

No. 724,600.

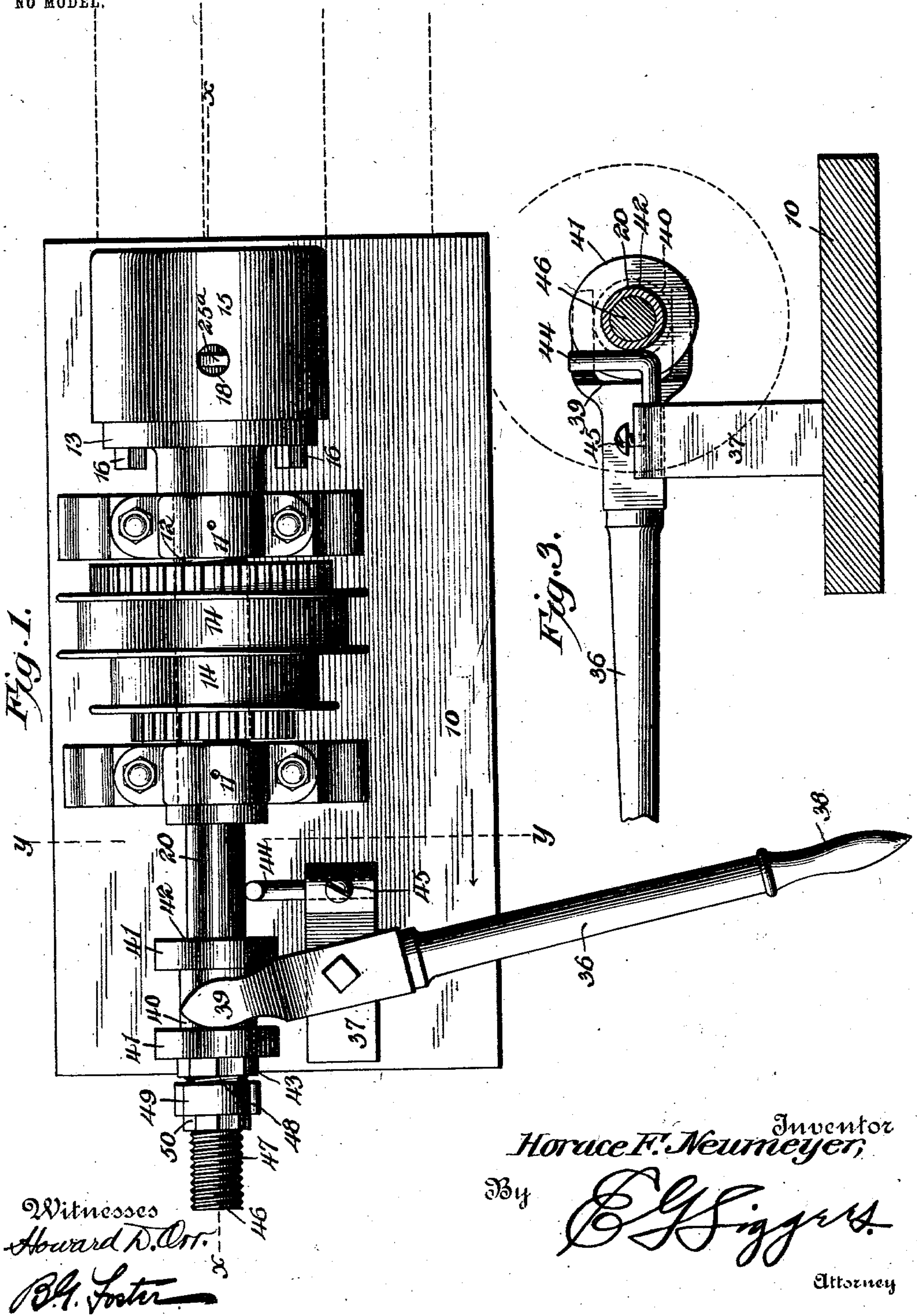
PATENTED APR. 7, 1903.

H. F. NEUMEYER.
CHUCK.

APPLICATION FILED JULY 30, 1902.

2 SHEETS—SHEET 1.

NO MODEL.



Witnesses
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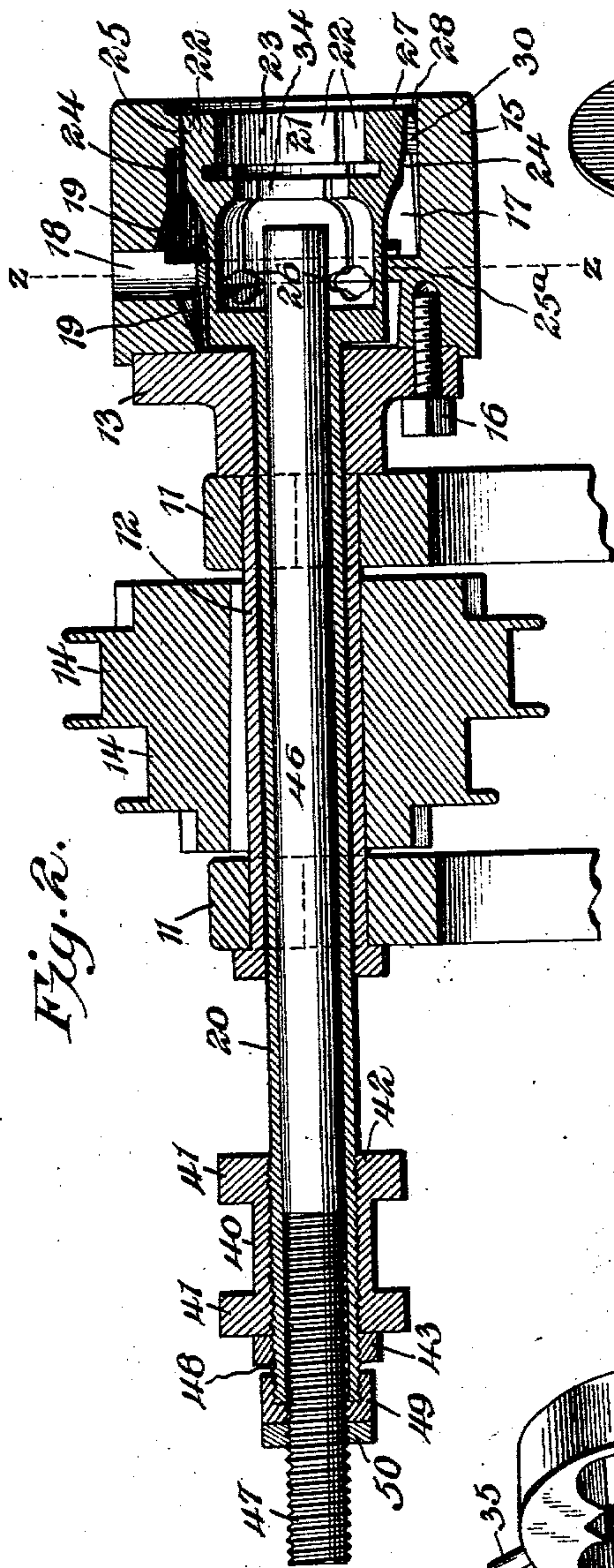


Fig. 2.

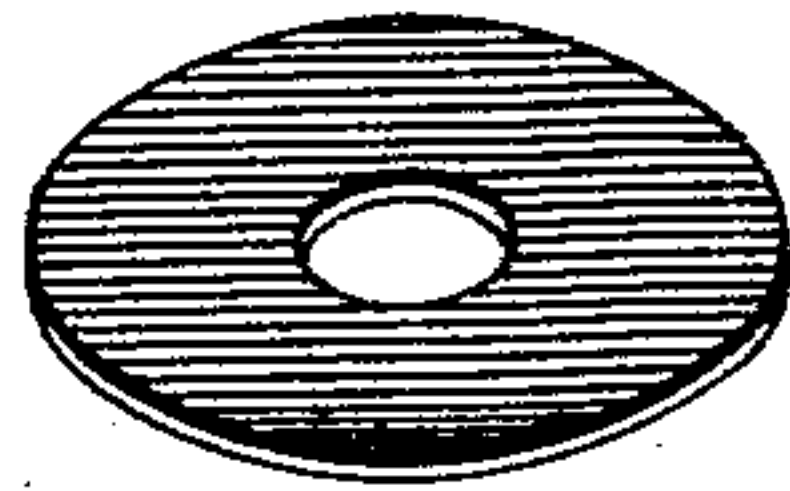


Fig. 8.

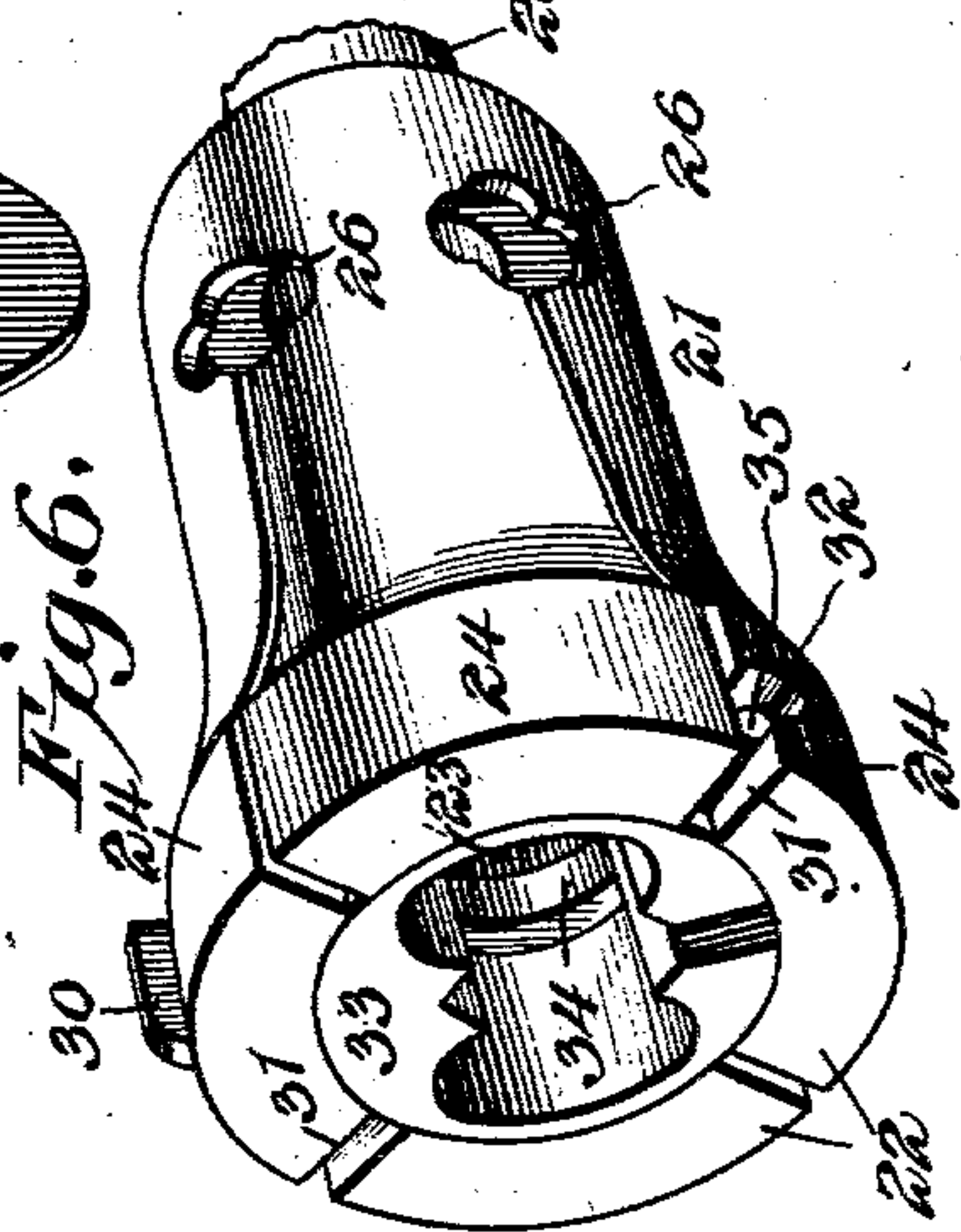


Fig. 6.

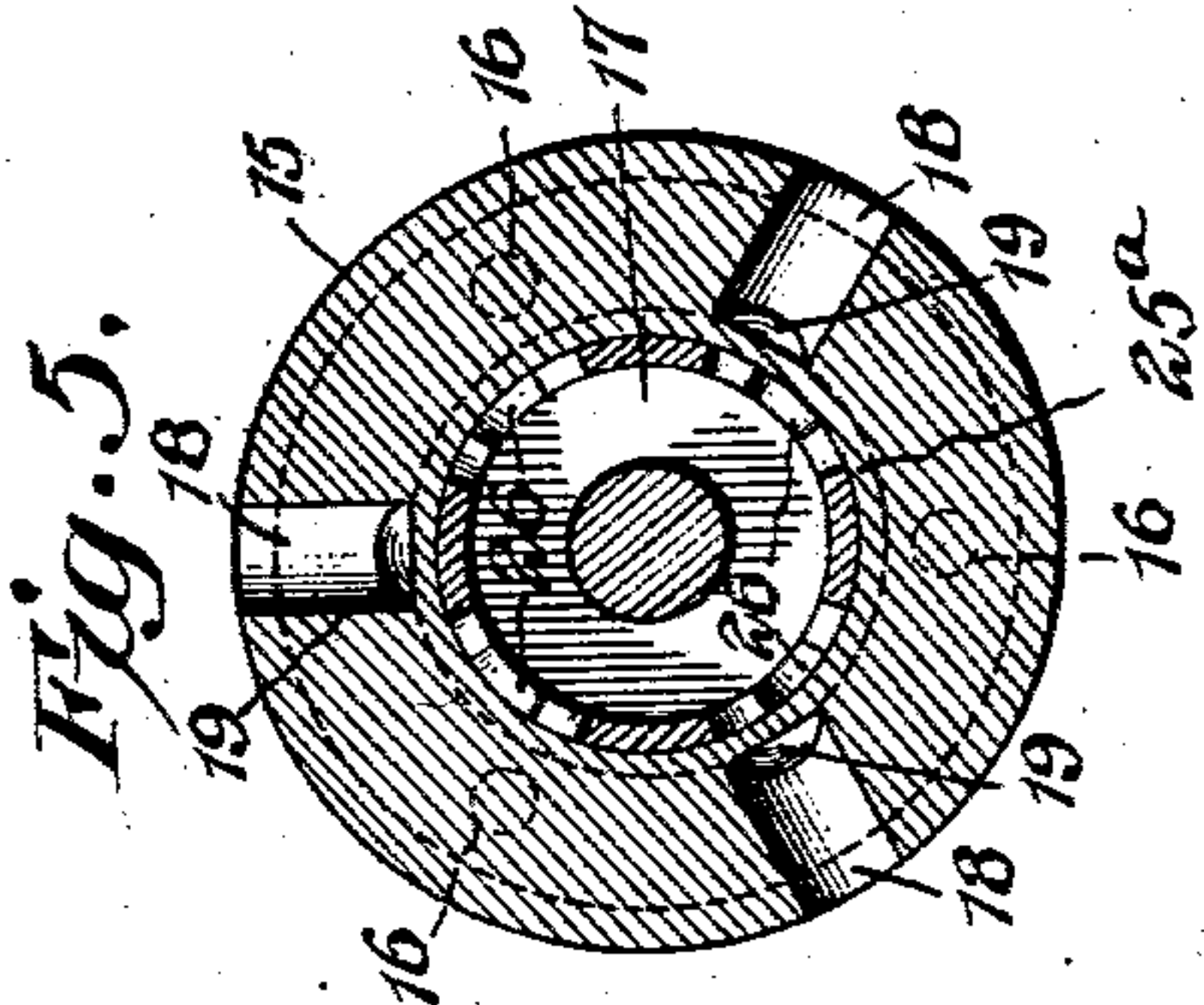


Fig. 5.

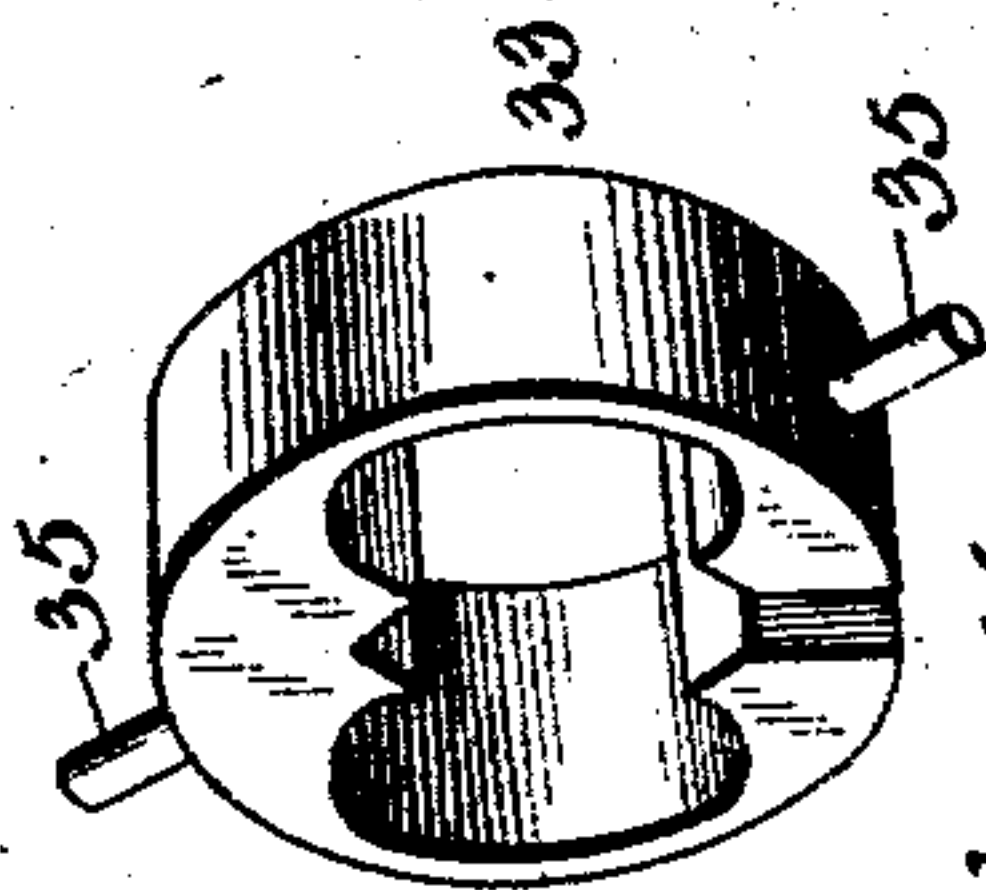


Fig. 7.

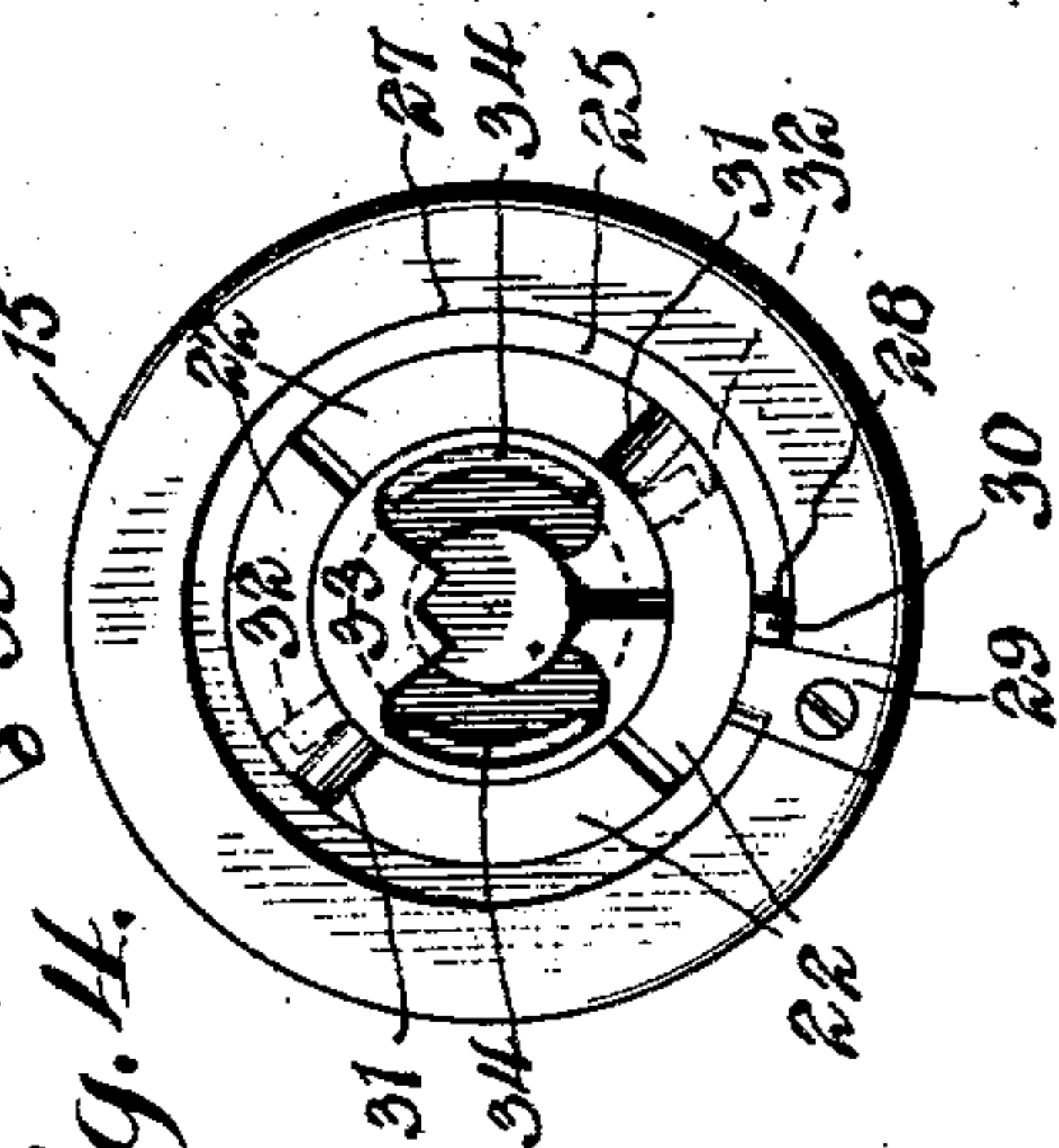


Fig. 4.

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UNITED STATES PATENT OFFICE.

HORACE FALK NEUMEYER, OF MACUNGIE, PENNSYLVANIA.

CHUCK.

SPECIFICATION forming part of Letters Patent No. 724,600, dated April 7, 1903.

Application filed July 30, 1902. Serial No. 117,729. (No model.)

To all whom it may concern:

Be it known that I, HORACE FALK NEUMEYER, a citizen of the United States, residing at Macungie, in the county of Lehigh and State of Pennsylvania, have invented a new and useful Chuck, of which the following is a specification.

The present invention relates to chucks, and while particularly designed for holding articles in lathes it will be apparent to those skilled in the art that it may be used in other relations and for various purposes.

When working upon small articles, it is very desirable to have mechanism which will securely and accurately hold such articles and at the same time permit of their being placed in and removed from the lathe with the smallest amount of delay possible. Heretofore it has been the custom to provide a revolving work-holding collet which can be opened or closed at will without the necessity of stopping the machine. The articles are each placed in the collet while it is open, after which it is closed upon the same; but it will be observed that all the time the said collet is in motion. In machines where long stock rods are fed through and cut up this mechanism may be satisfactory; but in working small articles, each of which must be separately placed in position and clamped, the operation is not only dangerous, but it very often happens that the article is not properly centered. This is perhaps specially true of angular and irregular shapes, which will not be forced to correct position by the closing of the collet upon the same.

One object of the present invention is to provide means by which the collet or work-holder may be quickly stopped and started without arresting the movements of the machine as a whole. Thus the work may be readily placed in position or removed.

Another feature of the invention resides in the employment of detachable auxiliary collets which may be used in connection with the master-collet, so that differently-shaped articles may be operated upon. It will be observed that this latter combination is specially desirable in connection with the master-collet that can be stopped, as it affords means for quickly changing the character of the work without the necessity of stopping the entire machine.

Still another feature resides in an adjust-

able stop-abutment employed in connection with the chuck to limit the distance to which the articles may be inserted in the same.

There are other features of a novel character which will become apparent upon understanding the invention as hereinafter set forth.

The preferred embodiment of the invention is fully illustrated in the accompanying drawings and described in the following specification. It will be apparent, however, upon an inspection of the claims hereto appended that the structure set forth is open to various changes and modifications.

In the drawings, Figure 1 is a top plan view of the improved mechanism. Fig. 2 is a vertical longitudinal sectional view through the same, taken on the line *xx* of Fig. 1. Fig. 3 is a sectional view taken on the line *yy* of Fig. 1. Fig. 4 is an end elevation of the head and the collet within the same. Fig. 5 is a sectional view taken on the line *zz* of Fig. 2. Fig. 6 is a detail perspective view of the master-collet and an auxiliary collet arranged therein. Fig. 7 is a perspective view of one of the auxiliary collets. Fig. 8 is a perspective view of a steel disk sometimes employed.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

In the embodiment of the invention shown a suitable base or support is employed, forming a part of the usual lathe, this support being provided with a pair of upstanding journal-bearings 11, that are spaced some distance apart. In these bearings there is journaled a spindle 12, that is tubular in form and is provided at one end with a face-plate 13. Suitable pulleys 14 are attached to the spindle between the bearings 11. A head 15 is attached to the face-plate 13 by means of screw-bolts 16, said head being hollow, as clearly shown in Fig. 2, thereby forming a chamber 17, the purpose of which will be hereinafter explained. Openings 18 are formed in the walls of the head and communicate with the chamber 17, suitably-inclined channels 19 leading to the openings. The mechanism thus far described constitutes the driving means for the chuck.

Arranged within the tubular spindle is a stem 20, that is slidable therein, the spindle being revoluble independently of said stem. To one end of this stem is secured a master-

collet 21, comprising a plurality of spring-jaws 22, secured together at their rear ends and forming between them a socket 23. The walls of the jaws are made comparatively thin at their rear ends to afford the necessary elasticity, their front ends being comparatively thick and having their outer faces tapered, as shown at 24. This collet is fitted within the head 15, and the tapering portions 24 of the jaws engage an annular bearing-flange 25, arranged just within the mouth of the head and having its active face beveled to correspond with the tapering faces 24 of said jaws. Another bearing-flange 25^a is located in the rear portion of the head and practically subdivides the chamber 17 into two compartments, this flange being located midway of the openings 18, as illustrated in Fig. 2. The collet 21 has openings 26 formed in its walls, which openings afford communication between the chamber 17 of the head and the socket 23 of the collet. The edge of the head 15, surrounding the mouth of the chamber 17, is rabbeted, as shown at 27, and a keyway 28 extends longitudinally into the chamber from said rabbet. A stop-plate 29 is secured to the outer end of the body and projects across the rabbet 27 at one side of the keyway 28, as clearly shown in Fig. 4. One of the jaws 22 of the collet carries a key 30, the width of which is sufficient to allow it to fit in the guideway 27 and pass into the keyway 28 when the stem 20 is moved longitudinally, as will be readily understood. The collet is furthermore provided in its outer ends with sockets in the form of bayonet-slots 31, which slots are preferably formed between adjacent jaws, the offsets 32 being located in said jaws, as will be seen by reference to Fig. 6.

In connection with the above-described master-collet there are employed auxiliary collets, one of which is shown at 33. This collet is in the form of a split ring the exterior face of which conforms to the interior configuration of the outer end of the master-collet, into which it is arranged to be fitted. The auxiliary collet is constructed of tool-steel and fits snugly in the master-collet, the interior configuration being of any desired shape that will engage and hold an article to be operated upon. The inward movement of the auxiliary collet is limited by a stop-flange 34, located within the master-collet and forming an abutment for said auxiliary collet. The collet 33, furthermore, is provided on opposite sides with projecting lugs or pins 35, which are arranged to engage in the bayonet-slots 31, as shown, to maintain said collet in place.

In order to move the stem 20 longitudinally within the spindle and the collet out of and into the head, a lever 36 is suitably pivoted upon an ear 37, one end being formed into a handle 38, the other end being bifurcated, as shown at 39, and fitting in the groove 40, formed between spaced flanges 41 of a collar

42, that is secured upon the rear end of the stem. This collar is shown in Fig. 2 as threaded upon the stem and held by a jam-nut 43, though other fastening means may be employed, if desired. Arranged in the path of movement of the collar 42 is a brake in the form of a finger 44, that is detachably secured in a socket of the ear 37 by means of a set-screw 45. It will thus be apparent that when the lever is swung in one direction the stem will slide through the spindle, and the outer end of the collet will be projected from the outer end of the head, allowing the spring-jaws of said collet to open. This movement will disengage the key 30 from the keyway 28, thus bringing the collar 42 into engagement with the brake-finger 44, and thus the stem and collet are held against rotation. On the other hand, when the lever is moved in an opposite direction the collet is withdrawn into the head, thereby not only moving the jaws together, but at the same time frictionally engaging them with the head and causing the key to interlock with said head to hold the stem and spindle against independent revolution. The stem will at the same time be released from the brake, as the longitudinal movement of said stem will carry the collar from the finger 44.

There is also employed means for limiting the distance to which the articles may be inserted in the collet. This means is shown in the form of a rod 46, slidably mounted in the stem 20, which is made hollow for that purpose, and projecting within the socket 20. The rear end of the rod is threaded, as shown at 47, and projects beyond the rear end of the stem, which is likewise threaded, as shown at 48. A holding-nut 49 is threaded upon the rod 47 and is provided with a threaded counterbore which engages the rear end of the stem. This nut is held against accidental rotation by a jam-nut 50.

It will be understood that the spindle is continuously revolved by a belt passing about the pulley 14. When it is desired to machine an article, the necessary auxiliary collet is first placed in the master-collet. This may be readily accomplished by disengaging said master-collet from the head, whereupon the stem will be braked and the movement of the collet stopped. The auxiliary collet having been placed in the master-collet, the article to be operated upon is then positioned and the stem moved rearwardly, whereupon the master-collet will be clutched to the revolving head and the article rotated. In chucking short articles the steel disk shown in Fig. 8 may be used, this steel disk being placed against the stop-flange 34 and behind the auxiliary collet. When it is desired to remove the article after it has been dressed, the lever is thrown in an opposite direction, thereby disengaging the master-collet and bringing it to a standstill. The distance to which the articles may be inserted in the collet can be readily regulated by disengag-

ing the holding-nut 49 from the rear end of the stem, sliding the abutment-rod 46 so that its front end will be at the desired position, and locking it in this position by again engaging the nut 49 with the stem. As a result of this apparatus it will be seen that the article to be chucked, whether true to pattern or not, smooth or rough, varying diameters natural to castings, or any irregular shape, can easily be put in or, if necessary, can be pressed in without any danger to the operator, as would be the case if the collets were revolving. When tubes or rods are to be machined, it is only necessary to remove the abutment-rod 46, thus leaving a hollow stem through which said tubes or rods may be passed and operated upon in the ordinary manner. When small articles are operated upon and openings are formed all the way through the same, the chips and refuse will pass into the socket of the collet and, dropping through the openings 26 formed therein, will reach the chamber 17 of the head. From this chamber they will gravitate through the channels 19 and openings 18, thus keeping the collet and head clear of refuse, which would otherwise interfere with the proper operation of the parts. It will thus be seen that a chuck is provided which accomplishes all the objects mentioned in the preliminary portion of the specification, and, furthermore, said chuck may be used upon any well-known form of lathe.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In mechanism of the class described, the combination with a rotatable holding element, of driving means therefor that is rotatable independently of the holding element and is detachably connected thereto for rotating the holding element, said element and driving means being relatively movable to disengage the driving means from the holding element and permit the stoppage of the latter, and manually-operated means for relatively moving the elements to disengage them while in motion, said elements being rotatable with relation to the operating means.

2. In mechanism of the class described, the combination with a rotatable holding element, of driving means therefor that is rotatable independently of the holding element and is detachably connected thereto for rotating the holding element, said element being longitudinally movable to disengage the driving means and permit the stoppage of the ele-

ment, and manually-operated controlling means for moving the holding element longitudinally, said elements having a rotatable engagement with the actuating means.

3. In mechanism of the class described, the combination with a movable holding element, of driving means therefor, said driving means and holding element having a detachable clutching engagement whereby they are movable together, and a brake for stopping the element when detached from the driving means.

4. In mechanism of the class described, the combination with driving means, of a brake, and a holding element that is alternately movable into clutching engagement with the driving means to move the holding element into engagement with the brake to prevent the movement of the holding element.

5. In mechanism of the class described, the combination with driving means, of a brake, a holding element that is alternately movable into clutching engagement with the driving means to move said holding element into engagement with the brake to prevent the movement of the holding element, and a controlling device for alternately moving the holding element.

6. In mechanism of the class described, the combination with driving means, of a brake, and a rotatable work-holding element that is longitudinally and alternately movable into and out of clutching engagement with the driving means and simultaneously movable out of and into engagement with the brake.

7. In mechanism of the class described, the combination with a support, of driving means, a holding element having a detachable interlocking engagement with the driving means, and a manually-operated controlling device for detaching the holding element while the driving means is running to permit the stoppage of the holding element, said controlling device being mounted upon the support and thereby held against movement with the element and driving means.

8. In apparatus of the class described, the combination with driving means, of a holding element having a detachable clutching engagement with the driving means, and a manually-operated controlling device for unclutching and clutching the holding element while the driving means is running, to permit the stoppage of the holding element, said holding element having a revoluble engagement with the controlling device.

9. In mechanism of the class described, the combination with a driving-spindle, of a collet having expansible walls that detachably clutch the spindle to hold said spindle and collet against independent rotary movement, and means for unclutching the collet from the spindle while the latter is running.

10. In mechanism of the class described, the combination with a driving-spindle having a head, of a collet having expansible walls that detachably clutch the head to hold the spin-

dle and collet against independent rotation, and means for unclutching the collet from the head while the spindle is running, to permit the stoppage of said collet.

5 11. In mechanism of the class described, the combination with a driving-spindle having a hollow head, of an expansible collet having its
10 expansible portion movable into and out of the head and having a detachable engagement therewith to hold the spindle and collet against independent rotation, and means for disengaging the collet from the head while the spindle is running, to permit the stoppage of said collet.

15 12. In mechanism of the class described, the combination with a hollow rotatable driving-head, of a collet having an expansible work-engaging portion that is movable into and out
20 of the head, said portion engaging the head and serving to clutch the collet to the same, and means for actuating the collet while the head is running to permit the stoppage of said collet.

25 13. In mechanism of the class described, the combination with a hollow rotatable driving-head, of a collet having a plurality of work-engaging jaws that are movable into and out of the head, said jaws simultaneously engaging the head and the work and serving to
30 clutch the collet to both, and means for actuating the collet while the head is running to permit the stoppage of said collet and the release of the work.

35 14. In mechanism of the class described, the combination with a tubular driving-spindle, of a collet comprising a stem that is rotatably mounted in the spindle, and a head that is movable into and out of clutching engagement with the spindle, and means engaging
40 the collet for moving the head into and out of such engagement, to permit the stoppage of the collet without interfering with the movement of the spindle.

45 15. In mechanism of the class described, the combination with a tubular driving-spindle, of a holding element comprising a stem passing through the spindle and longitudinally movable therein, said spindle being revoluble about the stem, a collet secured to one end of
50 the stem and having a detachable engagement with the spindle, said engagement holding the spindle and element against independent rotation, and means for moving the stem longitudinally within the spindle.

55 16. In mechanism of the class described, the combination with a tubular driving-spindle, of a holding element comprising a stem passing through the spindle and longitudinally movable therein, said spindle being revoluble
60 about the stem, a collet secured to one end of the stem and having a detachable engagement with the spindle, said engagement holding the spindle and element against independent rotation, and a lever engaging the
65 stem and arranged to move the same longitudinally within the spindle.

17. In mechanism of the class described, the

combination with a tubular driving-spindle having a head, of a stem longitudinally movable in the spindle, and a collet carried by the
70 stem and having a detachable clutching engagement with the head to hold the spindle and collet against independent rotation, said collet and head when disengaged, permitting the rotation of the spindle upon the stem. 75

18. In mechanism of the class described, the combination with a tubular spindle having a hollow head, of a stem longitudinally movable in the spindle, and a collet comprising a plurality of spring-jaws that are movable into
80 and out of the head, said jaws being moved toward each other upon their inward movement and bearing against the inner faces of the head, constituting a clutch which holds the spindle and collet against independent rotation, said jaws when disengaged from the
85 head, permitting the rotation of the spindle upon the stem.

19. In mechanism of the class described, the combination with a tubular spindle having a
90 hollow head provided with a bearing-flange, of a stem longitudinally movable in the spindle, and a collet carried by the stem and comprising a plurality of spring-jaws that are movable into and out of the head and engaged
95 with the bearing-flange.

20. In mechanism of the class described, the combination with rotatable driving means, of a rotatable holding element, said driving means and holding element being relatively
100 movable, one being provided with a keyway and the other with a key that is movable out of and into the keyway upon their relative movement, to detachably connect them against independent rotation, and manually-operated
105 means for obtaining said relative movement while the driving means is in operation.

21. In mechanism of the class described, the combination with rotatable driving means having a keyway in its side wall, of a rotatable holding element longitudinally movable with respect to the driving means, said holding element carrying a key that is movable
110 out of and into the keyway upon the longitudinal movement of the holding element, and manually-operated means for moving the holding element while the driving means is in operation.

22. In mechanism of the class described, the combination with a driving-spindle having a head provided with a keyway in its side wall and at its outer end, of an independent movable collet having a key at its outer end that is arranged to engage in the keyway upon the movement of said collet, and means for
115 moving the collet while the spindle is running.

23. In mechanism of the class described, the combination with a tubular driving-spindle having a hollow head provided in one wall with a keyway, of a stem rotatably and slidably mounted in the spindle, a collet secured by the stem and having a key that is movable
120 into and out of the keyway upon the sliding

movement of the stem, and means for sliding said stem.

24. In mechanism of the class described, the combination with a tubular driving-spindle, of a stem slidably mounted within the spindle and having a collet at one end that is arranged to detachably clutch the spindle, an abutment carried by the stem, means for moving the stem, and a brake-finger arranged in the path of movement of the abutment.

25. In mechanism of the class described, the combination with a tubular driving-spindle, of a stem slidably mounted within the spindle and having a collet at one end, a flanged collar carried by the stem, a lever engaging the collar to move the stem, and a brake-finger mounted in the path of movement of the collar.

26. In mechanism of the class described, the combination with a driving-spindle having a head, said head being provided with an interior annular refuse-chamber and a discharge-opening leading therefrom, of a collet movable into and out of the head, said collet having its walls spaced from the annular walls of the refuse-chamber and being also provided with a refuse-discharge opening there-through that communicates with the space between the walls of the collet and those of the refuse-chamber.

27. In mechanism of the class described, the combination with a driving-spindle having a head, said head being provided with an interior annular refuse-chamber and a plurality of discharge-openings leading therefrom, of an interior bearing-flange arranged within the chamber between its ends, and a collet movable into and out of the head and bearing against the flange, said collet extending into the refuse-chamber on opposite sides of the flange and being spaced from the walls of said chamber.

28. In mechanism of the class described, the combination with a master-collet having a plurality of spring-jaws, of means for moving the jaws toward each other, and an auxiliary collet comprising a spring-ring that is split entirely through from end to end and detachably fits between the jaws of the master-collet.

29. In mechanism of the class described, the combination with a master-collet comprising spaced jaws, of an auxiliary collet detachably fitted within the jaws and having projecting elements that engage in the spaces between the same.

30. In mechanism of the class described, the combination with a master-collet comprising spring-jaws, certain of said jaws having offset sockets leading from the spaces therebetween and forming bayonet-slots, of an auxiliary collet detachably fitted within the jaws and having pins that engage in the bayonet-slots.

31. In mechanism of the class described, the combination with a rotatable collet having a stem, of a stop-abutment movably mounted

within the collet, and an exposed adjustable connection between said collet and stem to hold the former against movement in the latter.

32. In mechanism of the class described, the combination with a rotatable collet having a hollow stem, of a stop-abutment movably mounted in the stem and projecting into the collet, and exposed adjusting means connecting the stem and collet for securing the abutment against movement.

33. In mechanism of the class described, the combination with a rotatable collet having a hollow stem that is threaded, of a stop-abutment rod slidably mounted in the stem and projecting into the collet, said rod being also threaded, and a nut threaded upon both the rod and the stem.

34. In mechanism of the class described, the combination with a tubular driving-spindle having a head, of a hollow stem slidably mounted within the spindle, a collet secured to one end of the stem and slidable into and out of the head, a lever connected to the other end of the stem for slidably moving the same, a stop-abutment slidably mounted within the stem, and projecting into the collet, and means for adjustably connecting the rod and stem.

35. In mechanism of the class described, the combination with a hollow driving-spindle having a head at one end, of a rotatable holding element loosely journaled and longitudinally movable in the spindle, said holding element having one end movable into and out of clutching engagement with the head of the spindle while the latter is in motion, and manually-operated controlling means engaging the holding element to move the same, said controlling means being held against rotation with the element.

36. In mechanism of the class described, the combination with a support, of a rotatable driving-spindle having a head, a loosely-journaled collet movable into and out of clutching engagement with the head, and a lever pivoted upon the support and engaging the collet to move the same, said collet having a rotatable engagement with the lever.

37. In mechanism of the class described, the combination with rotatable driving means, of a brake, a rotatable holding element that is alternately movable into engagement with the driving means and is rotated thereby, and into engagement with the brake to prevent its rotation, and non-rotatable manually-operated means connected with the holding element to move the same into its said engagements.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

HORACE FALK NEUMEYER.

Witnesses:

M. S. WEIDNER,
BLANCHE E. NAGLE.