D. H. DUGAR.

EXPANSIBLE REAMER.

APPLICATION FILED FEB. 3, 1917.

1,265,888.

Patented May 14, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

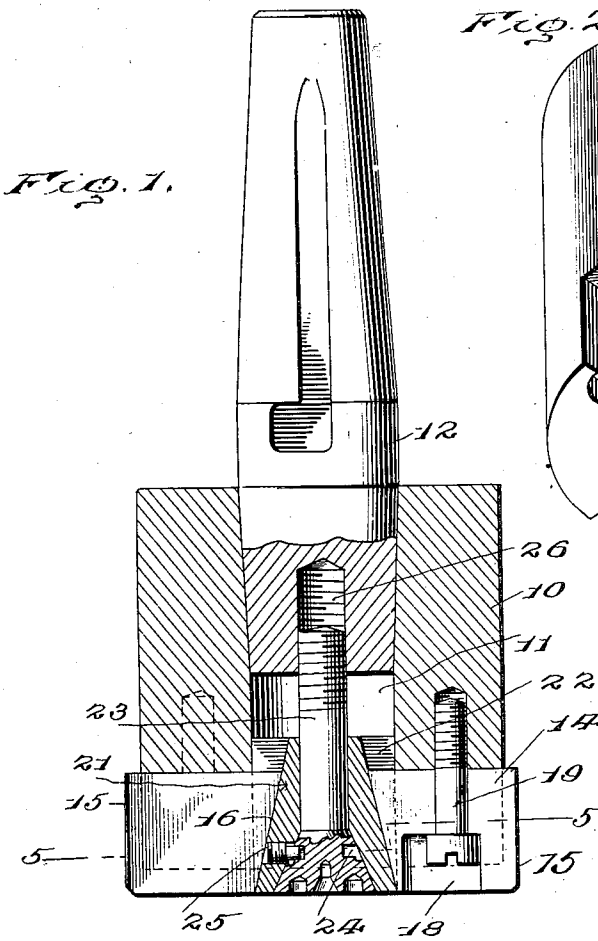


Fig. 2.

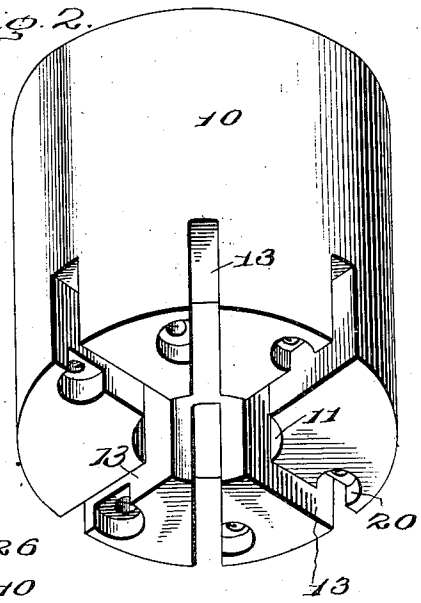
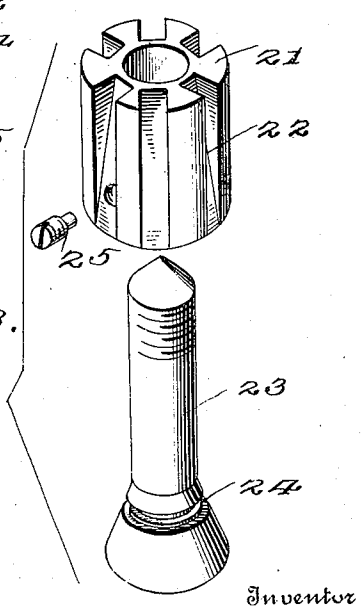


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

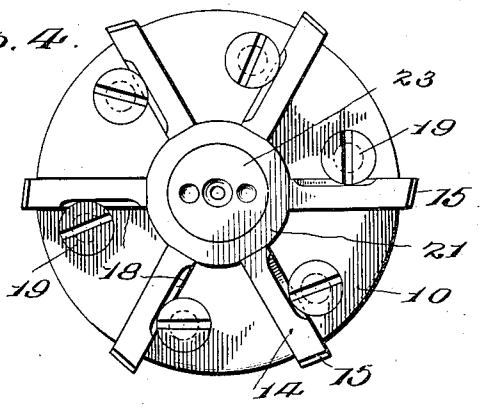


Fig. 5.

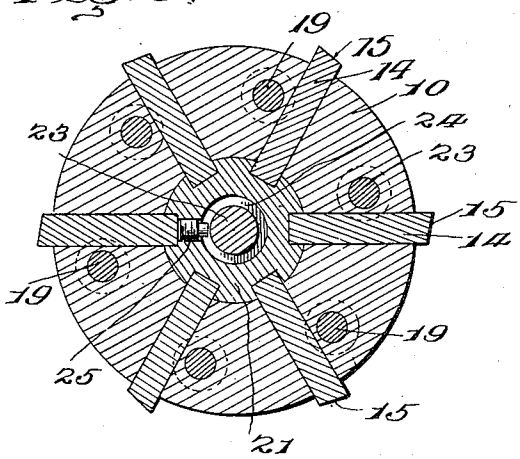


Fig. 6.

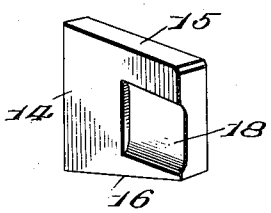


Fig. 7.

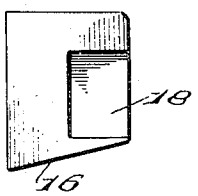
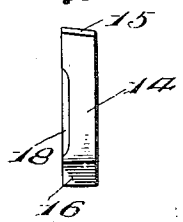


Fig. 8.



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UNITED STATES PATENT OFFICE.

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EXPANSIBLE REAMER.

1,265,888. Specification of Letters Patent. Patented May 14, 1918.

Application filed February 3, 1917. Serial No. 146,477.

To all whom it may concern:

Be it known that I, DELANO H. DUGAR, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Expansible Reamers, of which the following is a specification.

This invention relates to an improved expansible reamer particularly designed for boring the cylinders of internal combustion engines and has as its primary object to provide a device of this character wherein the cutting blades employed may be easily and delicately adjusted to vary the diameter of the bore to be cut by the reamer.

The invention has as a further object to provide an arrangement wherein all of the cutting blades may be adjusted simultaneously and in equal degree and wherein the said blades may be locked at adjustment.

The invention has as a still further object to provide a reamer wherein the means employed for adjusting the blades may, after the blades are locked, be removed from the body of the device for the purpose of oiling without affecting the adjustment of the blades.

And a still further object of the invention is to provide an arrangement wherein the screw for adjusting the blades will be engaged with the shank of the device for connecting the said shank with the body of the reamer.

Other and incidental objects will appear as the description proceeds and in the drawings wherein I have illustrated the preferred embodiment of the invention and wherein similar reference characters designate corresponding parts throughout the several views:

Figure 1 is a sectional view partly broken away and particularly illustrating the arrangement of the plug employed for adjusting the cutting blades radially of the body of the device and the manner in which the adjusting screw for the said plug is connected with the shank of the reamer,

Fig. 2 is a bottom perspective view of the reamer body and illustrating the slots formed therein to receive the cutting blades,

Fig. 3 is a perspective view illustrating the adjusting plug and screw detached and showing the inclined seats in the plug for engagement with the inner ends of the cutting blades,

Fig. 4 is a bottom plan view of the device particularly illustrating the radial disposition of the cutting blades,

Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 1 and illustrating the manner in which the adjusting plug is arranged to engage all of the cutting blades for simultaneously adjusting the said blades,

Fig. 6 is a detail perspective view showing one of the cutting blades detached and illustrating the seat formed therein to receive the locking screw for the said blade,

Fig. 7 is a side elevation of one of the cutting blades, and

Fig. 8 is a top plan view of one of the said blades.

In carrying out the invention, my improved reamer is preferably formed with a cylindrical body 10 provided with an axial bore 11, the upper portion of which is tapered. Fitted into the tapered upper extremity of the said bore is the inner tapered end of an attaching shank 12. The body, at its lower extremity, is provided with a plurality of radial slots 13 opening into the said bore and snugly fitted in the said slots to slide therein are the cutting blades 14 having straight inner edges to rest upon the bottom walls of the said slots.

The blades 14 are of the type particularly shown in detail in Fig. 6 of the drawings, being provided, at the outer extremities thereof with cutting edges 15 while the inner terminals of the said blades are provided with beveled edges 16. Formed in the outer longitudinal edges of the blades upon corresponding sides thereof, are suitable recesses providing seats 18 and engaging in the said seats are a plurality of locking screws 19 threaded into the body 10 to extend longitudinally thereof. As particularly shown in Fig. 1, the heads of these screws are countersunk into the body, the said screw heads being received in recesses 20 formed in the body at corresponding sides of the slots 13 with the said recesses communicating with the said slots. Consequently, the screws 19 may be adjusted to engage the

heads thereof within the seats 18 of the blades 14 for binding the said blades within the slots 13 and firmly connecting the blades with the body.

Slidably mounted within the lower extremity of the bore 11 is an adjusting plug 21 having a plurality of longitudinally extending slots formed therein to provide radially arranged inclined or beveled seats 22 corresponding in number to the slots 13 in the body 10 and adapted to register therewith for receiving the inner beveled terminals 16 of the cutting blades 14. Rotatably fitted through the plug 21 is an adjusting screw 23 provided in the conical head thereof with an annular groove 24 and threaded through one side of the plug to loosely engage in said groove, is a locking pin or screw 25 connecting the plug with the screw 23. The adjusting screw 23 is, as particularly shown in Fig. 1, engaged in an axial screw threaded bore 26 in the inner terminal of the shank 12.

As will now be clear, the locking screws 19 may be loosened and the screw 23 operated for adjusting the plug 21 inwardly within the bore 11 of the body 10. Such inward movement of the said plug will cause the inclined seats 22 thereof to coact with the beveled inner terminals 16 of the cutting blades 14 to correspondingly adjust the said blades outwardly upon the body 10 within the slots 13 for increasing the cutting diameter of the said blades. When so adjusted, the screws 19 may then again be tightened to firmly bind the blades within the said slots for holding the blades at adjustment. It will be noted that rotation of the screws 19 to engage the heads thereof within the seats 18 of the cutting blades will cause the said screw heads to frictionally contact with the bottom walls of the said seats for forcing the inner terminals of the cutting blades tightly against the plug 21 so that there will be no looseness between the parts. The cutting blades may thus be easily and delicately adjusted and attention is directed to the fact that by operating the screw 23 to force the plug 21 inwardly within the bore 11, all of the said blades will be simultaneously adjusted outwardly in equal degree.

After the screws 19 have been tightened, the plug 21 will then abut with the inner terminals of the cutting blades for holding the said plug rigid against further inward movement so that further tightening of the screw 23 will then act to bind the shank 12 within the upper tapered extremity of the bore 11 and rigidly connect the said shank with the body 10. Also, it is to be noted that after the cutting blades have been adjusted and the screws 19 tightened, the adjusting screw 23 may be released from the shank 12 and the plug 21 removed without affecting the adjustment of the said blades, so that the said plug and the screw may be oiled at any time desired.

It will therefore be seen that I provide a very simple arrangement and a reamer particularly adapted for the purpose set forth.

Having thus described my invention, what is claimed as new is:

1. A device of the character described including a body, an attaching shank, a cutting blade adjustable outwardly upon the body, means slidably coacting with the blade for adjusting the said blade, and means for adjusting said first mentioned means and engaging the said shank for connecting the shank with the body.

2. A device of the character described including a body provided with a bore and formed with a slot communicating with the said bore, a cutting blade slidably mounted in said slot to project into the bore, a shank fitted in one extremity of the bore, a plug slidable in the opposite extremity of the bore and formed to coact with said blade, and means for sliding the plug within the bore to adjust the said blade and engaged with the said shank for connecting the shank with the body.

3. A device of the character described including a body, a cutting blade adjustable outwardly thereon, means coacting with the blade for adjusting the said blade, and means loosely connected to said first-mentioned means and having the said first-mentioned means mounted to travel therewith for adjusting the said first-mentioned means.

4. A device of the character described including a body, a cutting blade adjustable outwardly thereon, means coacting with the blade for adjusting the said blade, means coacting with said first-mentioned means for adjusting the said first-mentioned means and free to rotate thereon, and means rotatably connecting the said first-mentioned means with the said second-mentioned means to travel therewith.

5. A device of the character described including a body provided with a bore having a tapered portion, a shank fitted in the tapered portion of said bore, a blade adjustable outwardly upon the body, and means arranged within the bore for adjusting the said blade and operatively connecting the shank with the body.

6. A device of the character described including a body, a blade adjustable outwardly thereon, a shank extending from the body, means coacting with the blade for adjusting the said blade, and means adjustably engaging the inner extremity of the shank for adjusting the said first-mentioned means.

7. A device of the character described including a body provided with a bore, a blade

adjustable outwardly upon the body, a shank fitted in one extremity of the bore, a plug fitted in the opposite extremity of the bore and coacting with the blade for adjusting the said blade, and means fitted through the said plug and engaging the inner extremity of the shank for adjusting the said plug.

8. A device of the character described including a body, a cutting blade adjustable outwardly thereon and formed upon one side with a shoulder, and means engaging the lower end of the body and overhanging said shoulder for holding the blade at adjustment.

9. A device of the character described including a body provided with a slot and having a recess formed therein communicating with the slot, a cutting blade adjustable outwardly upon the said body in the said slot, the said blade being formed with a shoulder, and headed means coacting with the body and having the head thereof received in said recess and engaging said shoulder for holding the blade at adjustment.

10. A device of the character described including a body, a cutting blade adjustable outwardly upon the body, means coacting with the said blade for adjusting the blade, and means having swiveled connection with the said first mentioned means for adjusting the said first mentioned means in opposite directions.

11. A device of the character described including a body, a shank carried by the body, a blade adjustable outwardly upon the body, means for adjusting the said blade, and means coacting with said first mentioned means for binding the shank in engagement with the body.

In testimony whereof I affix my signature.

DELANO H. DUGAR. [L. S.]