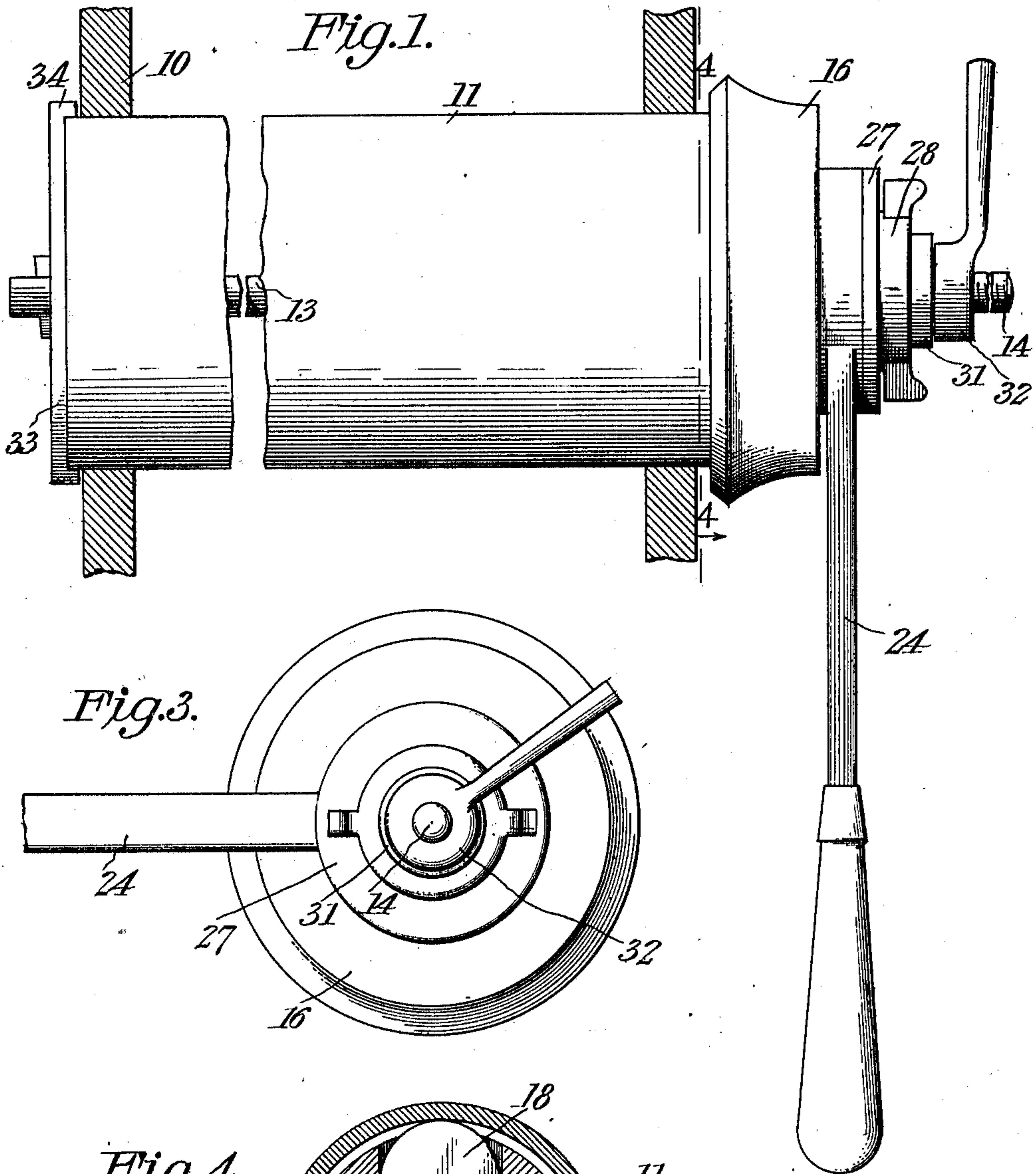


W. FLANAGAN.  
TUBE BEADER AND EXPANDER.  
APPLICATION FILED AUG. 19, 1910.

990,039.

Patented Apr. 18, 1911.

2 SHEETS—SHEET 1.



Witnesses  
Fenton & Belt  
J. O. Fenton

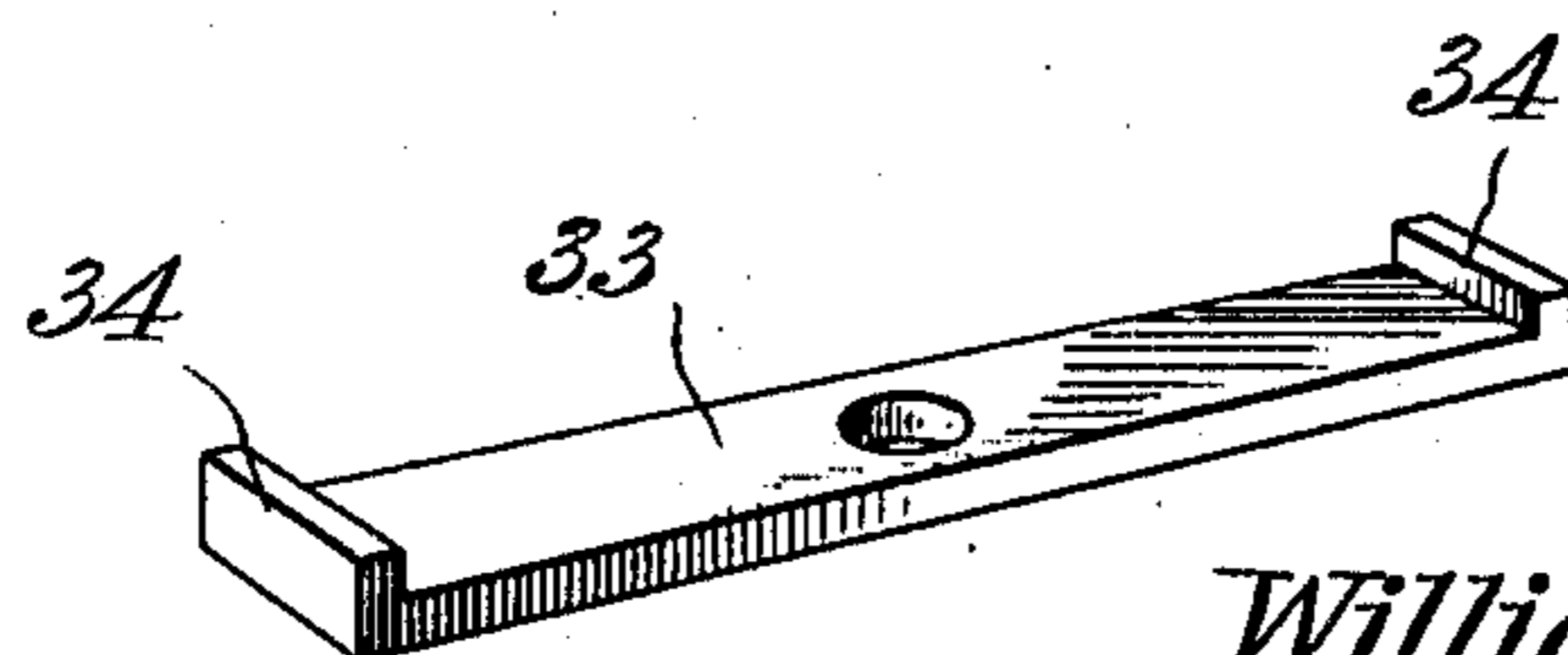
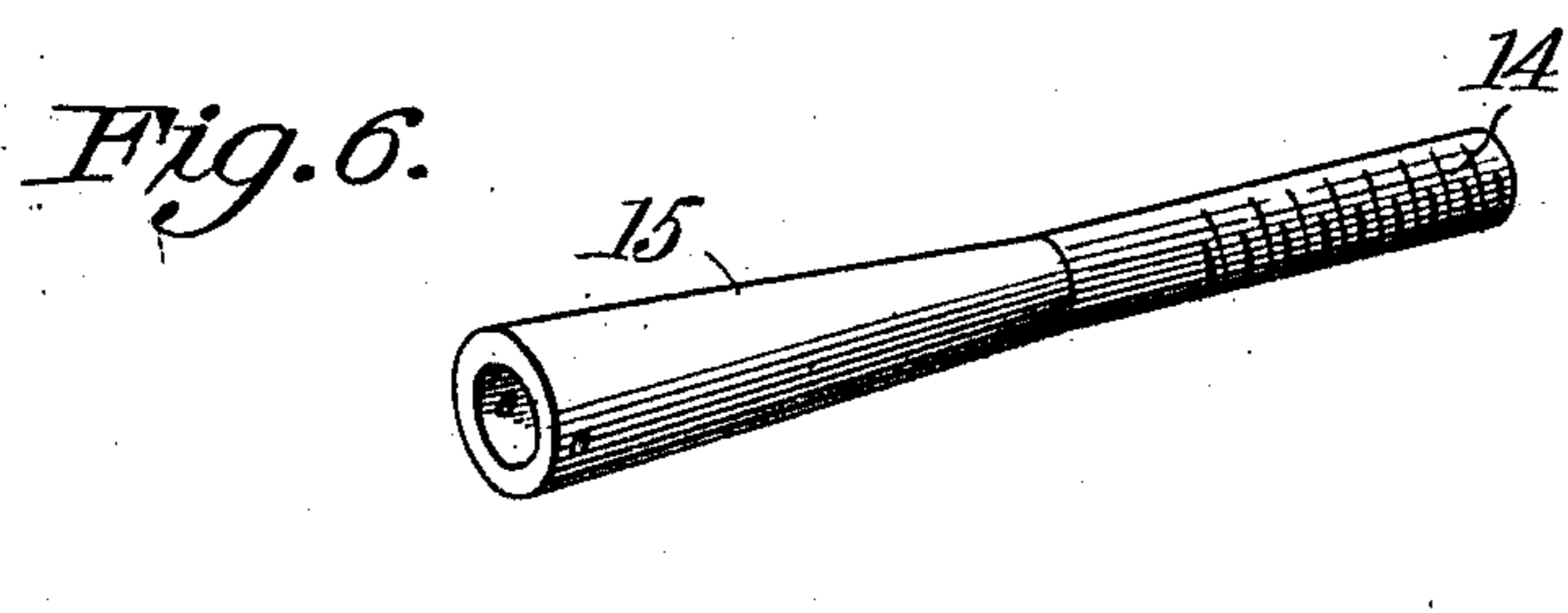
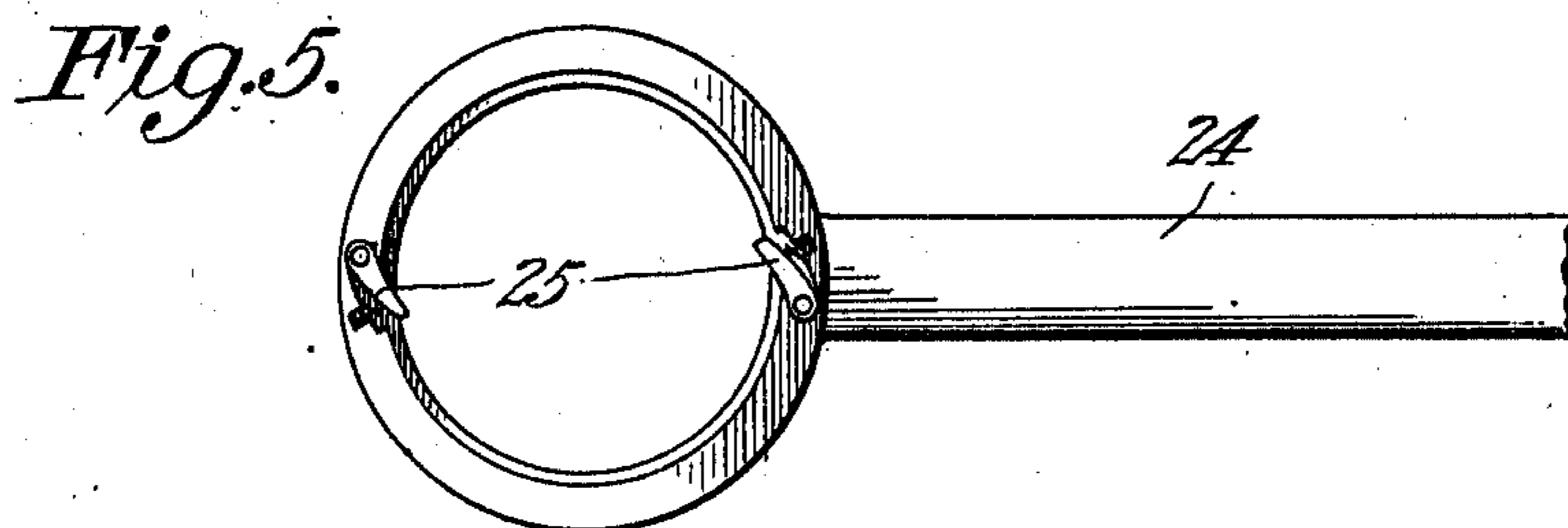
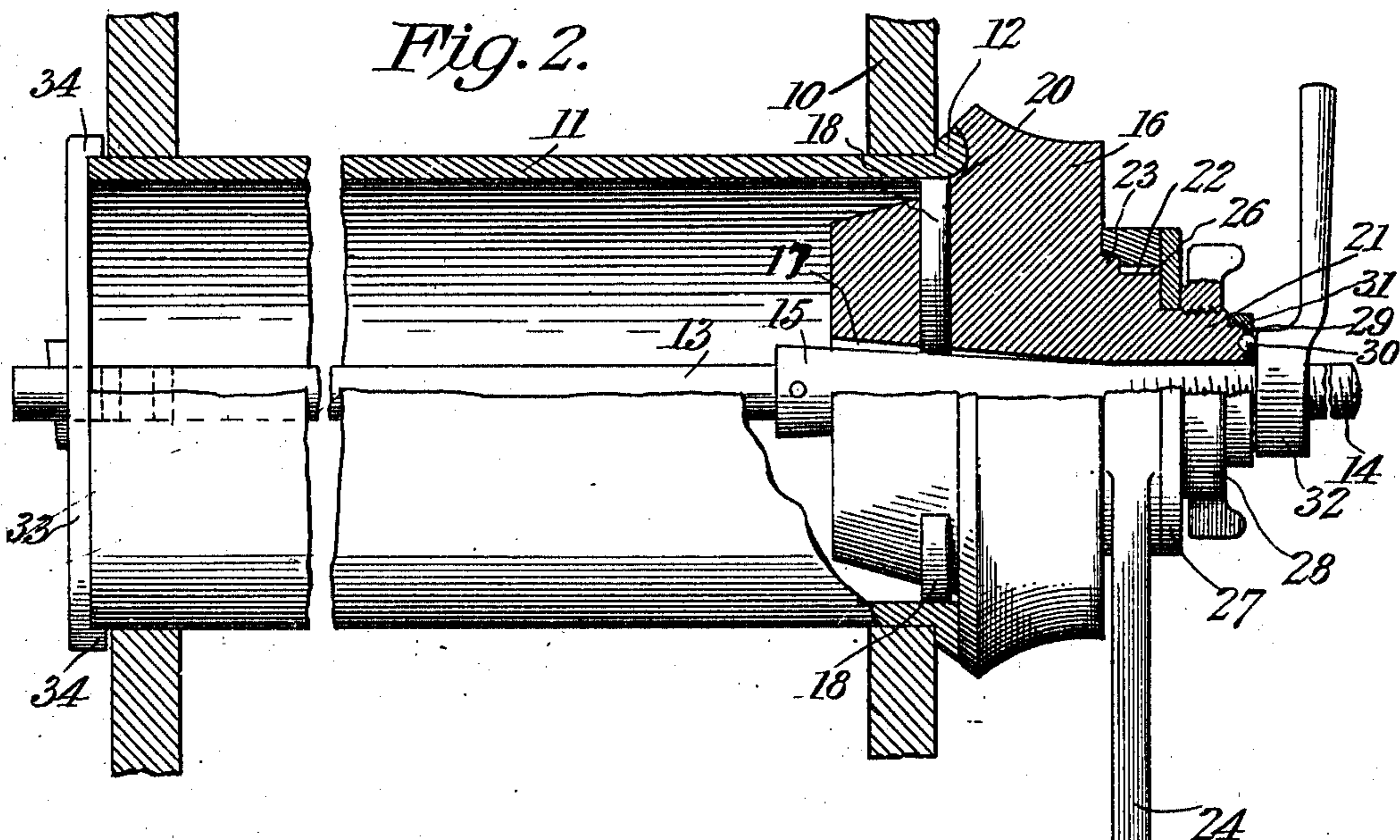
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2 SHEETS—SHEET 2.



Witnesses

Fenton St. Belt

*[Signature]*

*Fig. 7.*

William Flanagan

By *Victor J. Evans*

Attorney

# UNITED STATES PATENT OFFICE.

WILLIAM FLANAGAN, OF TRIBBETT, MISSISSIPPI.

TUBE BEADER AND EXPANDER.

990,039.

Specification of Letters Patent.

Patented Apr. 18, 1911.

Application filed August 19, 1910. Serial No. 578,234.

*To all whom it may concern:*

Be it known that I, WILLIAM FLANAGAN, a citizen of the United States, residing at Tribbett, in the county of Washington and State of Mississippi, have invented new and useful Improvements in Tube Beaders and Expanders, of which the following is a specification.

The invention relates to a tube or flue beader and expander.

The primary object of the invention is the provision of a device of this character in which a tube may be expanded and provided with a bead for the securing of the tube to boiler heads, tube sheets, or the like.

Another object of the invention is the provision of a device of this character in which the beading operation of the tool may be successively performed, whereby a curled or beaded edge may be rolled in a sheet metal tube or flue, and also the latter will be prevented from buckling on the joining of the same to a boiler body, manifold head or a tube sheet.

A further object of the invention is the provision of a device of this character which is simple of construction, efficient in operation, and inexpensive in manufacture.

With these and other objects in view, the invention consists of the construction, combination and arrangement of parts, as will be hereinafter more fully described, illustrated in the accompanying drawings, and pointed out in the claims hereunto appended.

In the drawings: Figure 1 is a side elevation, illustrating the device in position for expanding a tube and rolling a bead thereon. Fig. 2 is a similar view, partly in section, showing a wedging stem for use in setting or placing the expanding device. Fig. 3 is a top plan view of the device. Fig. 4 is a sectional view on the line 4-4 of Fig. 1. Fig. 5 is a detail perspective view of the ratchet handle detached from the device. Fig. 6 is a fragmentary detail perspective view of the wedging stem. Fig. 7 is a perspective view of the bridge piece.

Similar reference numerals indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings by numerals, 10 designates the tube sheet, and 11 one of the tubes or flues, and in Fig. 2 of the drawings, the said tube 11 is here shown as beaded at 12 along the outer side of the sheet 10,

the bead being formed or rolled by the device, as will be hereinafter more fully described.

The device comprises a main stem or bolt 13, which has one end portion provided with screw threads 14 and integral with or suitably secured on the said bolt 13 intermediate its ends is a wedge-shaped sleeve 15, the latter being suitably tapered to the required degree, preferably as here shown. Loosely surrounding the bolt 13 is a beading hub 16, the same being provided with a central tapered bore 17 in which is adjustably fitted the said bolt 13, and intersecting the said bore at diametrically opposite points are suitable recesses receiving expanding rollers 18, the latter being acted upon by the wedging head 15 of the bolt member 13, whereby the rollers will be forced outwardly of the hub to engage and traverse the inner surface of the tube 11 for the expanding thereof. The beading hub 16 is provided with a circular reduced portion 19 in which are formed recesses containing the expanding rollers 18, the hub being provided at the inner end of the reduced portion 19 with a concaved annular beading channel or groove 20 adapted to frictionally engage with the outer edge of the tube 11, so as to act upon the same for rolling a bead therein in a manner as will be hereinafter more fully described.

The hub 16 is provided with an externally threaded reduced end 21, formed with step shoulders 22 and 23, the latter being engaged by the circular end portion of a ratchet handle 24, the latter carrying spring-controlled pawls 25 engaging ratchet teeth 26 formed on the shouldered portion 22 of the hub, so that on the rotation of the handle 24, in one direction, it will be locked with the hub for causing it to rotate therewith in the same direction. Surrounding the reduced externally threaded end 21 is a washer 27, frictionally engaged with a winged binding nut 28 detachably engaging the threaded end 21 of the hub, whereby the ratchet handle 24 is held connected to the hub for rotation thereon.

In the outer circular edge of the reduced end 21 of the hub is formed a circular ball raceway 29, in which is arranged a series of bearing balls 30, the latter being confined within the said raceway by means of a washer 31 surrounding the bolt 13 and bearing upon the said balls 30, the washer 31 being held in proper position by a tail nut

32 adjustably engaged with the threaded end 14 of the bolt 13, and by the adjustment of the said tail nut 32, the bolt 13 may be moved longitudinally through the hub 16, whereby its wedging head 15 will be brought into position for action upon the expanding rollers 18 to separate the same when the reduced end 19 has been inserted in the tube 11 for the expanding thereof.

Adjustably connected with the bolt 13 is a bridge piece 33, the latter being provided with inbent right angular ends 34 which frictionally engage the tube 11 for locking the device therein and to prevent the rotation of the bolt 13 on the turning of the hub 16 by the ratchet handle 24 during the expanding and beading operation of the device.

In the operation of the device, the hub 16 is placed in the end of the tube 11, as shown in Figs. 1 and 2 of the drawings, the nut 32 being partly unscrewed and the bolt 13 slacked back sufficiently to allow the reduced end 19 carrying the expanding rollers 18 to freely slide into the said tube 11 when the device is being placed therein. The nut 32 is screwed up, drawing upon the bolt 13, so that the wedging head 15 is brought into engagement with the expanding rollers 18 forcing the same outwardly, which then take a firm hold upon the tube, the outer edge of the tube 11 being engaged in the beading channel or groove 20, so that on the rotation of the hub 16, the rollers 18 will expand the tube and the outer edge of the latter engaging in the groove 20 will be outwardly curled or rolled to provide the beading 12, thereby securing the tube to the tube sheet.

From the foregoing description, it is thought that the construction and operation of the invention will be clear, and therefore a more extended explanation has been omitted.

What is claimed is:

1. The combination with a threaded bolt having a wedging end, of a rotatable hub surrounding the bolt and having inner and outer reduced ends, the said hub being provided with a beading groove concentrically arranged with respect to the inner reduced end, rollers carried by the inner reduced end of the hub and adapted to be moved out-

wardly therefrom by the wedging end of the bolt, means on the bolt for advancing the wedging end of the bolt toward the hub, a ratchet controlled handle connected with the hub for rotating the same in one direction, and means on the bolt for locking it against rotation in a tube.

2. The combination with a threaded bolt having a wedging end, of a rotatable hub surrounding the bolt and having inner and outer reduced ends, the said hub being provided with a beading groove concentrically arranged with respect to the inner reduced end, rollers carried by the inner reduced end of the hub and adapted to be moved outwardly therefrom by the wedging end of the bolt, means on the bolt for advancing the wedging end of the bolt toward the hub, a ratchet controlled handle connected with the hub for rotating the same in one direction, means on the bolt for locking it against rotation in a tube, a collar threaded on the outer reduced end of the hub for retaining the handle connected therewith, and bearing balls interposed between the outer reduced end of the hub and the first-named means.

3. The combination with a threaded bolt having a wedging end, of a rotatable hub surrounding the bolt and having inner and outer reduced ends, the said hub being provided with a beading groove concentrically arranged with respect to the inner reduced end, rollers carried by the inner reduced end of the hub and adapted to be moved outwardly therefrom by the wedging end of the bolt, means on the bolt for advancing the wedging end of the bolt toward the hub, a ratchet controlled handle connected with the hub for rotating the same in one direction, means on the bolt for locking it against rotation in a tube, a collar threaded on the outer reduced end of the hub for retaining the handle connected therewith, bearing balls interposed between the outer reduced end of the hub and the first-named means, and means for adjusting the locking means for the bolt.

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

WILLIAM FLANAGAN.

Witnesses:

W. H. McGOWEN,  
JOE JENNINGS.