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Patented Apr. 10, 1900.

G. W. REDGATE & C. L. GANDY.
AUTOMATIC CHUCK FOR BROOM MAKING MACHINES.

(No Model.)

(Application filed Nov. 28, 1899.)

2 Sheets—Sheet 1.

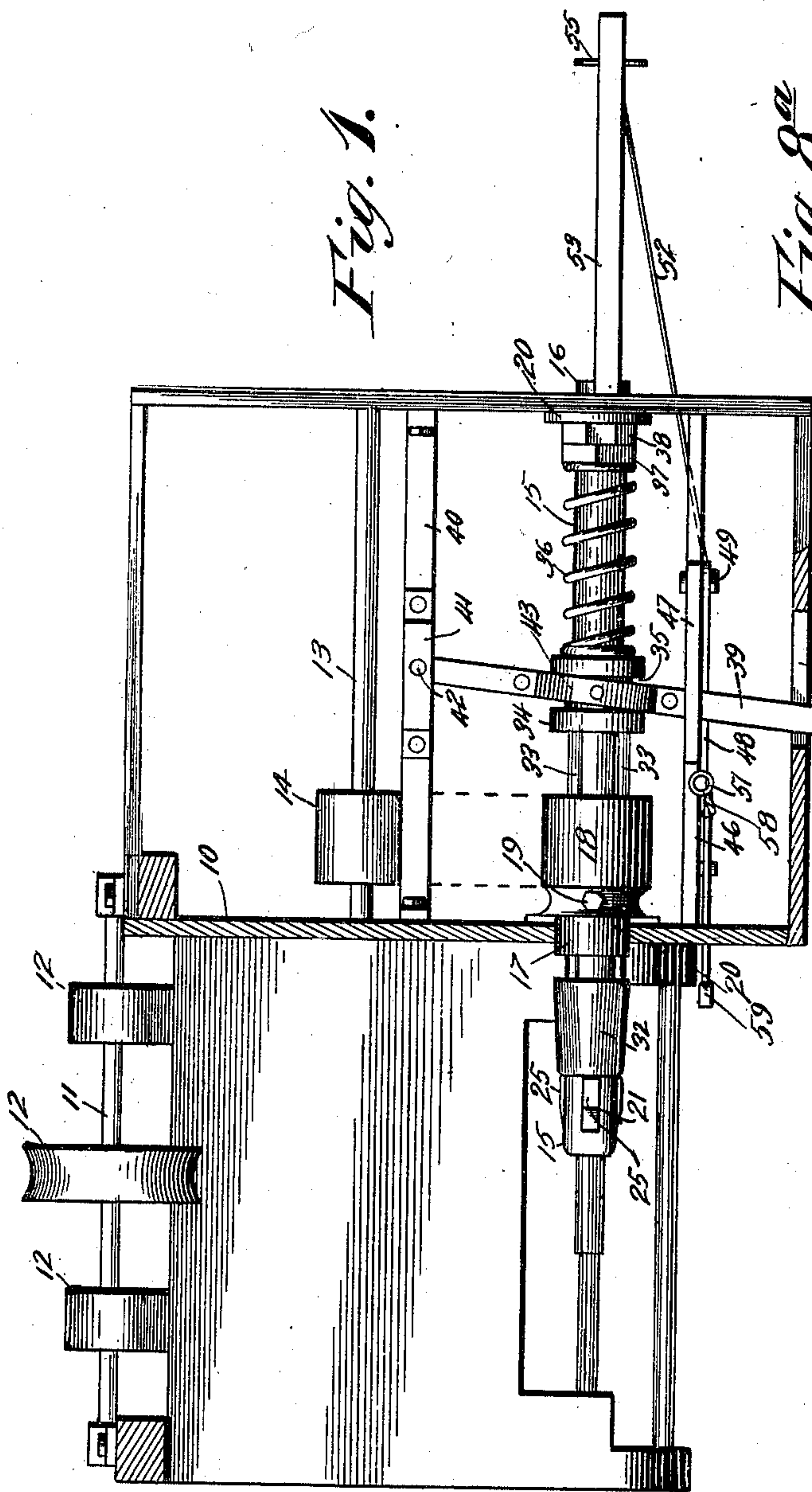


Fig. 1.

Fig. 8a.

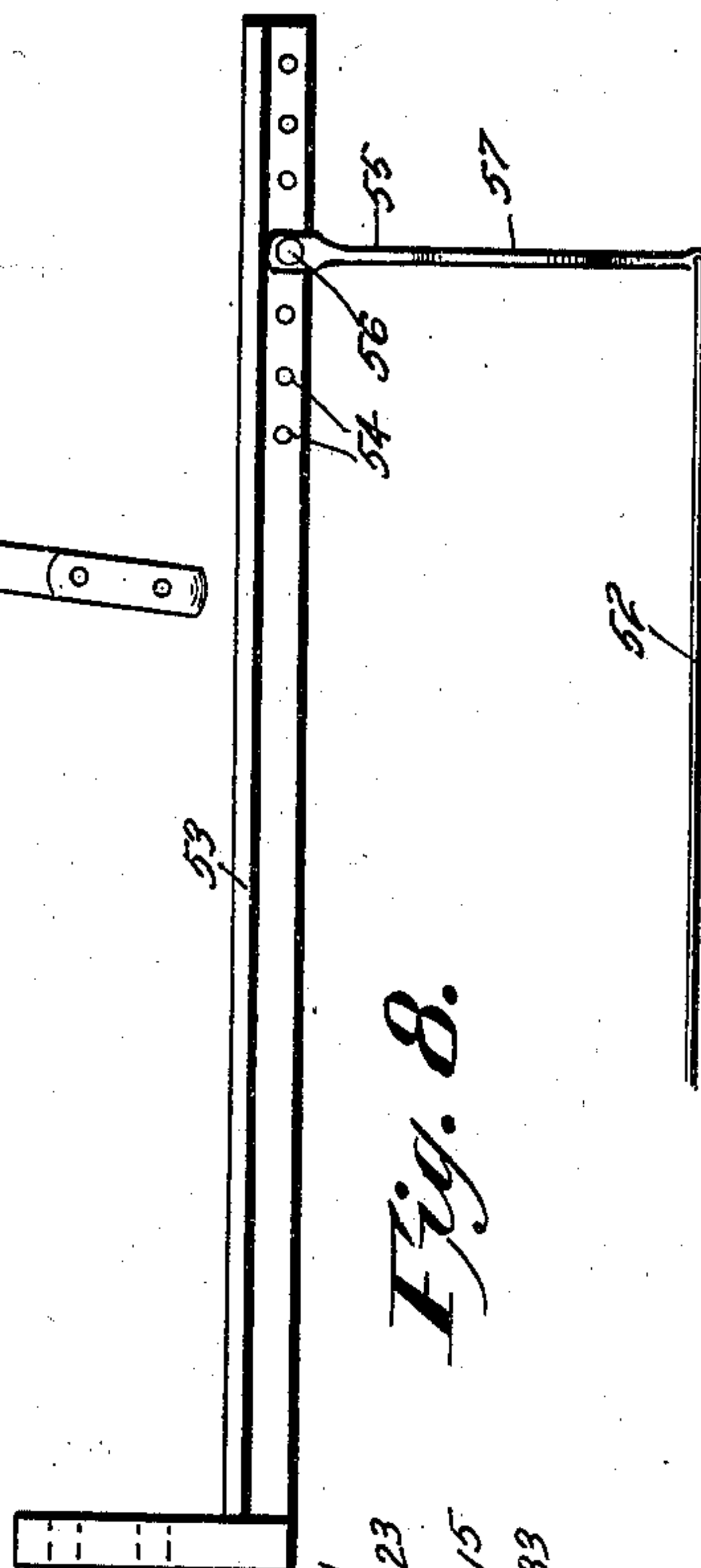
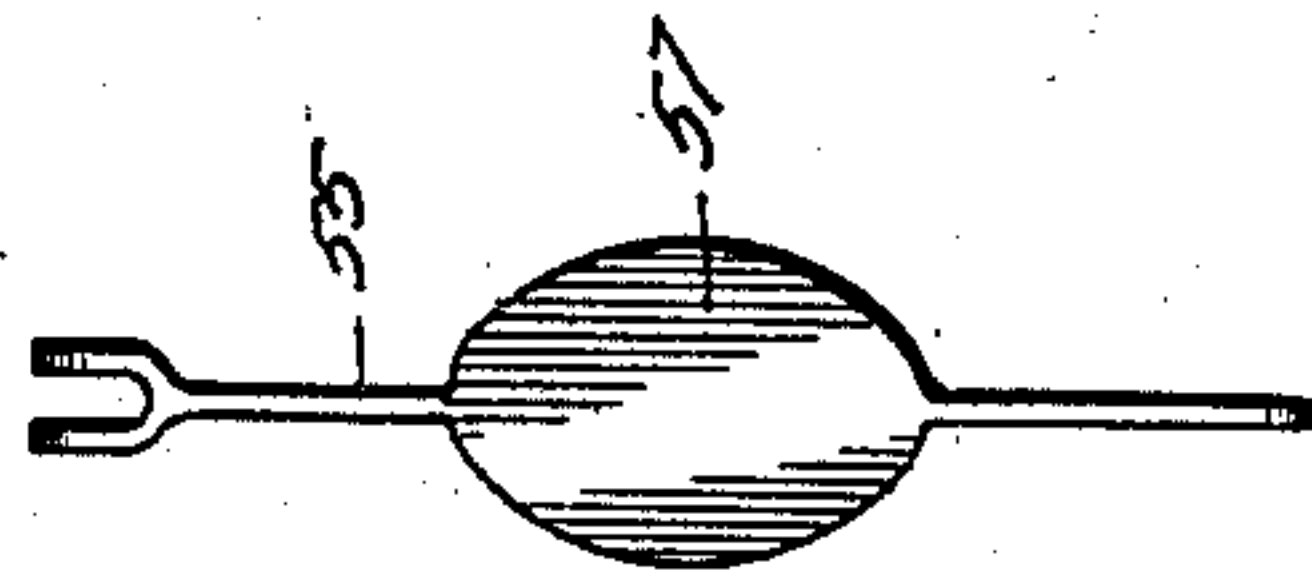
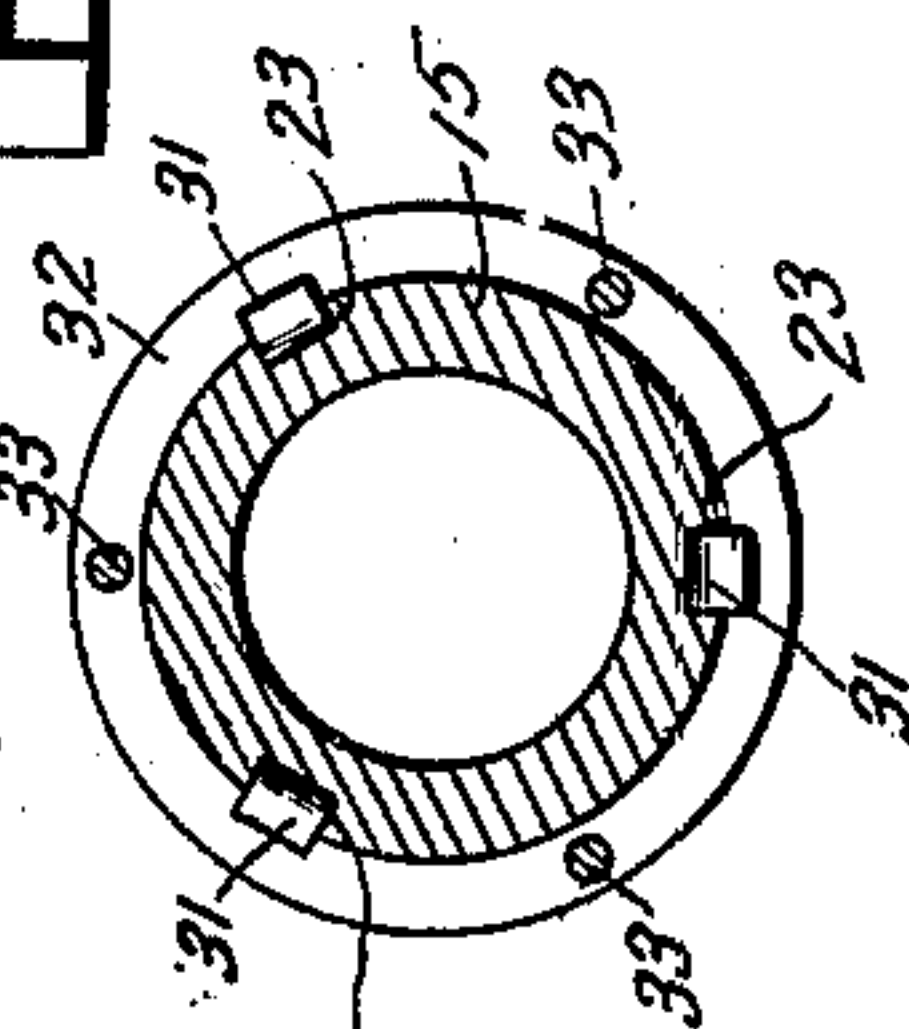


Fig. 8.

Fig. 9.



Witnesses

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2 Sheets—Sheet 2.

Fig. 2.

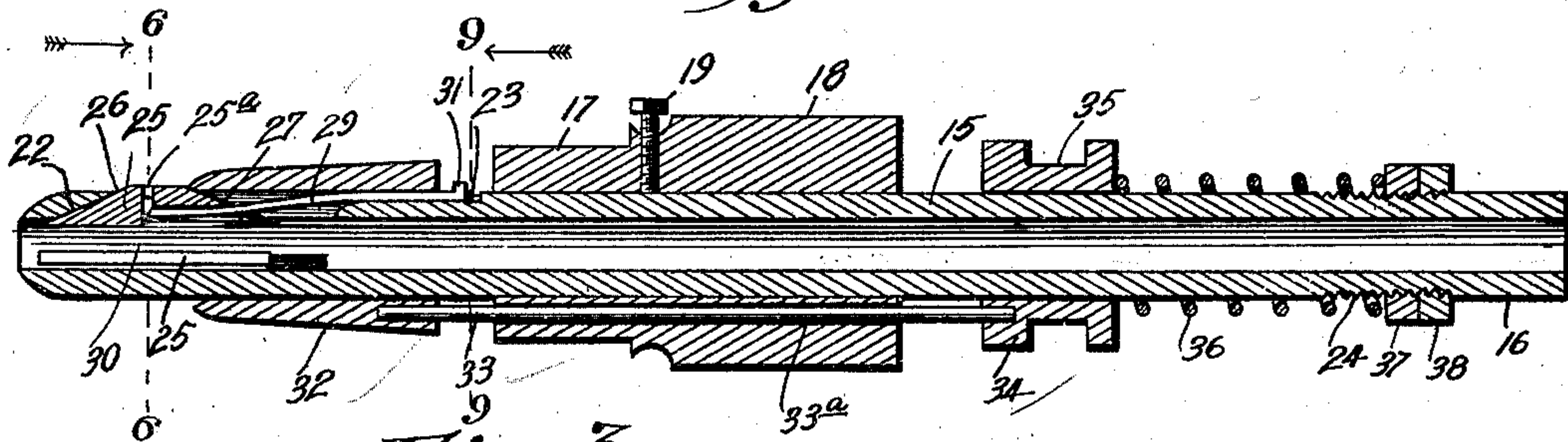


Fig. 3.

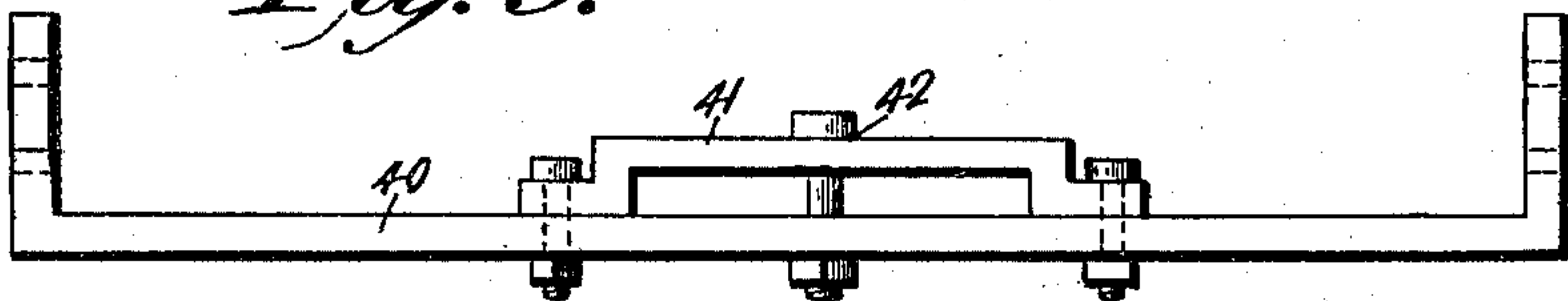


Fig. 4.

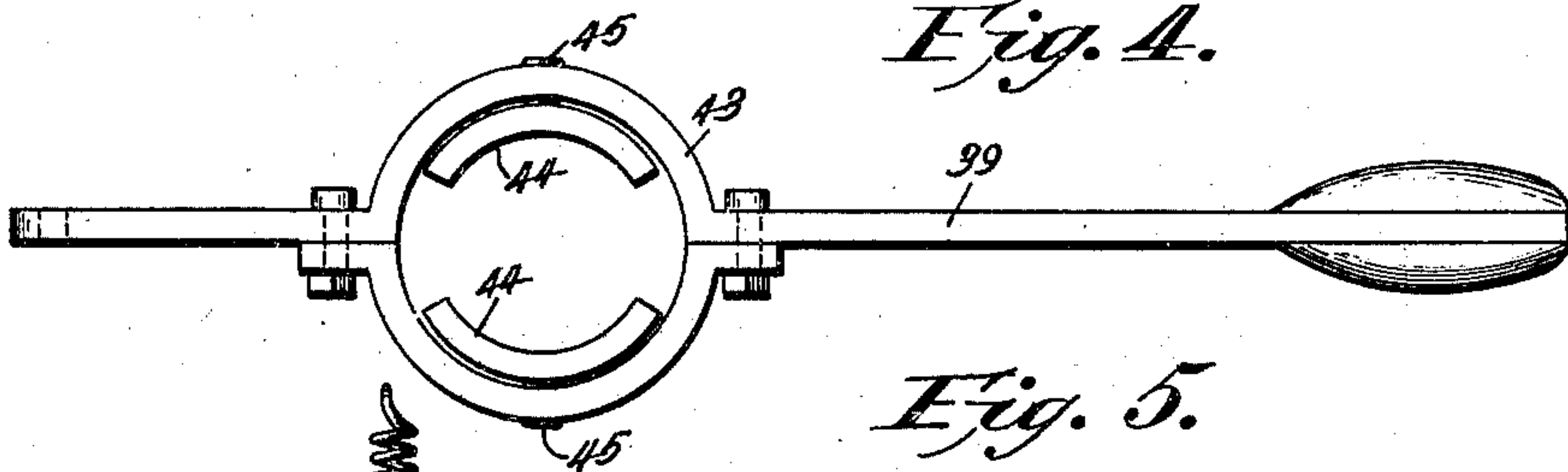


Fig. 5.

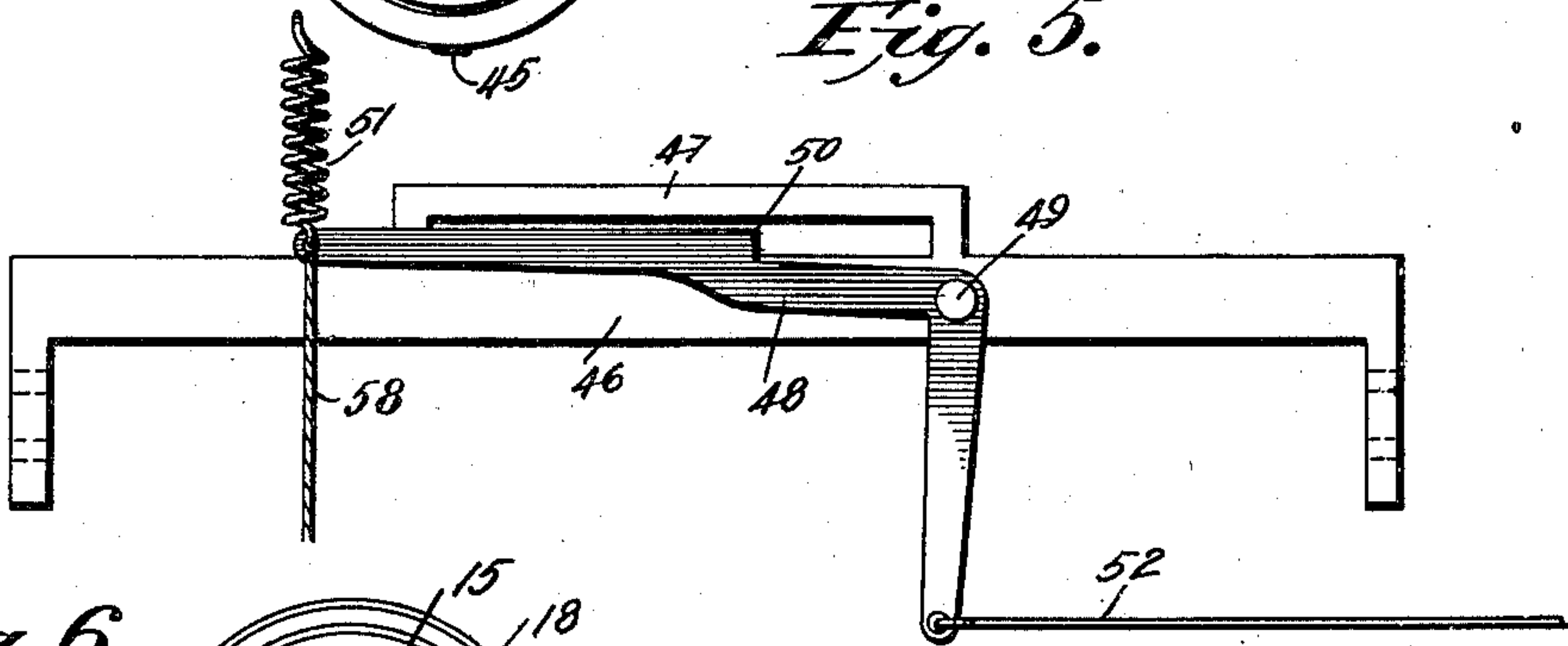


Fig. 6.

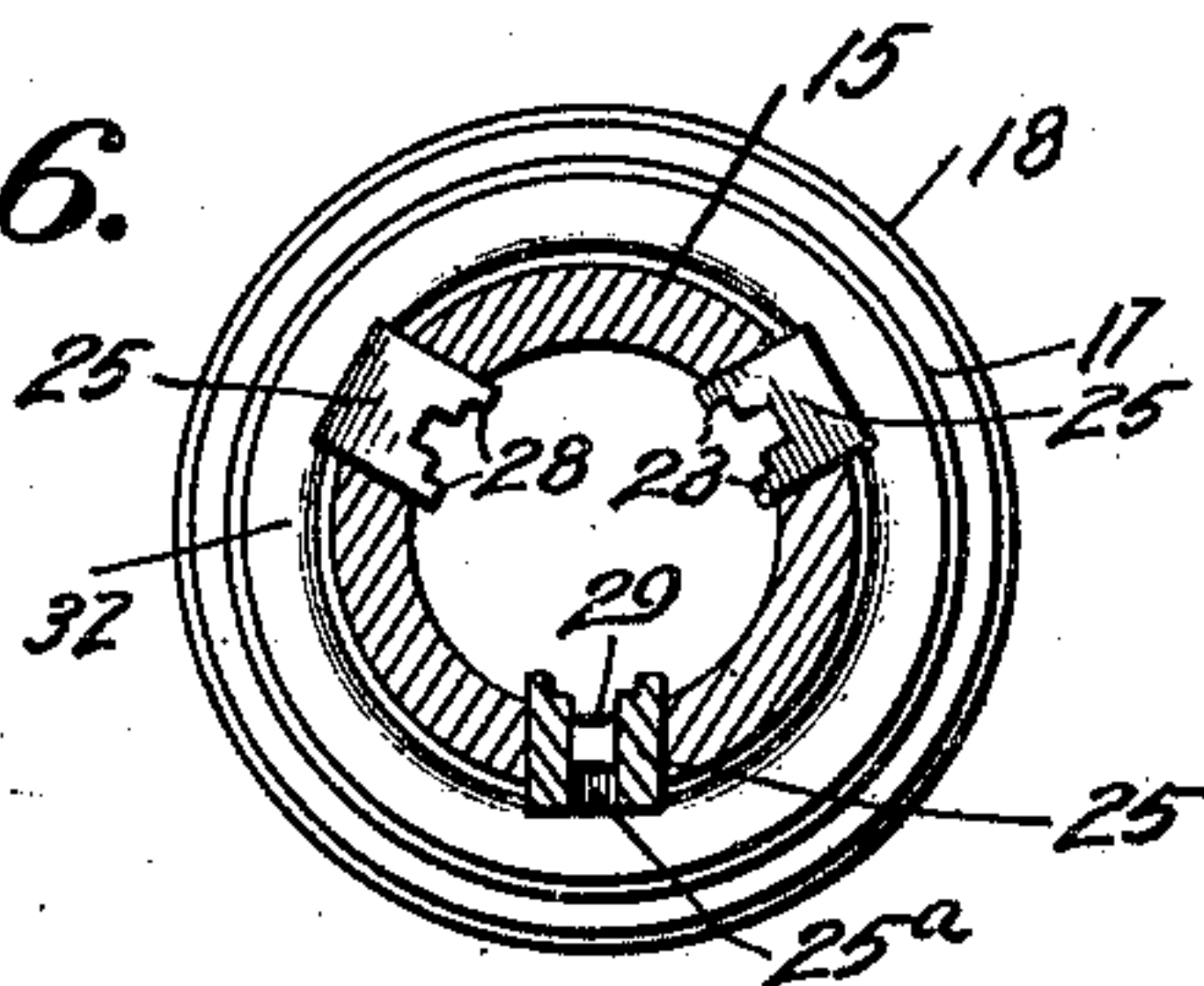
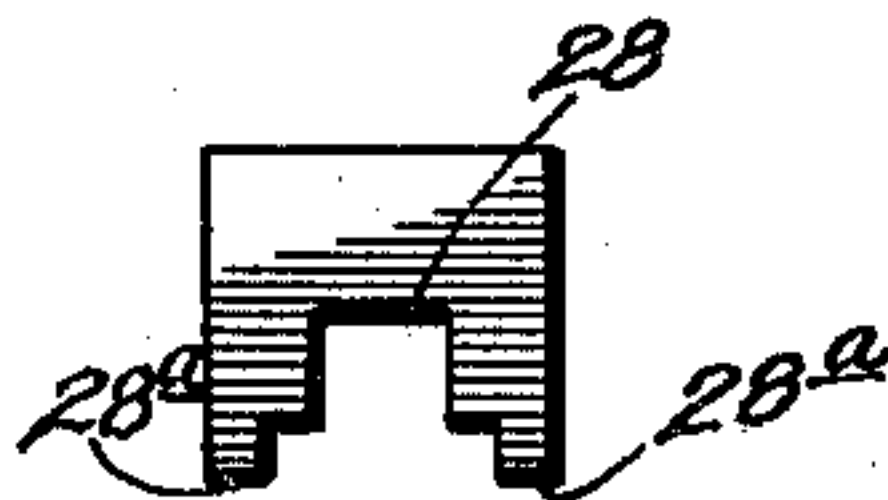


Fig. 7.



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UNITED STATES PATENT OFFICE.

GEORGE W. REDGATE AND CHARLES L. GANDY, OF-TOPEKA, KANSAS.

AUTOMATIC CHUCK FOR BROOM-MAKING MACHINES.

SPECIFICATION forming part of Letters Patent No. 647,115, dated April 10, 1900.

Application filed November 28, 1899. Serial No. 738,619. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. REDGATE and CHARLES L. GANDY, citizens of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented a new and useful Automatic Chuck for Broom-Making Machines, of which the following is specification.

Our invention relates to broom-making machines, and more particularly to the revoluble chuck for holding a broom staff or handle on which the bunches of broom-corn are laid previous to the operation of winding the broom-wire.

One object that we have in view is to automatically clamp the broom handle or staff in the hollow revoluble mandrel on the insertion therein of said handle or staff.

A further object is to provide means for conveniently retracting the staff-clamping elements of the chuck, and thereby facilitate the withdrawal of the handle or staff.

A further object is to provide an improved chuck, in which the parts are adjustable and operable for automatic operation in connection with handles or staffs which may be of different lengths and of various diameters.

With these ends in view our invention consists in the novel combination of devices and in the construction and arrangement of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings we have represented an automatic chuck for broom-making machines which embodies the several features of our invention in their preferred form, and to these drawings we shall now refer in order to explain more clearly the nature of the invention and the manner in which the same is or may be carried into effect.

Figure 1 is a sectional plan view of an ordinary type of broom-making machine with our automatic chuck applied in operative position thereto. Fig. 2 is an enlarged detail sectional view taken longitudinally through the chuck, which is removed from the machine. Fig. 3 is a detail plan view of the lever-supporting bracket. Fig. 4 is a side view in detail of the shiftable hand-lever. Fig. 5 is a detail view, in side elevation, of the automatic catch or locking contrivance for the lever. Fig. 6 is a vertical transverse section

through the chuck, taken in the plane of the dotted line 6 6 of Fig. 2. Fig. 7 is a detail enlarged view representing the inner end of one of the chuck-jaws. Fig. 8 is a detail view, in side elevation, of the staff-actuated trip and its supporting-arm. Fig. 8^a is a detail perspective view of the trip shown in elevation by Fig. 8. Fig. 9 is a detail cross-section in the plane of the dotted line 9 9 of Fig. 2.

The same numerals of reference are used to indicate like parts in each figure of the drawings.

The broom-making machine in which our automatic chuck is used may be of any character known to the art, because the chuck is capable of use generally with different styles of such machines; but in Fig. 1 of the drawings we have indicated a part of the casing or framework by the numeral 10, in which is mounted one of the machine-shafts 11, having the pulleys 12. The chuck-driving shaft 13 is shown by Fig. 1 as mounted in a concealed manner within the casing, and on this shaft is a pulley 14, adapted for the reception of a belt (not shown) which is adapted to encompass a pulley on the revoluble mandrel forming a part of our improved chuck.

The mandrel 15 of our improved chuck is shown by Fig. 2 as consisting of a single tubular length of metal, which is provided at its rear end with an integral journal 16. A journal 17 and a pulley 18 are made or cast in a single piece of metal for application to the mandrel at a point intermediate of its length, and this cast-metal element is secured firmly around the mandrel by any suitable means—as, for instance, by the binding-screws 19. The mandrel is mounted in the machine frame or casing by fitting its journals 16 17 in suitable shaft-bearings 20, which are secured to opposite sides of the casing, (see Fig. 1,) and one end of this mandrel is extended or prolonged through and beyond the casing, so as to be exposed for the ready introduction of the broom staffs or handles therein. This exposed protruding end of the hollow mandrel is provided with a series of radial slots 21, preferably three in number and arranged equidistant with respect one to the other, each slot having the beveled end face 22, against which is adapted to ride one of the gripping-jaws 25. The mandrel is fur-

thermore provided with short longitudinal grooves 23, which are formed in the outer surface thereof between the jaw-receiving slots and the journals 17, and, furthermore, this mandrel is provided at its opposite end with a male screw-thread 24, the purpose of which will hereinafter appear.

We employ a series of gripping-jaws 25, corresponding in number to the slots 21, and these jaws are fitted in said slots to extend into the bore or longitudinal passage of the mandrel and to work or play therein. Each jaw 25 is provided at one end with a beveled or inclined face 26, adapted to ride against the beveled end 22 of the slot in which the jaw is fitted, while the other end of the jaw is formed with a reversely or oppositely beveled face 27, the series of jaws presenting their beveled surfaces 27 in the same circular plane for engagement simultaneously by a slidable adjusting-sleeve 32. Each of the series of jaws 25 is furthermore provided with a longitudinal groove or channel 28, (see Fig. 7,) and this groove divides the inner side of the jaw into narrow gripping-faces 28^a, whereby each jaw is constructed for the accommodation of the toe-formed end of a pressure-spring 29. A series of these pressure-springs corresponding in number to the jaws is used in our improved chuck, one spring to each jaw, and these springs are arranged to exert pressure against the jaws in a direction to normally force the latter outwardly. The springs are preferably of the type known as "leaf-springs," consisting of elastic plates curved or shaped to accommodate themselves to the jaws and the mandrel, each spring being provided at one end with a toe 30 and at its opposite end with a heel 31. Each spring has its heel-formed end fitted loosely in one of the grooves or seats 23 of the mandrel, the latter serving to restrain the spring against displacement circumferentially on the mandrel while permitting the spring to have a limited endwise movement with the gripping-jaw. The free ends of the springs enter the grooves 28 in the jaws, so that the toes 30 will enter transverse openings 25^a of the jaws, as shown by Fig. 2, in order to detachably connect the springs and jaws. The springs are seated on the mandrel so as to exert their tension in an outward direction against the jaws, and the heels 31 of said springs lie in the path of the slidable collar 32 in a manner to be engaged with and retracted positively by said collar when the latter is moved endwise in one direction by the hand-lever. This slidable collar or sleeve 32 is fitted loosely on the mandrel for endwise movement between the jaws and the journal 17, one end of said sleeve engaging with the beveled faces 27 of the jaws. The slidable sleeve 32 has a series of connecting-rods 33, secured firmly thereto, and said connecting-rods are arranged exteriorly to the mandrel and fitted loosely in longitudinal passages 33^a, provided in the single-piece journal and pul-

ley 1718. (See Fig. 2.) The connecting-rods are made fast at their rear ends to a slidable collar 34, which is fitted loosely on the mandrel on the opposite side of the pulley 18 from the sleeve 32, the connecting-rods serving to connect the sleeve and the collar for simultaneous endwise movement on the mandrel, while the rods also restrain the sleeve and collar from displacement circumferentially by reason of the rods fitting loosely in the passages of the journal and pulley, which are made fast with the mandrel. Said adjusting-collar 34 is provided with a circumferential groove 35, and against said collar is seated one end of a pressure-spring 36, the same being of spiral form and loosely encircling the mandrel. The jam-nuts 37 38 are screwed on the threaded part 24 of the mandrel, one of said nuts serving as a seat for the rear end of the screw, while the other nut forms the shoulder to the journal 16 to assist in restraining the mandrel from endwise movement in its bearings.

The connected sleeve and collar are pressed normally in one direction by the spring 36, so as to make the sleeve ride on the beveled ends of the jaws, and thereby force the latter inwardly for the purpose of gripping the staff or handle, which may be inserted in the mandrel; but to provide for the retraction of the elements, so as to release the staff, we employ a hand-lever 39. A lever-supporting bracket 40 of flanged construction is secured firmly within the frame or casing at one side of the mandrel, and on this bracket is bolted a removable keeper 41, the bracket and the keeper serving as the support for the bolt 42, which constitutes the fulcrum for the lever. This lever is provided at a point intermediate its length with a ring or annulus 43, within which are arranged the oppositely-curved shoes 44, that are loosely connected to said ring by the pivots 45, said shoes being capable of a limited turning movement within said ring of the lever. The lever is arranged for its ring to fit over the adjusting-collar 34 and for one end of said lever to be supported by the fulcrum-bolt 42, the shoes 44 of the lever being received loosely within the groove 35 of the adjusting-collar. A catch-supporting bracket 46 is secured firmly in the machine-casing on the opposite side of the mandrel from the lever-supporting bracket, and said catch-bracket is formed or provided with a lever-guide 47, in which is loosely fitted the lever 39, said lever being also arranged to play in a slot 39^a of the machine-casing, so that its handle-formed end is exposed to free access by the operator. (See Fig. 1.) An angular catch or locking device 48 is fulcrumed on the bracket 46, as at 49, and one arm of this catch is provided with a shoulder 50 for engagement with the lever 39 in order to hold the latter and the connected collar and sleeve in a retracted position against the tension of the pressure-spring 36. A retracting-spring 51 is connected with the pivoted latch in a manner to hold

the shoulder thereof in a position for engagement with the lever, and to the other end of the latch is attached a cord, chain, or rod 52, which leads to a broom-actuated trip 55. A trip-supporting arm 53 is secured firmly to the outside of the casing, so as to occupy a position in the vertical plane assumed by the broom-staff when the latter is thrust into the mandrel. This arm is shown as provided with a series of transverse openings 54, with either of which the trip 55 may have its upper end aligned for the reception of the pivotal pin 56, whereby the trip-arm is pivotally and adjustably supported on the fixed arm 53. This trip-arm carries a plate 57, which is supported in alinement with the tubular mandrel 15, so as to lie in the path of an end of the broom-staff, and to the free end of the trip-arm is fastened the cord or other connection 52, which leads to the spring-actuated or automatic lock for the lever 39.

The operation is as follows: With the lever in its retracted position the slidable collar and the sleeve are moved toward the rear of the mandrel, so as to compress the spring 36 and permit the springs 29 to throw the jaws outwardly, and in this position of the parts the shoulder of the latch engages with the lever, and thereby holds the parts in position for the easy introduction of a broom-handle into the mandrel. The handle or staff of a broom is thrust through the mandrel until its end strikes against the plate of the trip-arm, thus moving the latter in a direction to operate the latch against the tension of the spring 51. The shoulder of the latch is thus released automatically from the lever, and the spiral spring 36 acts against the collar, the rods, and the sleeve to forcibly impel the latter in a direction toward the end of the mandrel. This collar rides upon the jaws and makes the latter ride against the beveled ends 22 of the slots in the mandrel. During this movement of the jaws the springs travel therewith, and the jaws are compressed against the tension of the spring in a manner for the inner faces thereof to grip the broom staff or handle. To retract the slidable sleeve and permit the springs to become active in forcing the jaws outwardly, the lever is moved in a direction to make the collar compress the spring 36, and this rearward movement of the sleeve 32 acts against the heels of the springs, so as to positively retract the said springs and the jaws connected thereto.

It is evident that the trip-arm may be adjusted to accommodate the staffs or handles, which may vary in length. As the gripping-jaws are actuated in one direction by the spring and are positively moved in the other direction by the sleeve, it is evident that the jaws are operable in a manner to accommodate staffs or handles which vary in diameter.

From the foregoing description it will be observed that we have provided the chuck, which has its locking elements for the grip-

ping-jaws released automatically on the insertion of the broom-staff, so that it is not necessary for the operator to adjust the chuck on the insertion of the staff therein. The staff may rotate with the mandrel of the chuck; but to release the staff it is only necessary to operate the lever, which normally occupies a stationary position and is readily accessible, because it does not rotate with the mandrel.

Changes within the scope of the appended claims may be made in the form and proportion of some of the parts while their essential features are retained and the spirit of the invention is embodied. Hence we do not desire to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

In the embodiment of the invention heretofore shown and described we have set forth that the latch 48 is disengaged automatically from the adjusting-lever on the introduction of a broom-staff into the hollow mandrel, so as to impinge against the trip-arm 55, for the purpose of releasing the lever and permitting the spring 36 to close the jaws upon the broom-staff. Under some conditions in the operation of the machine, however, it is desirable to provide means for manually tripping the latch from engagement with the lever—such, for example, when the machine is used for the manufacture of short brooms or brushes. We have therefore provided a suitable treadle 59, which is connected by an intermediate cord or rod 58 with the latch 48. The attachment of the cord to the latch is clearly shown by Fig. 5 of the drawings, while the position of the foot-operated treadle 59 is indicated by Fig. 1 of the drawings. It is evident that the treadle may be depressed for the purpose of moving the latch in a downward direction, so that the shoulder 50 thereof will be freed from engagement with the lever 39, thereby permitting the spring 36 to become active in moving the collar 35, the rods 33, and the sleeve 32 for compressing the jaws into engagement with the work.

Having thus described the invention, what we claim is—

1. In a chuck for broom-making machines, the combination of a hollow mandrel, gripping-jaws mounted therein, means for actuating and locking said jaws, and means disposed in the path of a broom-staff for automatically releasing the jaw-locking devices, substantially as described.

2. In a chuck for broom-making machines, the combination of a hollow mandrel, gripping-jaws carried thereby, means for compressing said gripping-jaws, a locking contrivance for restraining the jaw-compressing devices in a retracted position, and a trip device disposed in the path of the work and operable thereby to automatically release the gripping-jaws from restraint of the locking contrivance, substantially as described.

3. A chuck for broom-making machines

comprising a slotted mandrel, a slidable sleeve thereon, gripping-jaws having wedge engagement with the mandrel and the sleeve and capable of a limited movement longitudinally and radially of the mandrel, means for pressing said jaws normally into engagement with the sleeve, means for automatically releasing the jaws from locked position, and means for adjusting the sleeve endwise on the mandrel, substantially as described.

4. A chuck for broom-making machines comprising a radially-slotted hollow mandrel, a series of jaws having slidable engagement with said mandrel for movement radially and longitudinally therein, springs slidably seated on the mandrel and connected individually with the jaws to travel endwise therewith, a sleeve engaging with the jaws, means for locking the said jaws, means for automatically releasing the jaws from locked position, and means for adjusting the sleeve, substantially as described.

5. A chuck for broom-making machines comprising a hollow radially-slotted mandrel, gripping-jaws fitted in said slots and provided with longitudinal grooves, springs seated on the mandrel and engaging removably with the grooved parts of the jaws, and the slidable sleeve engaging with said jaws for compressing them against the tension of their springs, substantially as described.

6. A chuck for broom-making machines comprising a slotted and grooved mandrel, jaws fitted therein, springs connected with the jaws and having heel-formed ends seated in the grooved mandrel, and a slidable sleeve arranged to engage with the heels of the springs for positively retracting the same, substantially as described.

7. In a chuck for broom-making machines, the combination of a mandrel, jaws mounted therein, a connected sleeve and a collar spaced apart from each other and slidably mounted on the mandrel, a pressure-spring surrounding a portion of the mandrel and acting against the collar, and the lever having an intermediate portion engaging loosely with said collar, substantially as described.

8. In a chuck for broom-making machines, the combination with a mandrel, and gripping-jaws therein, of a slidable sleeve, a collar, rods confined in suitable guides and se-

cured fast to said sleeve and the collar, a pressure-spring acting against the collar, and means engaging with the collar to retract the latter and the sleeve against the tension of the spring, substantially as described.

9. In a chuck for broom-making machines, the combination with a mandrel, and gripping devices carried thereby, of a sleeve in movable relation to the said gripping devices, a collar at a distance from and connected to the sleeve, both the sleeve and collar being mounted on the mandrel, a lever having an intermediate ring fitted loosely around the collar, and shoes pivotally mounted within the ring of said lever and loosely engaging the collar.

10. In a chuck for broom-making machines, the combination with a mandrel, and gripping devices thereon, of retracting mechanism in operative relation to the gripping devices, a lever for said retracting mechanism, an automatic latch in the path of said lever, and a trip disposed in alignment with the mandrel and connected operatively with the latch, substantially as described.

11. In a chuck for broom-making machines, the combination with a mandrel, of gripping mechanism arranged for engagement automatically with the work on its insertion therein, a lever for retracting the gripping devices, a spring-actuated locking contrivance normally disposed in the path of the lever, and an adjustably-supported trip disposed in the path of the work on its insertion in the mandrel and connected with said locking contrivance, substantially as described.

12. In a chuck for broom-making machines, the combination with a mandrel and a gripping mechanism, of a lever for retracting the gripping devices and having an open portion with shoes to engage the latter, a spring-actuated latch in the path of said lever, and a flexible pull device attached to said latch for manually releasing the same.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

GEORGE W. REDGATE.
CHARLES L. GANDY.

Witnesses:

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FRANK S. DAVIS.