H. B. KENDALL.

COMPOUND TOOL.

APPLICATION FILED JAN. 27, 1915.

1,204,994. Patented Nov. 14, 1916.

Fig. 1.

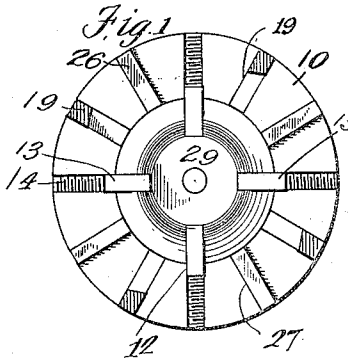


Fig. 2.

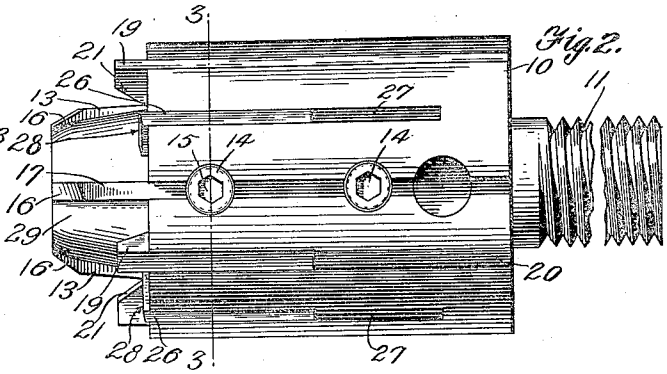


Fig. 3.

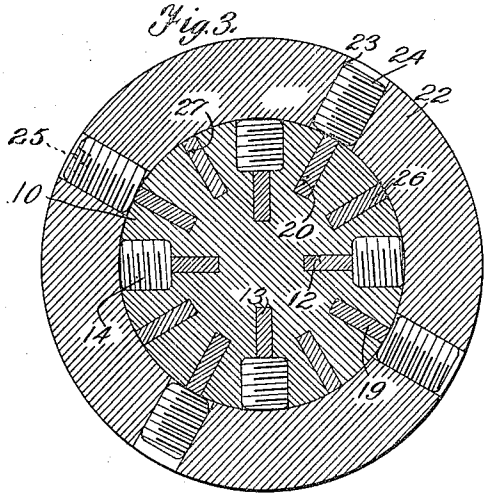


Fig. 4.

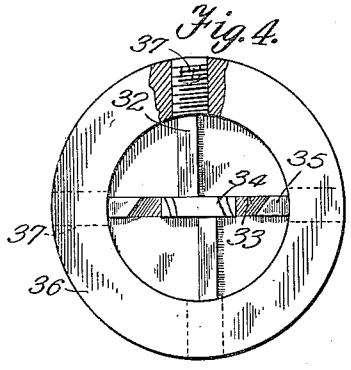


Fig. 6.

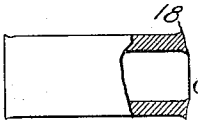


Fig. 7.

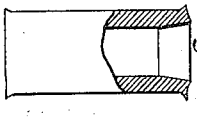


Fig. 8.

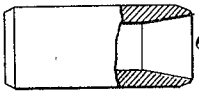


Fig. 9.

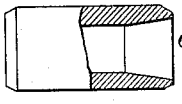
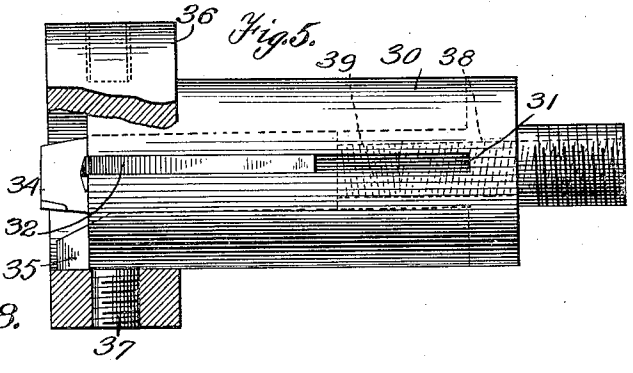


Fig. 5.



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UNITED STATES PATENT OFFICE.

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COMPOUND TOOL.

1,204,994. Specification of Letters Patent. Patented Nov. 14, 1916.

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To all whom it may concern:

Be it known that I, HARRY B. KENDALL, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Compound Tools; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to tools for treating the burred ends of pipes or nipples, and one object of the invention is to provide a tool which will ream, chamfer, and finish the end of the nipple in one operation.

Another object of the invention is to provide a tool for reaming the inside bur from a pipe in such a way that the reaming cutters will act as the centering or steadying means when the end and chamfering cutters are brought into operation.

With these and other objects, the invention resides in the combination and arrangements of parts hereinafter described and claimed.

In the accompanying drawings wherein two forms of the invention are shown, Figure 1 is an end view of one form of the invention, Fig. 2 is a top plan view of the form shown in Fig. 1, Fig. 3 is a vertical transverse section taken on line 3—3 of Fig. 2 showing a reinforcing collar not shown in Fig. 2, Fig. 4 is an end view of another form of the invention, Fig. 5 is a top plan view of the tool shown in Fig. 4, a collar such as shown in Fig. 3 being employed and having a part thereof removed, and, the Figs. 6, 7, 8 and 9 represent, respectively, a nipple in successive stages as treated by the tool described herein, the figures being progressive starting with the nipple in rough as seen in Fig. 6 and ending with the finished nipple as seen in Fig. 9.

Heretofore, it has been common in the trade to ream the inside of a pipe or nipple, as seen in Fig. 7 of the drawings; but the chamfering of the outside of the same as seen in Fig. 8 and the finishing of the end, as seen in Fig. 9, has not been accomplished at the same time and has been possible only by the use of expensive machinery. The general aim of the present invention is to provide a single, inexpensive tool for successively reaming, chamfering, and finishing the end of a pipe or nipple in one operation.

The tool comprises a cylindrical body 10, from which extends an integral threaded shank, 11, to be received by any rotating member (not shown). The body, 10, is provided with radial slots 12, four of which are shown in Fig. 3. The slots 12, may extend the full length of the body and the reamers, 13, are held in the bottom of the slots by means of screws, 14. These screws are threaded into radial sockets in the body and may be tightened by means of the hollow nut heads 15. As many of the screws, 14, may be provided as are found necessary, and it is apparent that the material on either side of the slot, 12, is reinforced by the screws 14.

The reamers 13, have beveled cutting edges 16 of suitable pitch and clearance to remove the inner bur, seen in Fig. 6. The non-cutting portion of the reamer, 13, as at 17, is given practically no clearance, and the pitch of this portion is very slight so that no cutting is done by the part 17 after the nipple passes the cutting edges, 16. By reason of this fact, the reamer, 13, will act as a centering and steadying means to hold the nipple against chattering. As the tool is advanced, the outer bur, 18, is cut by the chamfering cutters, 19. In order to accommodate the cutters, 19, the body 10 is provided with slots, 20, which extend preferably the full length of the body but are not as deep as the slots, 12. It will be apparent that the exposed ends of the chamfering cutters, 19, will be acted upon by a force which serves to move those ends of the tool away from the axis of the body 21 because of the inclined cutting edge, which is given the proper clearance. In order to prevent this movement, there is provided a collar, 22, which has radial threaded sockets, 23, to receive the screws, 24. There is one screw for each chamfering cutter, 19, and when the collar is in place, the screw may be turned tightly against the outer side of the cutter, 19, by means of hollow nut head, 25. The collar, 22, is made to fit closely over the body.

When the nipple has been reamed by cutters 13, it has the appearance of a nipple such as shown in Fig. 7, and after it has been reamed and chamfered by cutters 13 and 19,

respectively, it has the appearance of a nipple such as shown in Fig. 8. However, there is almost always a rough end which has to be removed. For this purpose, end cutters 26, are employed which are received by slots 27 cut in body 10. In order to save the strength of body 10, these slots, 27, are not extended through the full length of body, 10. There is another reason why the slots 27 need not be the full length of the body, 10, to wit: the end cutters, 26, which have the cutting edges, 28, do very little work and always take a smaller cut than is taken by the cutters 13 or 19, respectively. There is less wear on cutters 26 for this reason, and the end cutters need not be ground so often and may therefore be made of less length than the cutters 13 and 19. As the end cutters advance they will finish the end of the nipple so that it will look like the nipple shown in Fig. 9.

The chamfering cutters, 19, usually extend the full length of the body, 10, so that the slots containing them are completely filled. The cutters 19, are also made slightly larger in width than the containing slots in order to effect a driving fit. In this way, the large surface of both flat sides of the cutters, 19, serve to resist longitudinal movement of the cutters, 19.

While the body 10, has a large number of slots cut therein, yet the cutting end of the tool is practically as strong as though the body were solid. This is brought about by filling the slots, 27, with cutters which extend the full depth of the said slots, and in inserting screws 14 between the opposite sides of the slots 12. Also, the cutters 13 which extend through the slots 12 in the nose, 29, integral with the body 10, effectively close up the slots and make a structure practically as strong as though the nose were without slots.

If the cutting edges of the several cutters should get dull, the chamfering cutters, 19, can be forced out of their respective slots and sharpened. This leaves the cutting edges 28 of the end cutters 26, extending somewhat beyond the end of the body 10, so that they also may be sharpened and the cutting edges 16 of the reamers 13, can also be sharpened as they are not in the same plane with the end cutters. By tapping the rear ends of the cutters they may be advanced for adjustment.

The form of the invention just described is for use with a nipple of such size as will receive the nose, 29, when the latter is made as small as considerations of strength will permit. When a smaller sized nipple is to be finished, the form of the invention shown in Figs. 4 and 5 may be employed. In this form, the body 30 is provided with slots, 31, which receive end cutting tools 32. The slots are preferably disposed slightly off a true diameter as shown in Fig. 4, so that the cutting edges of the end tools may be in the same plane.

Extending through the body, 30, is a slot, 33, in the central portion of which is a reamer, 34, having the cutting edges thereof formed very much in the same way as the cutting edges of the reamer 13, shown in the first form of the invention. Thus, the part of the reamer first to engage the nipple does the cutting and that nearer the body, 30, serves as a centering and steadying means to prevent chattering. The slot, 33, also contains the chamfering tools, 35. As in the first mentioned form of the invention, a collar, 36, is employed to strengthen the body 30. This collar, 36, is provided with screws, 37, which bear down upon the end cutters 32, and the chamfering tools 35. The collar, 36, fits tightly upon the body, 30, and is held there by said screws, 37. The chamfering tools, 35, are acted upon by a force which tends to move them radially from the body, 30, but this is resisted by the adjacent screws, 37. The screws also serve to steady the reamer 34.

It will be seen that the screw 37, which pushes down upon the end cutter, 32, will force the same against one side of the reamer, and the opposite side of the reamer, 34, against a solid portion of the body 30. With the construction shown in Fig. 4, the pressure just mentioned may be made to extend over a large part of the width of the reamer to prevent twisting thereof. The cutters may be made of such length as is required to insure sufficient strength of the assembled tool.

In order to move the chamfering and end cutters, tapping of the non-cutting ends may be restored to, as in the first form of the invention, but in order to advance the reamer, there is provided an internally threaded bore, 38, in which is mounted a screw, 39, which may be advanced by means of a tool inserted through a hollow, threaded shank 40 which is integral with the cutter, 30. By making the collar, 36, extend beyond the end of the body 30, there is provided a protecting means for the cutters and the end of the nipple which is being cut.

I claim—

1. A compound tool comprising a cylindrical head with an integral nose projecting from its front end, there being peripheral longitudinal slots in the head and a set of deeper slots extending longitudinally of the head and the nose, reamers mounted in the last-named slots with their cutting edges adjacent the end of the nose, means for adjusting the position of said reamers, and other cutters mounted in the remaining slots with their cutting edges projecting beyond the end of the head.

2. A compound tool comprising a cylindrical head with a nose projecting from its front end, there being peripheral longitudinal slots in the head and a set of deeper slots extending longitudinally of the head and the nose, reamers mounted in the last-named slots with their cutting edges adjacent the end of the nose, cutters mounted in the remaining slots with their cutting edges projecting beyond the end of the body, and means for adjusting the last-named set of cutters longitudinally.

3. A compound tool comprising a cylindrical head with a nose projecting from its front end, there being peripheral longitudinal slots in the head and a set of deeper slots extending longitudinally of the head and the nose, reamers mounted in the last-named slots with their cutting edges adjacent the end of the nose, means for adjusting said reamers longitudinally, other cutters mounted in the remaining slots with their cutting edges remote from those of the reamers, and independent means for adjusting the distance which the cutting edges of these cutters shall project beyond the head alongside the nose.

4. A compound tool comprising a body, and reaming cutters and end cutters carried by the body, the cutting edge of the reamers being remote from the cutting edges of the end cutters while the parts of the reaming cutters adjacent the end cutters are non-cutting and of slight pitch so as to act as a steadying means for the object being operated upon.

5. A compound tool comprising a body having a plurality of longitudinal slots formed therein, end cutters and chamfering cutters extending to the periphery of the body, the body having other slots cut longitudinally therein, reaming cutters located in the bottoms of said other slots, and screws engaging the sides of the body opposite each of said other slots and engaging the reaming cutters.

6. In a tool of the class described, the combination with a cylindrical head having longitudinal slots in its body and radial sockets opening from the slots through its periphery; of cutters whose shanks are mounted in said slots, screws threaded into said sockets against the shanks, and a collar surrounding said body and inclosing the screws.

7. A compound tool having a cylindrical body, end cutters extending beyond one end of the body, reamers having their cutting edges extending beyond the end cutters, and removable chamfering cutters having their cutting edges between the cutting edges of the reamers and end cutters.

8. A compound tool having a cylindrical body and a nose extending from one end of the body, reamers carried by the nose and having cutting edges adjacent the end of the nose and non-cutting edges from the cutting edges back to the body, and end cutters carried by the end of the body remote from the end of the nose.

9. In a tool, the combination with a cylindrical body having longitudinal slots opening radially through its periphery, and tools whose shanks are mounted in said slots and whose cutting edges project beyond the end of the body; of a collar inclosing said body and having radially threaded sockets, and screws engaging said sockets and bearing against the tools within said slots.

10. A compound tool comprising a body having longitudinal peripheral slots opening out its front end, an axial nose projecting from said body and having longitudinal radial slots extended into the body, end cutters and chamfering cutters whose shanks are mounted in the slots in the body and whose cutting edges project beyond its front end, and reamers whose shanks are mounted in the remaining slots and whose cutting edges are of steep pitch and stand near the end of the nose, said reamers having non-cutting portions of less pitch in rear of their cutting edges.

11. A compound tool having a cylindrical body, a nose extending therefrom, reamers carried by the nose and having cutting edges remote from the body, chamfering cutters carried by the body and having cutting edges remote from the cutting edges of the reamers, and means to adjust the reamers longitudinally.

12. A compound tool comprising a cylindrical body, reamers having cutting edges remote from one end of the body, chamfering cutters carried by the body and having cutting edges adjacent one end of the body, and means to adjust the distance between the sets of cutting edges.

13. A compound tool comprising a cylindrical body, end cutters carried by the body and having cutting edges at one end of the body, reamers carried by the body and having cutting edges beyond the cutting edges of the end cutters, chamfering cutters having the cutting edges adapted to engage the object operated upon at a point between the other cutting edges, and means to adjust the reamers and chamfering cutters longitudinally.

14. A compound tool comprising a cylindrical body provided with a series of longitudinal slots, end cutters located in said slots, the body being provided with a second series of slots, reamers located in said last-named slots, said body being provided with a third series of slots, chamfering cutters in said last-named slots, a collar surrounding the

body, and screws located in the body, adapted to engage the chamfering cutters to hold the same against movement.

15. A compound tool comprising a cylindrical body, chamfering cutters carried thereby, a collar surrounding the body, screws located in the collar adapted to engage the chamfering cutters to resist movement of the latter, reamers carried by the body, and separate means to hold the reamers in position.

16. A compound tool comprising a cylindrical body having longitudinal slots opening radially thereof, reamers located in the slots, and radial screws located in the body and engaging the opposite walls of the slots.

In testimony whereof I affix my signature in presence of two witnesses.

HARRY B. KENDALL.

Witnesses:
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W. H. WAKEFIELD