No. 696,634. Patented Apr. 1, 1902.

J. HARTNESS.

CHUCK.

(Application filed Mar. 20, 1901.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1

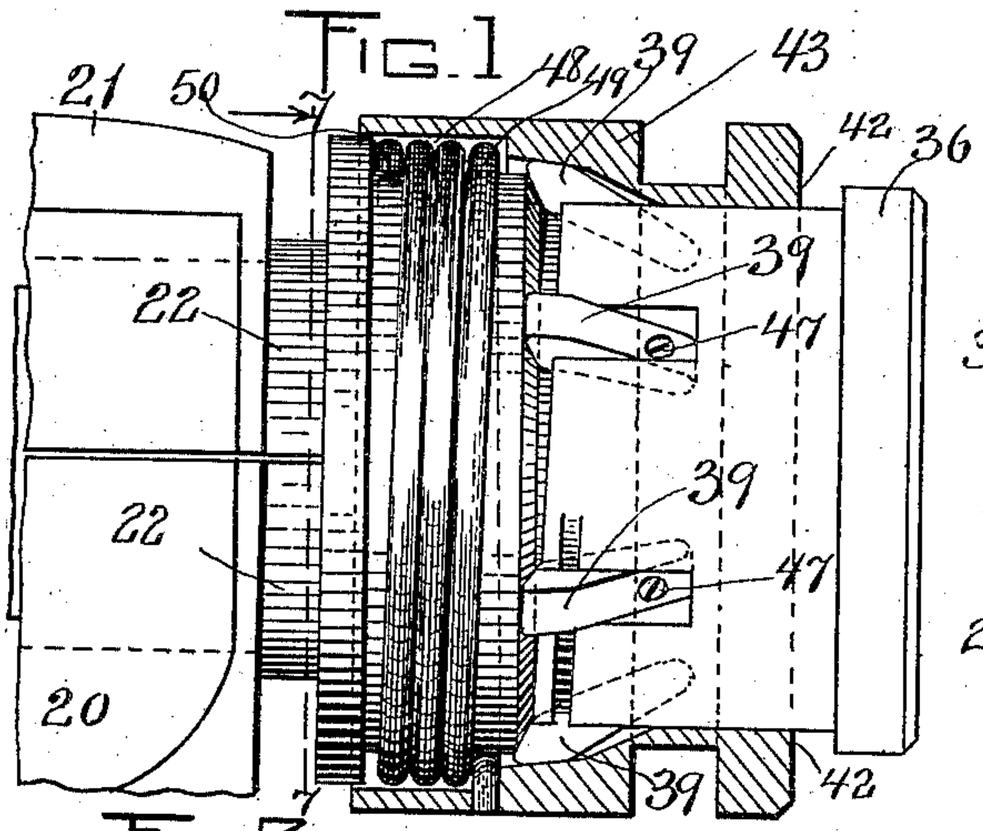


FIG. 2

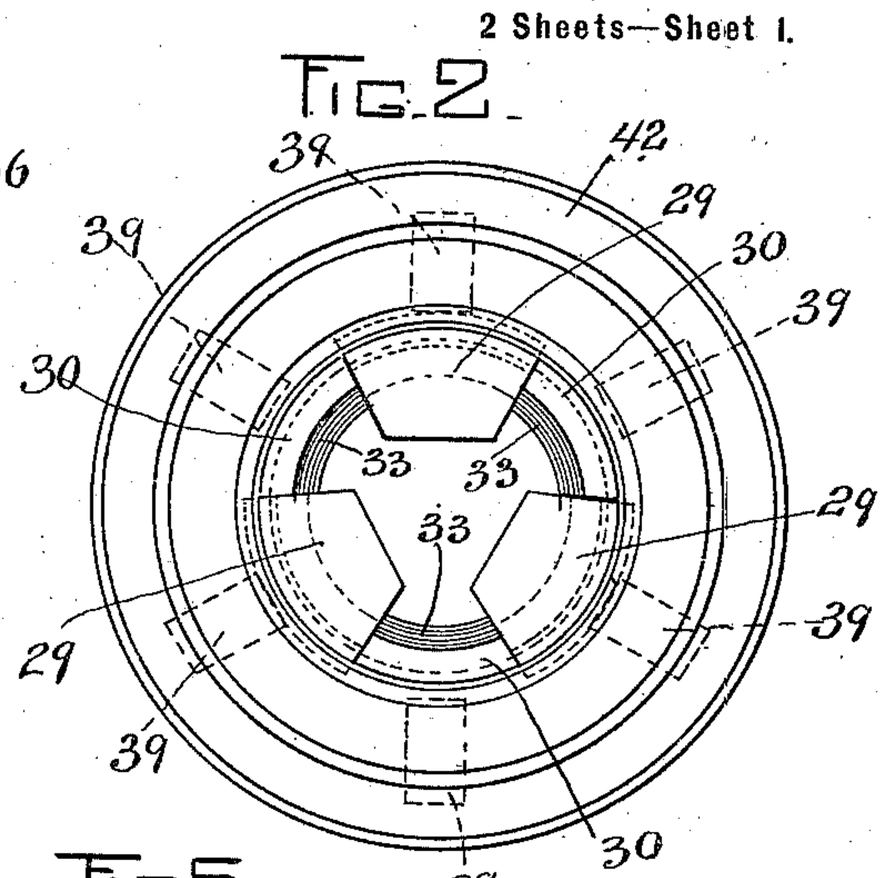


FIG. 3

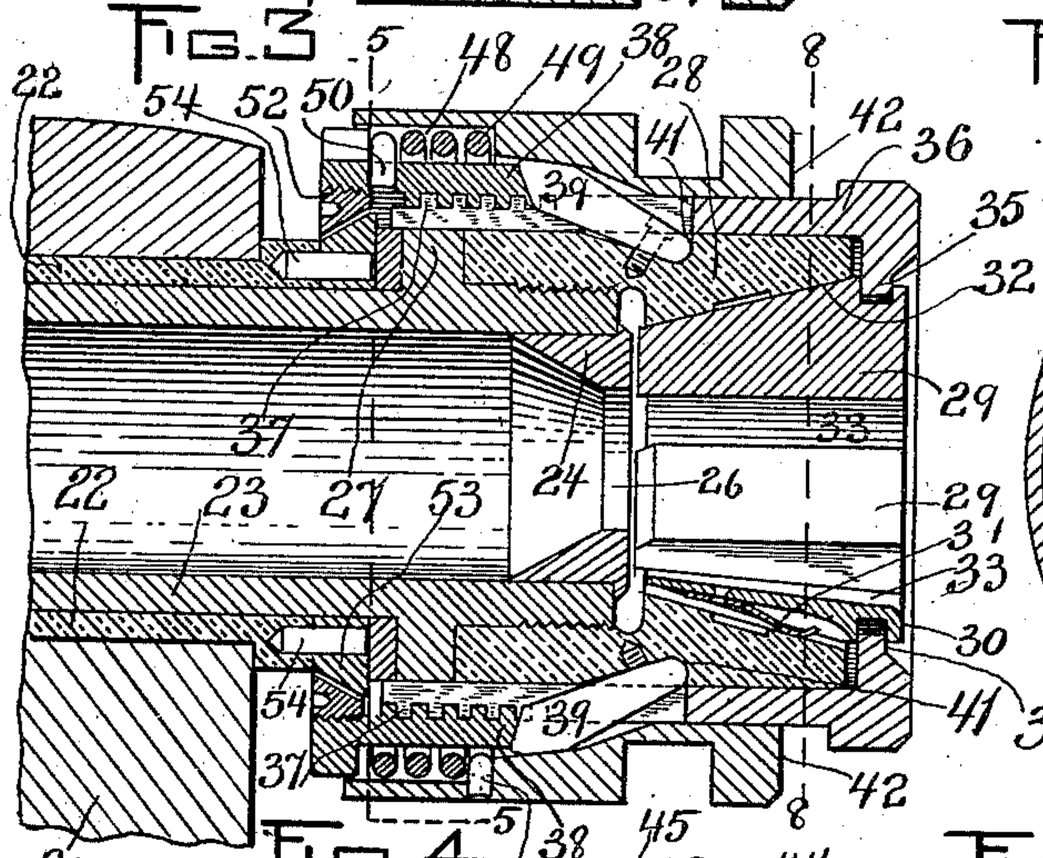


FIG. 5

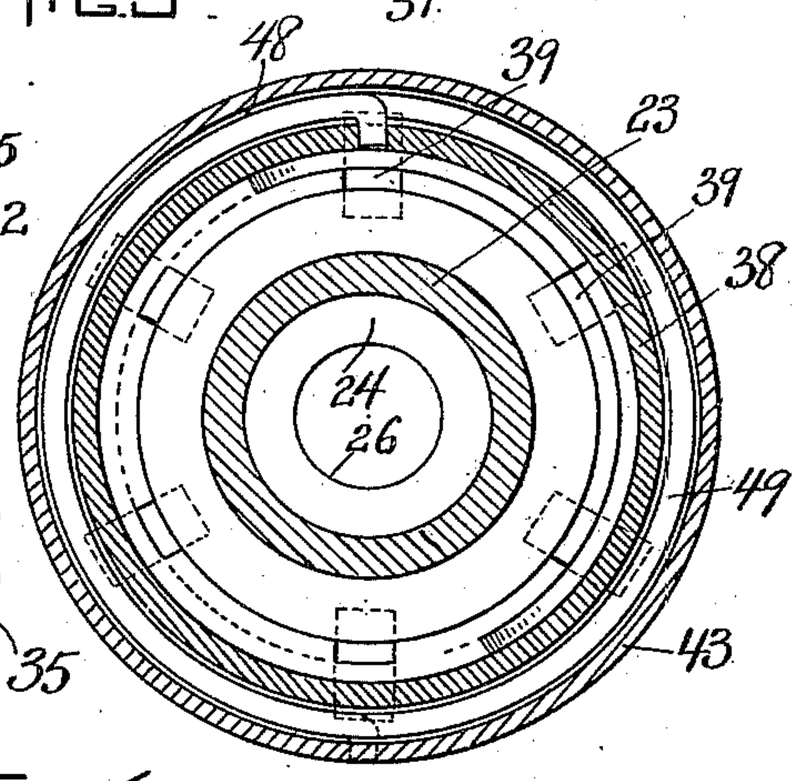


FIG. 4

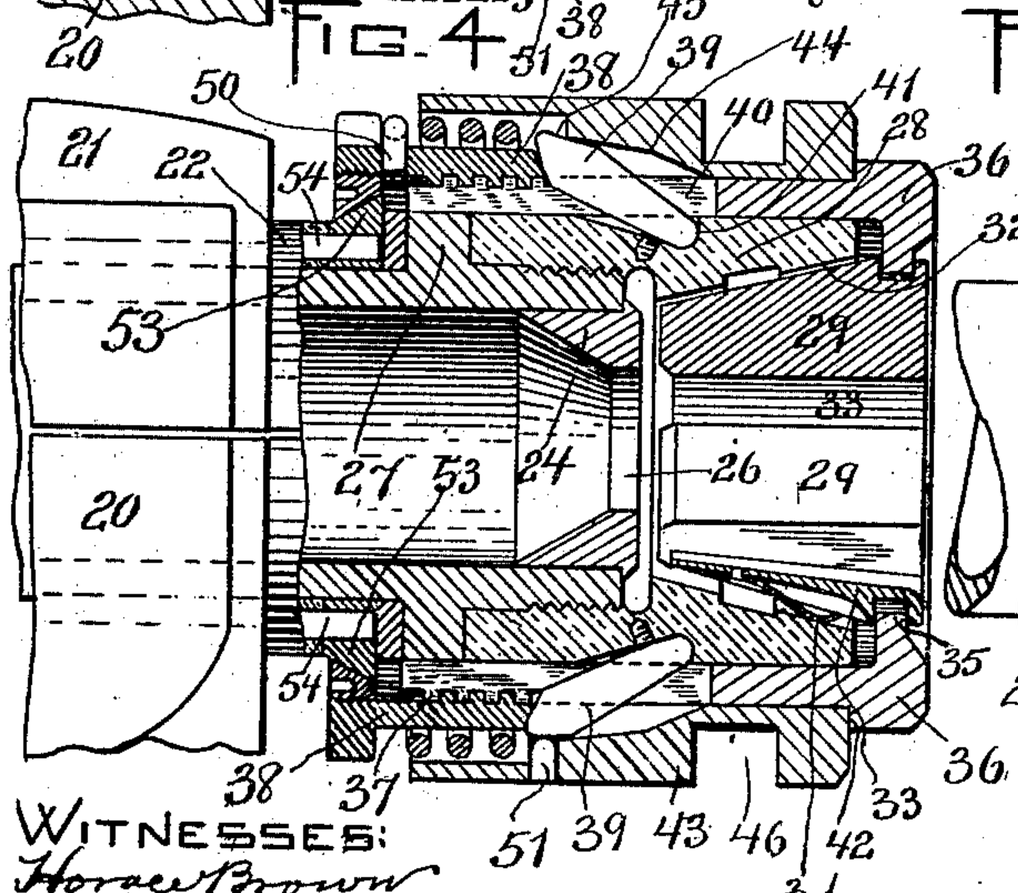
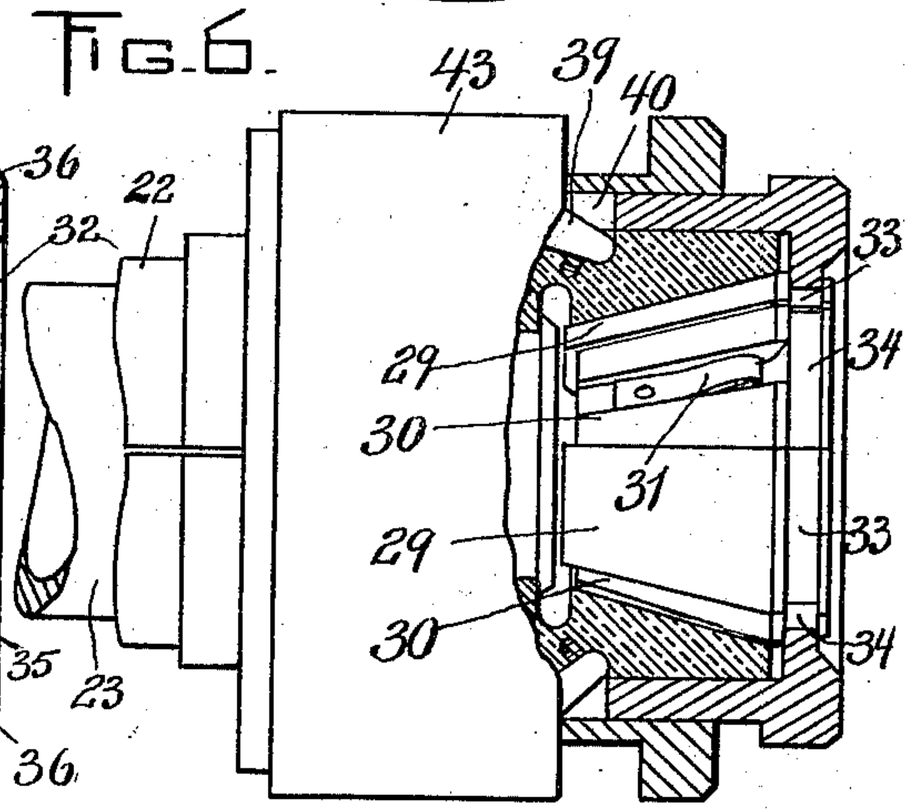


FIG. 6.



WITNESSES:
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J. M. Bennett

INVENTOR:
James Hartness

No. 696,634. Patented Apr. 1, 1902.

J. HARTNESS.

CHUCK.

(Application filed Mar. 20, 1901.)

(No Model.) 2 Sheets—Sheet 2.

FIG. 7.

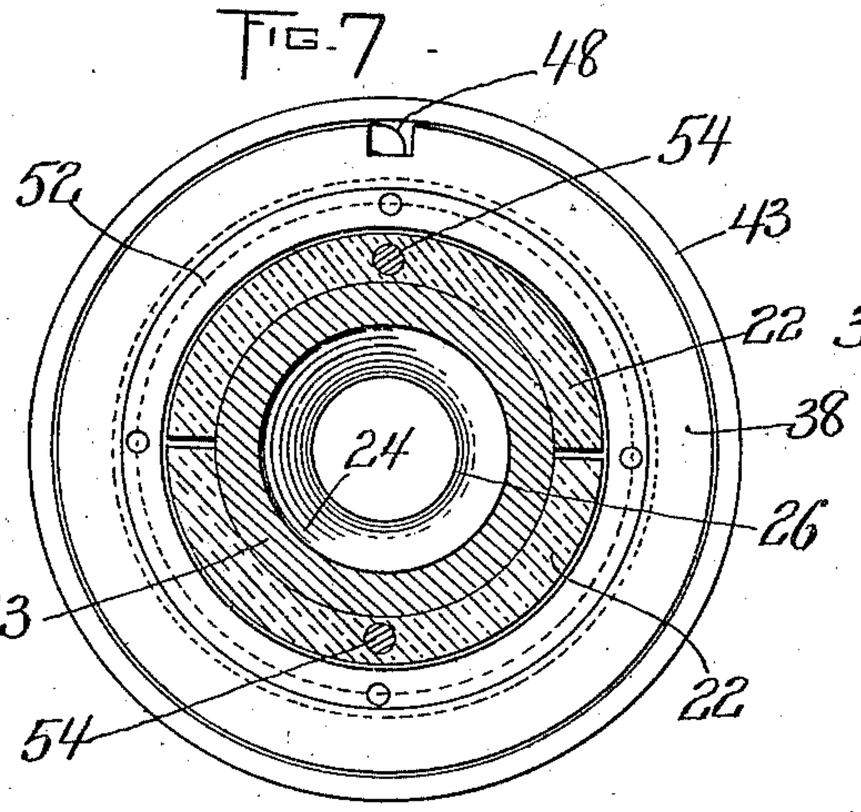


FIG. 8.

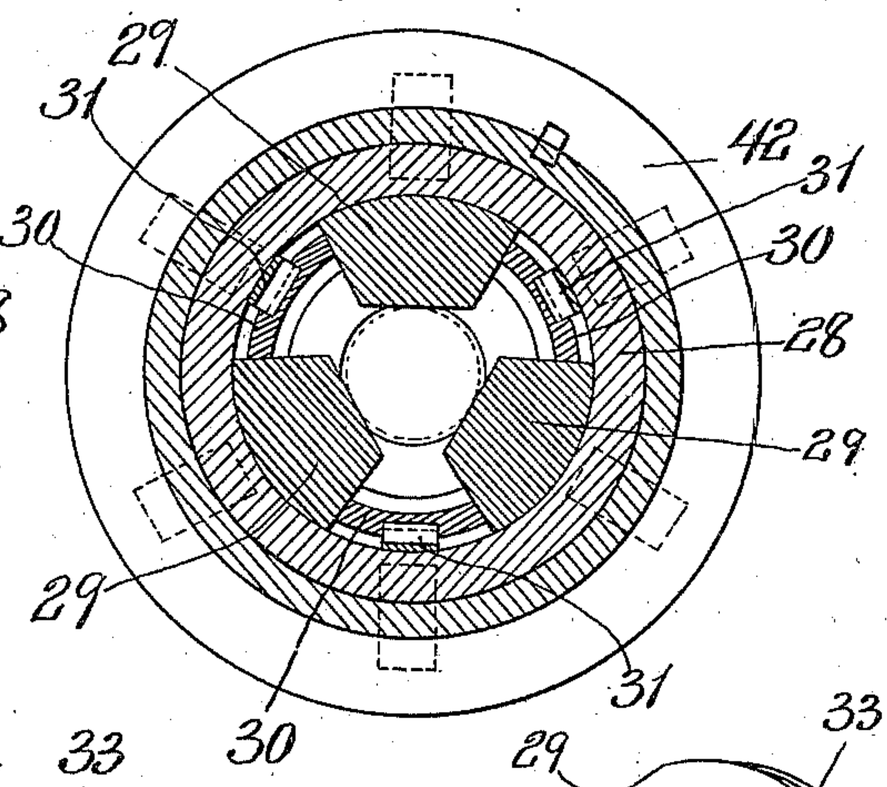


FIG. 9.

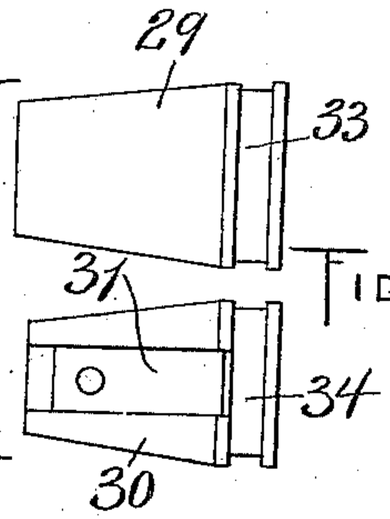


FIG. 10.

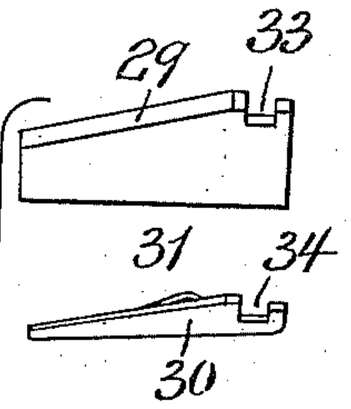


FIG. 11.

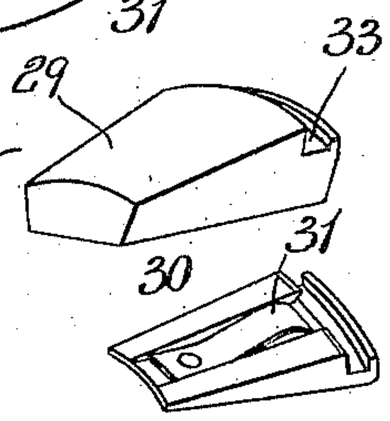


FIG. 12.

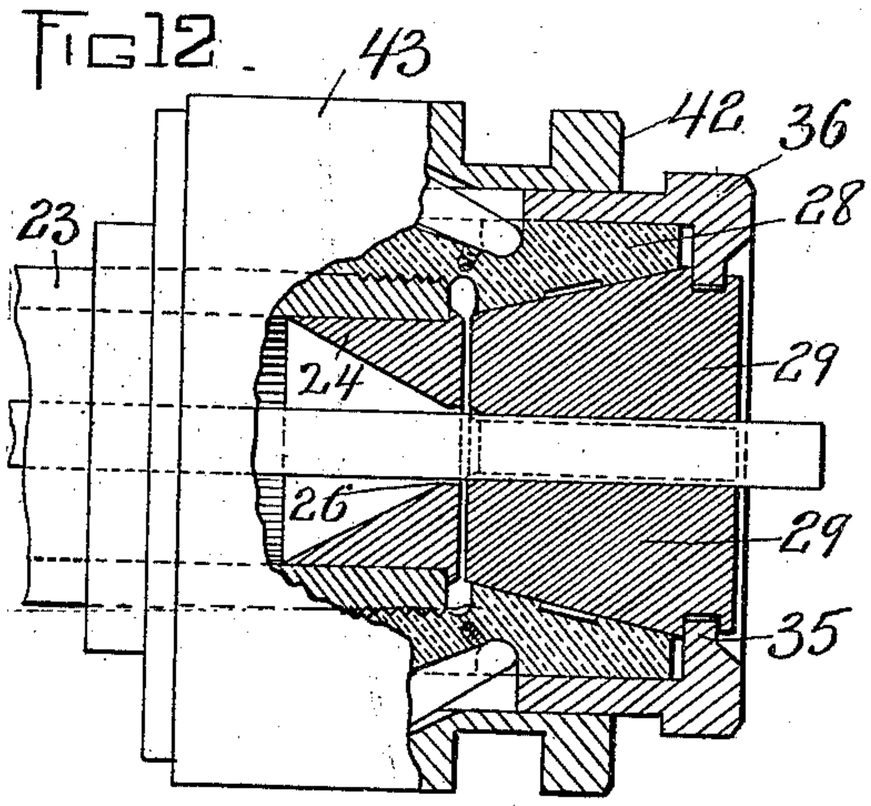
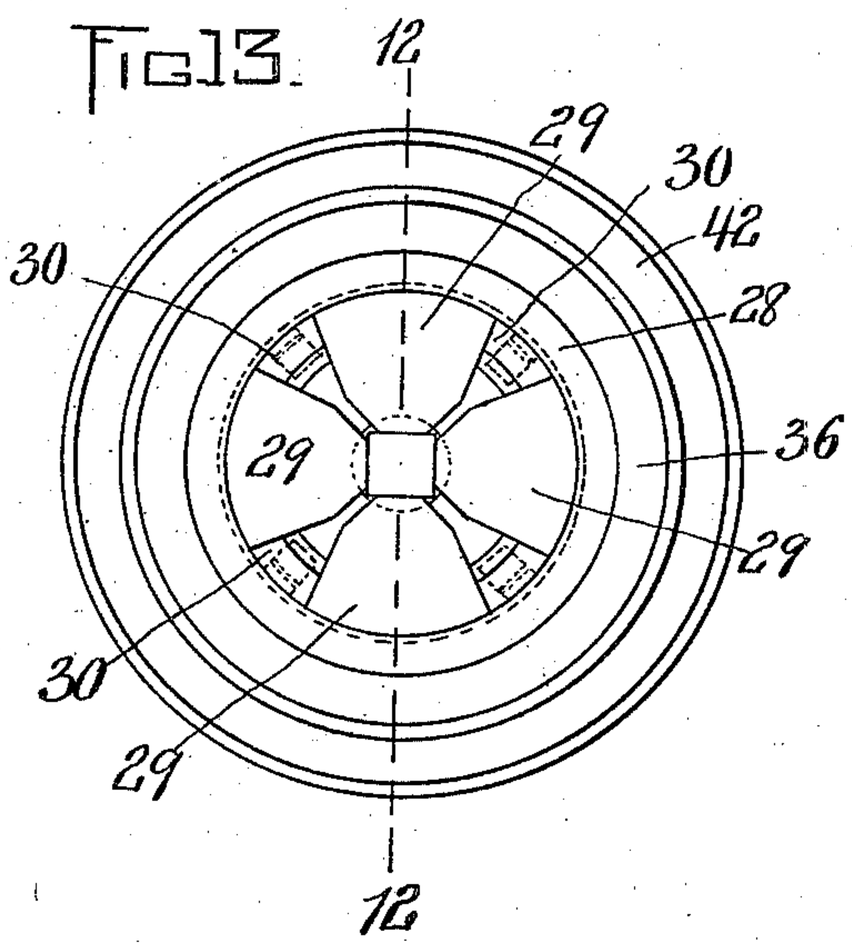


FIG. 13.



WITNESSES:
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UNITED STATES PATENT OFFICE.

JAMES HARTNESS, OF SPRINGFIELD, VERMONT.

CHUCK.

SPECIFICATION forming part of Letters Patent No. 696,634, dated April 1, 1902.

Application filed March 20, 1901. Serial No. 52,044. (No model.)

To all whom it may concern:

Be it known that I, JAMES HARTNESS, of Springfield, in the county of Windsor and State of Vermont, have invented certain new and useful Improvements in Chucks, of which the following is a specification.

This invention has relation to chucks for machine-work, and has for its objects, first, to provide an automatic adjustment for the jaw-setting device to compensate for unevenness in the work; second, to provide means for holding the jaws open when the chuck is open and also to prevent chips or fine particles of foreign matter from entering the chuck, and, third, to provide means for centering the work relatively to the jaws as it is fed thereinto.

So far as many of the features of the chuck are concerned it is adapted for employment on both work and tools, as will be subsequently explained in detail.

The manner in which I attain the objects of the invention and in what the invention consists are set forth in the following specification and claims, which may be read in connection with the accompanying drawings.

Referring to said drawings, which illustrate one embodiment of the invention, Figure 1 represents my chuck in front elevation with the hollow sleeve or member in section. Fig. 2 represents an end elevation of the chuck. Fig. 3 represents a longitudinal section of the chuck, showing the parts in closed position. Fig. 4 represents a similar section with the chuck open. Fig. 5 represents a section on the line 5 5 of Fig. 3. Fig. 6 represents a partial sectional view of the chuck and illustrates the spacers. Fig. 7 represents a section on the line 7 7 of Fig. 1. Fig. 8 represents a section on the line 8 8 of Fig. 3. Figs. 9, 10, and 11 illustrate different positions of the jaws and spacers. Fig. 12 illustrates an embodiment of my invention in which four jaws and spacers are employed for the work or for holding a tool. Fig. 13 represents a front elevation of the same.

On the drawings, 20 indicates a bearing having a cap 21, and 22 indicates a fixed non-rotary bushing or bearing-block in which is journaled a hollow spindle 23. In bar-working machines the work is fed longitudinally through this spindle by suitable feed mechanism, at which time the jaws of the chuck are open. Therefore to center the work when it is introduced into the spindle I employ an internal bushing 24, which is beveled, as shown, having a reduced mouth or throat 26, which is slightly larger in diameter than the internal diameter of the jaws when the latter are in their extreme open positions. The spindle is formed with an external circumferential flange 27 and with an external thread to receive a tapered collar 28, which is shown in Figs. 3 and 4 as screwed home against the flange 27. This collar or abutment is beveled inwardly, as shown, to provide a conical surface against which the jaws 29 slide to wedge them against the work. The inward movement of said jaws longitudinally of the axis of rotation causes them to be forced against the work, while an outward movement in the opposite direction releases them. In order to normally hold the jaws with a spring-pressure against the internal beveled surface of the collar 28, I employ spacers 30. In front elevation the jaws taper from their outer toward their inner ends, so that the space between the two jaws is V-shaped, as indicated in Fig. 2. The sides of the spacers are therefore inclined, so as to bear against the sides of the jaws and fill the space between them. Each spacer, as shown in Figs. 9, 10, and 11, is provided with a leaf-spring 31, which bears against the beveled face 32 of the collar 28 and tends to force said spacer toward the center of the chuck. The pressure of the springs against all of the spacers causes the sides of the latter to wedge against the sides of the jaws and hold the outer surfaces or ends of said jaws yieldingly against the beveled face 32 of the collar 28. In this way when the jaws are open they are prevented from falling inward toward the center of the chuck, and it is therefore impossible for chips or fine particles of foreign matter to be introduced between the jaws and the collar.

The inclination of the sides of the jaws and the spacers to the radii of the chuck is such that when the jaws are thrust inward toward the center of the chuck the spacers are forced radially outward by the jaws, and when the spacers are thrust inwardly by their springs the jaws are forced outward. Hence the jaws are always held against the collar

28 by the spacers and the springs 31, said springs being powerful enough to move both the spacers and the jaws when the latter are free to move outward.

The jaws and the spacers are provided with grooves at their outer ends, which project beyond the collar 28, the grooves in the jaws being indicated at 33 and those in the spacers at 34, and it will be seen from Fig. 6 that all of the grooves are in alinement to receive an inwardly-projecting flange 35 on the end of the sleeve 36, which encircles the collar 28. Thus when the collar, which is movable longitudinally of the spindle, is actuated the jaws and the spacers are moved with it. The grooves in the spacers and in the jaws are so deep and the flange 35 extends so far thereinto that the flange never becomes disengaged from the grooves. On its inner end the sleeve 36 is provided with screw-threads 37 to receive an external nut 38, against which bears the ends of wedges 39, which are located in slots 40 in the sleeve and have their inner ends resting in sockets 41 in the collar.

Placed upon the sleeve 36 and held from moving forward thereon by the shoulder 42 is a sliding sleeve 43, splined thereto and having an internal beveled surface 44, which bears against the inclined ends 45 of the dogs 39. When the sleeve 43 is moved rearwardly, the inclined internal cam-surface 44 engages the ends of the wedges, forcing them downwardly against the nut 38, with the result that the said nut is thrust rearwardly, carrying with it the sleeve 36 and the jaws and spacers, whereby said jaws are forced inwardly by the internal beveled face of sleeve 28 to grip the work or tool placed between them. The sleeve 43 is grooved, as at 46, to receive suitable means for moving it longitudinally, such as pins or rolls on a yoke. (Not shown.) The wedges 39 are held loosely against dislocation by screws 47. In addition to these devices I provide means for effecting an automatic adjustment of the jaws inward when the sleeve 43 is moved outwardly toward the end of the spindle. To accomplish this, I place within a socket 48, in the rear end of the sleeve 43, a helical spring 49 and attach one end 50 to the nut 38 and the other end 51 to the sleeve 43. (See Figs. 3 and 4.) To the internal-threaded inner end of the nut I attach a screw. The beveled internal collar 52 is adapted at certain times to engage a beveled flange 53, secured by pins 54 to the bearing 22. The engaging faces of the flanges 52 and 53 are at the same inclination. Hence when the sleeve 43 is thrust outwardly by the usual lever having pins or rolls entering the circumferential groove 46 in said sleeve 43, as shown in Fig. 4, to move the jaws relatively to the sleeve 28, and thereby permit said jaws to open, the flange on the end engages the stationary flange, and as the sleeve continues to rotate, the nut is held frictionally against rotation, and the spring 49 is wound up, and at the same time to screw the sleeve 36 outwardly and permit the jaws to open still farther under the tension of springs 31. Then after the work is fed through the chuck, the further movement of the sleeve 43 inwardly or rearwardly carries the sleeve 36 backward far enough to disengage the two flanges 52 and 53 and permit the spring to rotate the nut and move the jaws inward against the work, this inward movement of the jaws being increased as the wedges 39 are forced inwardly by the internal beveled face 44 of the sleeve 43. The action of the spring is to bring the jaws up against the work, while a further movement of the sleeve tightly wedges the jaws against the work to hold it rigidly against movement. It is evident that any number of jaws and spacers may be employed, and in Figs. 12 and 13 I have shown four of each; but the action does not differ from the action of those which I have described. It is obvious that in any case the movement of the jaws and spacers is opposite—that is to say, when the jaws are moved inward that the spacers are moved outward and when the pressure on the jaws is released the springs on the spacers move the latter inward and the jaws outward. There are numerous advantages incident to this construction; but as they will be apparent to those familiar with this art it is unnecessary to enumerate more than has already been done.

Having thus explained the nature of the invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is—

1. A chuck having jaws, means for closing said jaws and supports coöperating with said jaws for holding said jaws open when the chuck is open, said supports frictionally engaging said jaws at their sides, whereby said jaws are movable relatively thereto.

2. A chuck having radial jaws and wedge-shaped radially-movable spacers interposed between said jaws.

3. A chuck having radial jaws and spring-tensioned spacers having provisions for holding said jaws open.

4. A chuck having radial jaws, wedge-shaped spacers between said jaws, and means whereby when the jaws are moved toward their common center, the spacers move away from said center, and vice versa.

5. A chuck having wedge-shaped jaws, and radially-movable wedge-shaped spacers coöperating therewith.

6. A chuck having wedge-shaped jaws and spring-tensioned wedge-shaped spacers.

7. A chuck having radial jaws, radial spacers between said jaws, said jaws and spacers being grooved, and a sleeve having an internal flange extending into said grooves, and thereby holding the spacers against movement longitudinally of the chuck relatively to the jaws.

8. A chuck having an annular abutment, jaws located within said abutment, and independent radially-movable spacers located between said jaws for holding them against said abutment, when said jaws are open.

9. A chuck having jaws radially disposed and tapering from their outer to their inner ends, and spacers interposed between the sides of the jaws and movable relatively to said jaws for the purpose described.

10. A chuck having jaws, means for opening and closing said jaws, and supplemental means for closing said jaws with a spring-pressure against the work.

11. A chuck having jaw-operating means, and also having provisions for closing said jaws upon the work prior to the actuation of said jaws by said operating means.

12. A chuck having jaws, means for opening and closing said jaws, and provisions whereby said jaws are closed yieldingly against the work, prior to the operation of the jaw-closing means.

13. A chuck having jaws, a sliding sleeve for positively closing said jaws, adapted to be operated manually or automatically, and a spring for closing said jaws prior to the actuation of said jaws by said sleeve.

14. A chuck having jaws, a spring for bringing the jaws against the work, and means additional thereto for tightly wedging the jaws against the work after the operation of the spring.

15. A chuck having jaws, a sleeve for actuating the jaws, means for actuating said sleeve, and mechanism between said means and said sleeve for automatically moving one relatively to the other when said means is actuated.

16. A chuck having jaws, a jaw-closing sleeve, an outer collar for moving said sleeve, and means between said collar and sleeve for automatically moving one relatively to the other.

17. A chuck having jaws, a jaw-actuating sleeve, a collar thereon to move said sleeve, a nut threaded on said sleeve, means for automatically rotating said nut in one direction or the other, when the collar is moved.

18. A chuck having jaws, means for positively locking said jaws against the work, and supplemental provisions for engaging said jaws with the work prior to the locking of said jaws.

19. A chuck comprising a rotary spindle, a stationary friction member, jaws, a sleeve for operating said jaws and having a friction member complemental to the first-mentioned friction member whereby when said members are engaged the said sleeve is moved to actuate the jaws, and means for causing the engagement or disengagement of said friction member.

20. A chuck for bar-working machines, comprising a hollow spindle by which it may be rotated, and through which the bar may be passed from the rear of the jaws for engaging the jaws, means for operating the jaws, and means independent of and in the rear of the jaws for centering the work relatively to the jaws.

21. A chuck having a hollow spindle for the reception of work passed longitudinally therethrough, jaws on said spindle, means for operating said jaws, and a beveled centering-bushing independent of said jaws located within said spindle in the rear of said jaws.

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

JAMES HARTNESS.

Witnesses:
J. W. BENNETT,
D. S. BROWNELL.