

F. NOLD.
VALVE RESEATING TOOL.
APPLICATION FILED DEC. 31, 1908.

996,664.

Patented July 4, 1911.

Fig. 1

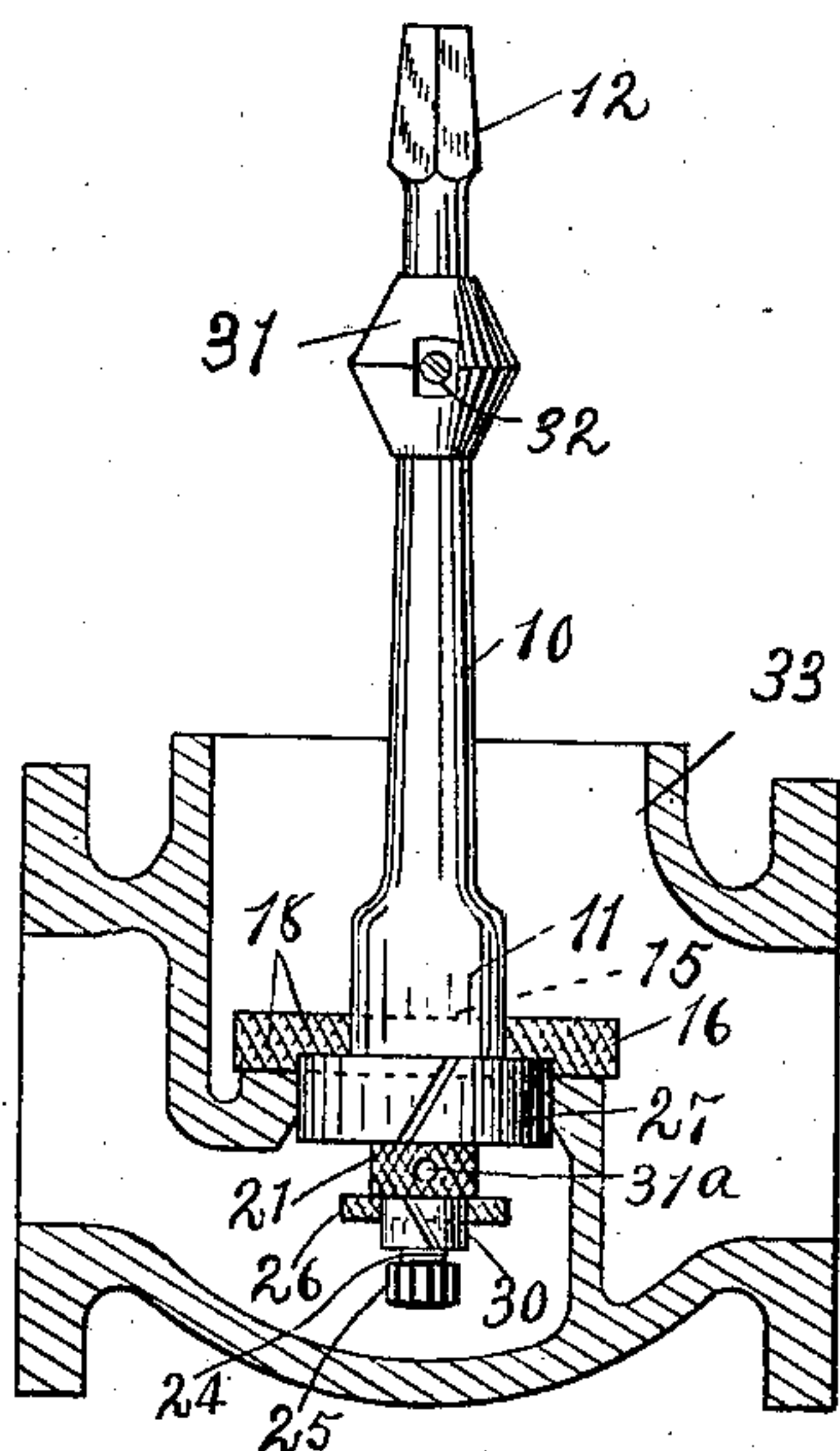


Fig. 2.

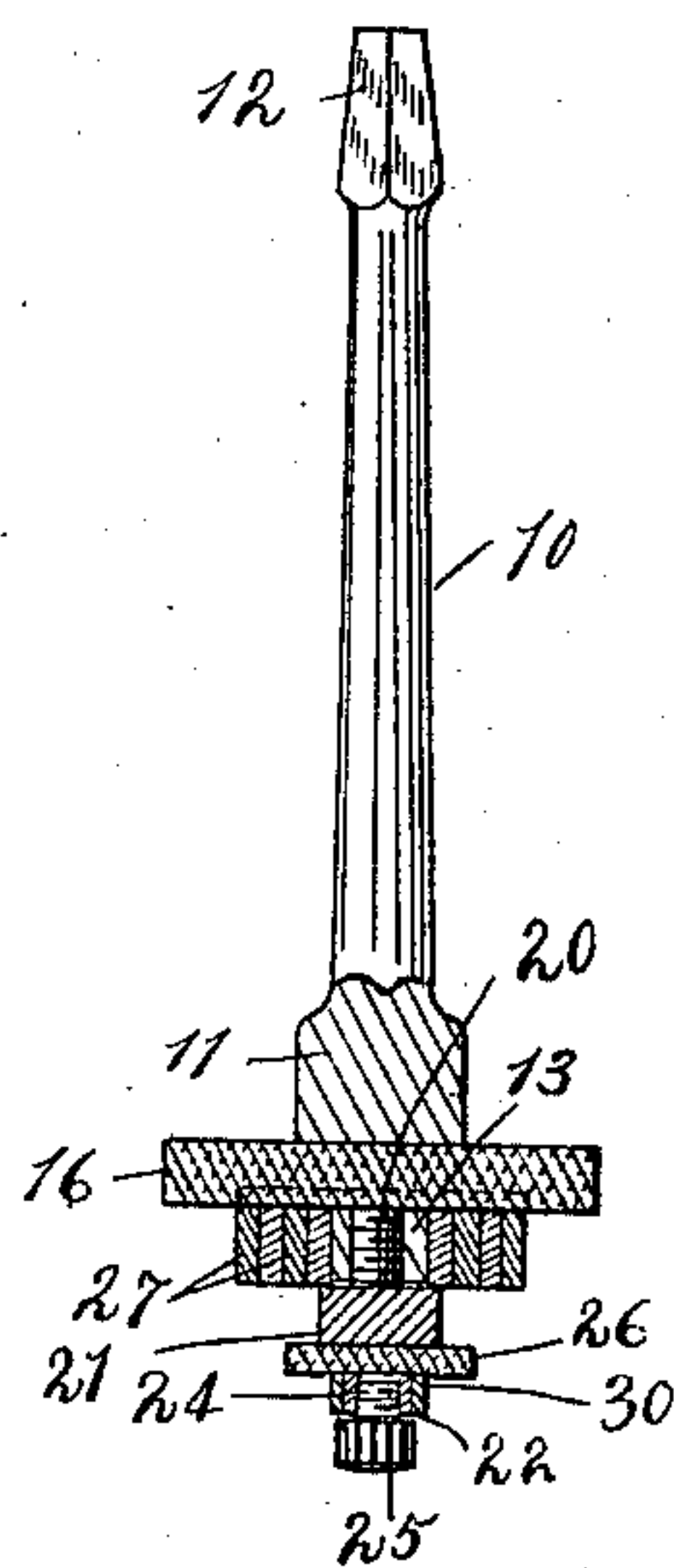


Fig. 4.

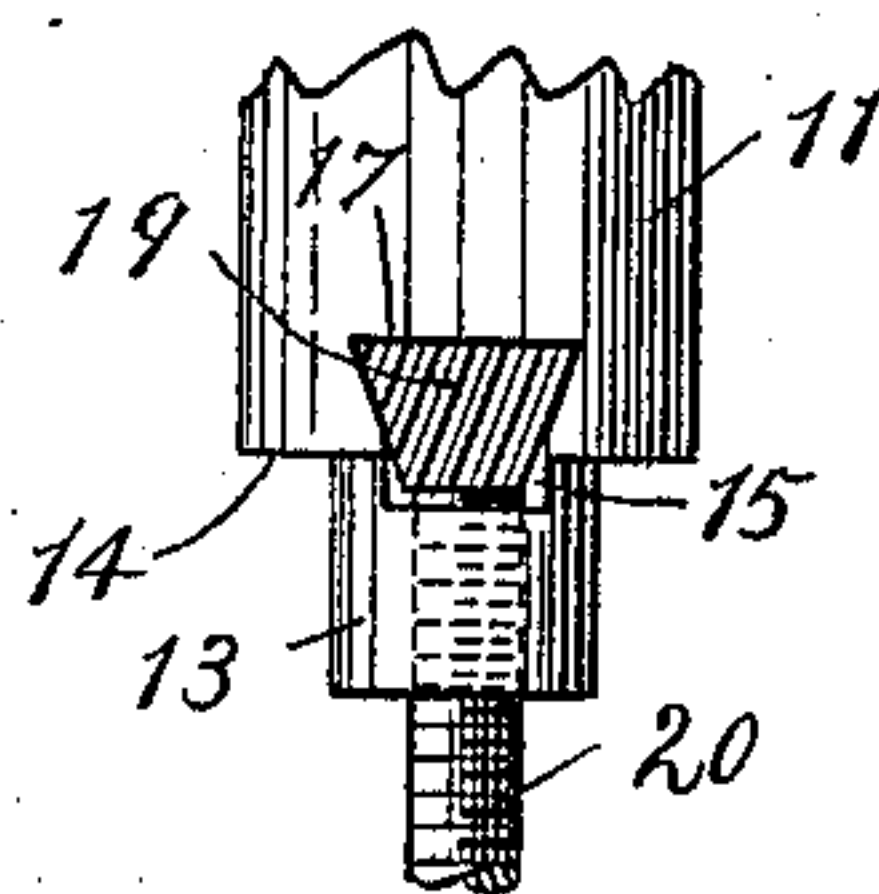


Fig. 5.

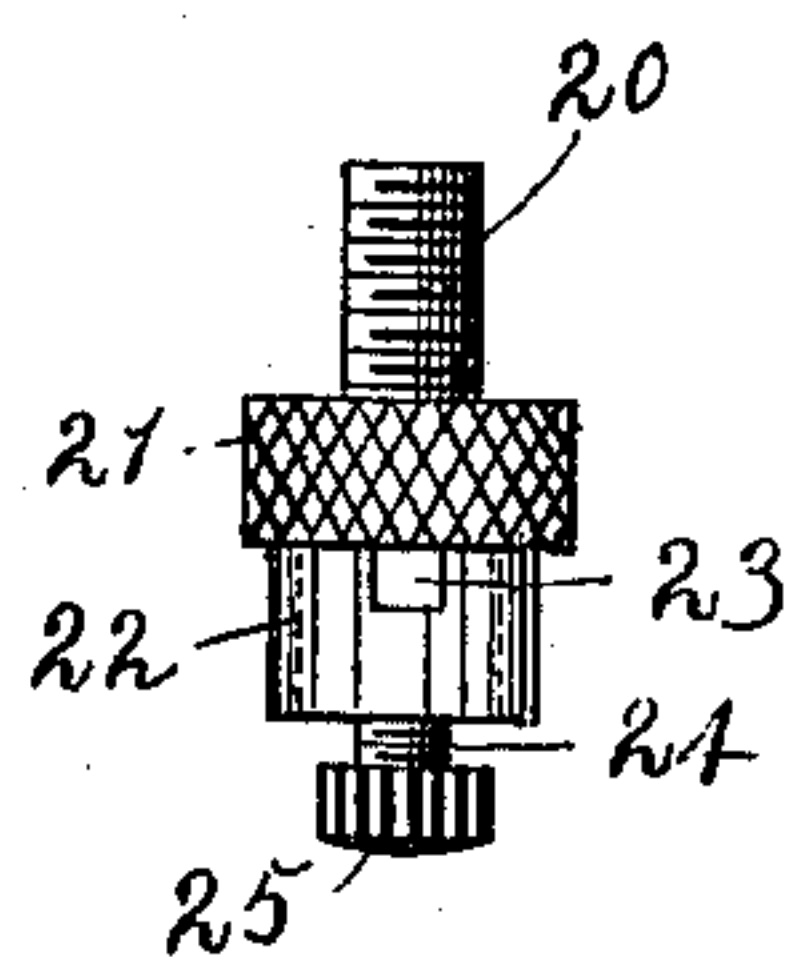


Fig. 6

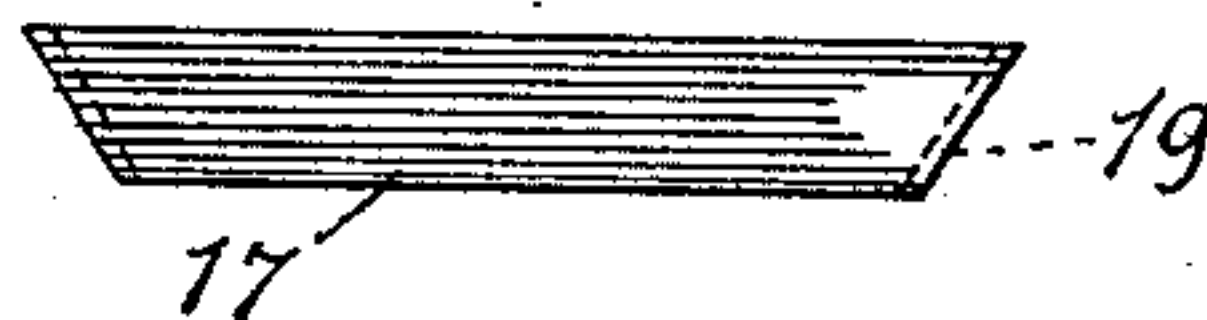
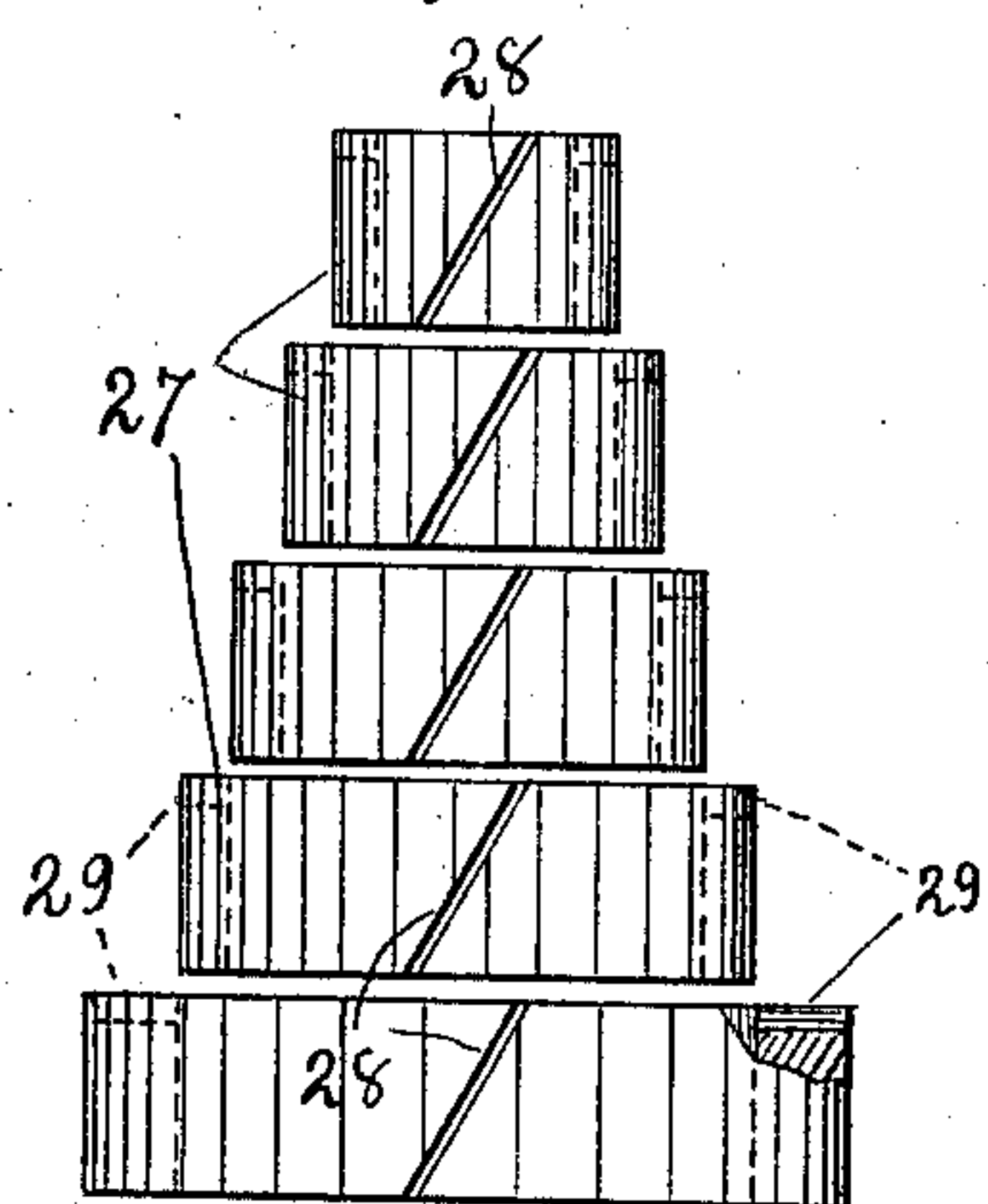


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRANK NOLD, OF SAGINAW, MICHIGAN.

VALVE-RESEATING TOOL.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK NOLD, citizen of the United States, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Valve-Reseating Tools, of which the following is a specification.

My invention relates to cutting or abrading tools and refers especially to devices adapted to regrind valve-seats, and commonly termed valve reseating tools.

The chief objects of the improvements which form the subject matter of this application are to provide a simple, efficient and convenient valve reseating tool; to furnish means for centering the tool while being operated, and to construct such centering means so that it can be readily adjusted for valves of different sizes and shapes and to produce a tool of the character stated so constructed that the cutting or abrading elements will be interchangeable, thus adapting the device for service upon flat or beveled valve seats.

Further objects of the invention are to provide cutting or grinding bits having a plurality of abrading surfaces with teeth of varying degrees of fineness and to furnish means for changing the position of the bits so that the coarse or fine surfaces may be used as required; to arrange a guide for the shank of the tool, which will act as a centering means for the said shank, and to make such guide adjustable longitudinally thereon.

I accomplish the desired results by means of the device illustrated in the accompanying drawing, which forms a part of this application, the various details of construction being disclosed in the following views:—

Figure 1 is an elevational view showing the tool in operative position within a valve casing, the latter being in section, and with the bonnet removed; Fig. 2 is a similar view of the tool removed from the valve casing, and with the bushing rings sectioned to show manner of nesting; Fig. 3 is an enlarged view showing the open bushing rings in side

elevation; Fig. 4 is a fragmentary view, enlarged, of the lower end of the shank with a beveled tool in position in its slot; Fig. 5 is a side elevation also enlarged of the lower cutter holder showing both set screws, and Fig. 6 is a side elevation of the beveled tool shown in Fig. 4.

Referring to the details of the drawing, the numeral 10 indicates the shank and 11 the head of the main portion or body of the tool, the end 12 opposite the head being squared and tapered to adapt it to fit the chuck of a suitable holder. The head is provided with a reduced portion 13, thus forming a shoulder 14, and has a transverse slot 15. This slot has its lower portion rectangular while its upper part is dove tail shaped. The slot is thus fitted to receive cutting tools or bits that are rectangular in cross section, or to hold others that have angular or inclined sides. A square bit or cutter 16 is shown in the slot in Figs. 1 and 2, and an angular cutter 17 is shown in position in Fig. 4. The tool or cutter 16 has abrading teeth 18 upon each of its four sides and these teeth are preferably of different degrees of fineness upon the various surfaces, and as the bar is square any one of the sides desired may be placed in working position. The tool bar 17 is smooth upon all sides, but has its end surfaces furnished with suitable cutting teeth 19, and the ends are beveled and slightly curved to fit the contour of the seat which is to be ground. It will thus be seen that the square cutters or bits are adapted for use upon flat valve seats, as shown in Fig. 1 while the beveled and curved ends of the bits 17 are fitted for truing conical or beveled valve seats. In order to secure these tools in position in their slots, a set screw 20 is provided. This screw engages threads in an axial bore in the reduced portion 13, and has a knurled head or thumb nut 21 furnished with a suitable hole 31^a which may be engaged by a small rod or spanner wrench. This head has a reduced extension 22 furnished with a transverse square slot 23, and is supplied with a set screw 24 provided with a suitable head 25,

the said screw 24 being arranged axially, and penetrating the slot 23, as in the case of the previously described screw 20. The purpose of the slot 23 is to receive cutters 26 of smaller dimensions than the cutters 16 and 17.

Upon the reduced portion 13 of the head of the tool are mounted a series of nested bushing rings 27. The smallest of these rings has a sliding fit on said reduced member 13, and each ring fits the next smaller ring in the same way. In order to give the necessary amount of friction between the sliding surfaces the rings are made resilient by cutting them transversely as indicated at 28. These cuts are inclined to the plane of the rings, and when the rings are assembled for use the cuts or openings 28 are arranged at opposite sides of the nest in the alternate rings, so that the slightly eccentric form which each ring assumes when expanded to slip over the next one will be compensated for. Each bushing ring 27 is furnished upon one side with two notches 29 located diametrically opposite on the ring margins and adapted to receive the adjacent edge or side of either form of the cutters 16 or 17, when seated in the slot 15. The cutter thus forms a key which locks the rings together and prevents them from turning relatively to the shank upon which they are mounted, when the latter is rotated in the operation of the tool.

The reduction 22 of the nut 21 is of less diameter than the part 13 of the handle or shank and is provided with one or more split bushing rings 30, precisely similar to the said rings 27 differing only in size, and having marginal notches to receive the smaller sized cutter 26.

For the purpose of centering the upper portion of the tool while being operated, I provide a guide ferrule or sleeve 31, in the form of a double cone. This tapering sleeve is slidable on the shank 10 and is adjustably secured thereon by a set screw 32.

The tool is prepared for operation in the following manner:—The proper sized spring bushing ring 27 having been selected, all rings of the corresponding series larger than the selected ring are removed, and the remaining rings assembled upon the reduction 13 in nested relation, as shown in the section, Fig. 2, care being taken to have the openings or diagonal cuts 28 in the alternate rings arranged upon opposite sides of the nest and the notches 29 in alinement with each other, the said notches thus forming a groove or channel, which must register with the lower part of the slot 15. A suitable cutting tool is then placed in the said slot 15 and in engagement with the channel formed by the notches 29, and the set screw 20 then inserted and turned by means of the thumb nut 21

until the latter engages the nested rings, forcing them against the cutting tool or bit, and clamping both rings and cutter firmly in operative position, as shown in Figs. 1 and 2. The valve is prepared for the re-seating operation by removing the bonnet and valve stem (not shown) and the latter separated from the bonnet and the packing taken out of the packing nut. The tool is then placed in the body 33 of the valve so that the outer bushing ring engages the bore of the valve seat while the cutting tool rests upon the seat, the relative position of the tool and valve body being shown in Fig. 1. The bonnet is then replaced and the tapered guide sleeve mounted upon the shank by slipping it over the squared end 12 and adjusted at the proper point by means of the screw 32. The location of this sleeve is above the bonnet and separated from the latter a distance slightly greater than the thickness of the material which is to be removed from the valve seat. The packing nut is then put back in place, and its aperture will form a bearing for the tapered upper or conical surface of the sleeve thus centering the shank and causing the tool to revolve centrally through the opening formerly occupied by the valve stem. The tool may be rotated by means of a wrench or crank applied to the end 12 of the shank, or a breast drill or brace may be used if desired. If a wrench or crank is used to operate the tool a slight uniform pressure of the abrading or grinding tool upon the valve seat is produced by screwing the packing nut down with one hand while the tool is rotated by the other. In case a brace is used, the set screw 32 is not tightened, thus allowing the sleeve to remain loose upon the shank. The packing nut can then be screwed down firmly upon the sleeve clamping it fast, while the tool is rotated in the sleeve as a bearing.

When the valve bore is of less diameter than the smallest of the bushing rings 27, the latter are removed entirely and the reduced portion 13 used to center the tool in the said valve bore if of suitable size. In case this reduction should prove too large, the rings 30 may be used in the same way and for the minimum size of valve the reduction 22 may be employed with one of the smaller cutters in cooperation therewith.

By making the bushing rings 27 and 30 and the reductions 13 and 22 of standard sizes to correspond with the diameter of valve bores as usually constructed, a single tool provided with interchangeable cutters will have a wide range, since it will be applicable to valves having bores equal to the largest ring 27 supplied with the tool and the smaller reduced portion 22 and all intermediate sizes.

Having thus described my invention what I claim as new, is:—

5 A valve reseating tool comprising a shank, a head for the shank, having a reduced portion, a slot extending transversely through said head, a set screw engaging an axial hole in said reduced portion and adapted to enter said slot, a head on said screw having a re-

duction provided with a transverse slot, and a set screw engaging said reduction.

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

FRANK NOLD.

Witnesses:

JOHN HENRY,
CHAS. W. KUEHL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."