hub, as is sometimes the case, it should be marked off as shown in Fig. 186.



After the turning is completed, the keyway or featherway may be marked off, as shown in Fig. 189. Placing the centerpiece on the hub side of the eccentric, so that the plain side may lie flat on the slotting machine table, and not require parallel strips or packing wherewith to chuck it, we mark off upon it the center of the hole in the eccentric; and from that center, we mark a circle whose diameter must be equal to the required width of the keyway to be cut. Then selecting the location of the keyway, we we describe there another circle of the same diameter. Placing a straight edge so that one of its edges is just even with one and the same side of each circle, we draw the line, A; and by repeating the operation on the other side of the circle, we shall have the sides of the keyway marked. To mark the depth, we make a fine centerpunch mark at the requisite distance from the bore of the eccentric, and then, using the square shown in Fig. 162, we place one of it sedges parallel with the outer edges of the two circles, and the other edge fair with the center of the centerpunch mark, and scribe a line along the latter edge and across the width of the keyway, the operation being shown in Fig. 190, A being the square. When, however, there are a number of keyways of the same width and depth to be marked, it is more expeditious to make the gage shown (together with its method of application) in Fig. 191, in which A represents the gage, being a piece of sheet iron about one sixteenth of an inch thick, the curved line being of the same curvature as the bore of the hole in the eccentric, and the projection, B, being of the required size of keyway. The ends, C D, are to be slightly bent (both in one direction), so that, while the projection, B, will lie on the face of the hub,







the ends, C D (being depressed), will contact with the bore of the hole of the eccentric and thus serve to keep the gage true with the bore. The gage should be carefully marked out and smoothly filed true to the lines. The small hole, shown near C, is to hang up the gage by when it is not in use.

Quick Work in a Rail Mill.

Inter-Ocean says: "A few weeks since, the North Chicago Rolling Mill Company claimed the championship of the world in the manufacture of steel rails when they produced 1,010 rsils in twenty hours. The Joliet mills laid themselves out lately with the following result: Between the hours of 5.50 p.m. on Monday, and 5.45 Tuesday morning, they turned out 603 rails. At 6.35 the day turn commenced, and at 5.45 p.m. had made 604 rails, thus accomplishing the wonderful run of 1,207 steel rails, weighing 53 lbs. per yard and 30 feet in length, in 17 hours and 25 minutes, and surpassing the work of the Chicago mills by 193 rails, with 2½ hours time to spare. The average time used for making each rail was 52 seconds, while the Chicago mills used 1 minute and 12 seconds. The Bessemer works of the Joliet Company also lead off with a run of 1,432 tuns, while the biggest run made by any other mill was 1,317 tuns, by the Chicago works last month. The boys claim that they haven't shown their best foot yet; and if anybody can equal this, they will go them a good deal better."

Wood for Docks.

A fact has occurred at Belfast, Victoria, which is well worth noting. In 1868 an auger was dropped in the bay there by one of the workmen employed on the jetty. Last Christmas, the tool was picked up on the beach near the mouth of the Moyne. The iron auger was encrusted with rust, sand, etc., and the iron partly destroyed, but the wooden handle (blackwood) was perfectly sound. In building jetties this fact would prove that iron bolts are not as durable as treenails of blackwood.