March 12, 1929. G. S. BRANTINGSON 1,705,232

FEED SCREW

Filed March 18, 1926

Fig. 1.

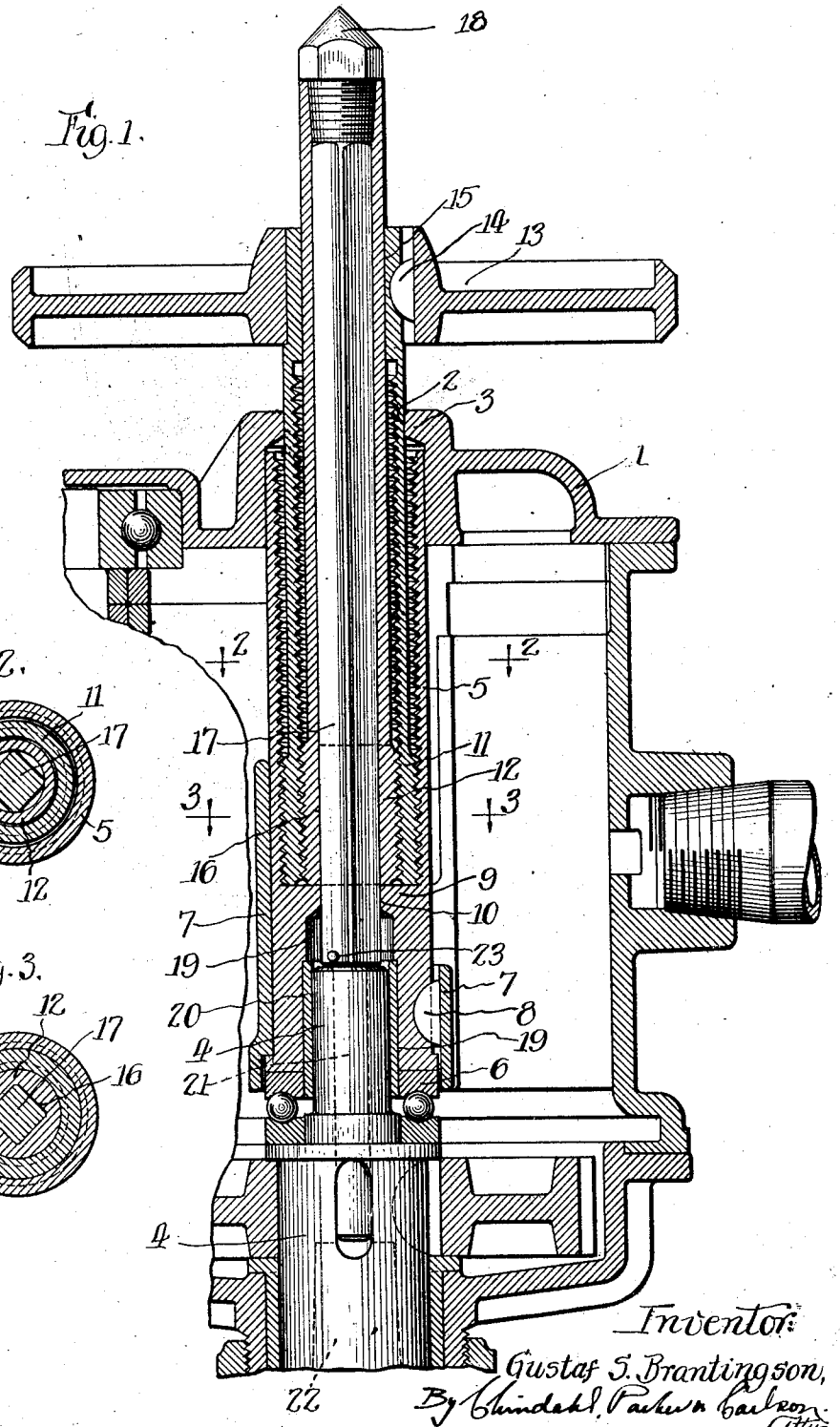


Fig. 2.

Fig. 3.

Inventor:
Gustaf S. Brantingson,
By Crandell, Parker & Carlson
Attys.

Patented Mar. 12, 1929. 1,705,232

UNITED STATES PATENT OFFICE.

GUSTAF SIGURD BRANTINGSON, OF GRAND HAVEN, MICHIGAN, ASSIGNOR TO WILLIAM H. KELLER, INC., OF GRAND HAVEN, MICHIGAN, A CORPORATION OF MICHIGAN.

FEED SCREW.

Application filed March 18, 1926. Serial No. 95,699.

This invention relates to feed screws and particularly to telescopic feed screws for pneumatic drills.

One object of this invention is to provide a telescopic feed screw which will have a more rapid and more positive action than has heretofore been obtained in devices of this type.

Another object is to provide a feed screw which will be strengthened throughout its operating range without incorporating unnecessary bulk and weight in the various parts comprising the device.

Other objects and advantages of my invention will become apparent in the following description.

In Figure 1 of the accompanying drawings is shown a cross section of my telescopic feed screw installed in the casing of a pneumatic drill.

Figs. 2 and 3 show cross sectional views of the feed screw taken on the lines 2—2 and 3—3 of Fig. 1.

While I have shown, in the drawings and will describe fully herein, a preferred embodiment of my invention, it is apparent that it is susceptible of various modifications and alternative constructions and it should be understood that I do not intend to limit the invention to the exact construction disclosed but aim to cover in the subjoined claims all such modifications and alternative constructions falling within the scope of the invention.

My invention in general consists of three concentric cylindrical sleeves arranged in telescopic relation around an angular pin. The outer sleeve of the three is fixed in the casing so as to prevent any movement relative thereto. The inner sleeve constituting an inner feed member is slidable on an angular pin but is held against rotational movement. The intermediate third sleeve constituting an outer feed member is disposed between the outer sleeve and inner feed member and is capable of both rotational and longitudinal movement. An interengaging relation between the three sleeves through the agency of right and left hand screw threads on the sleeves causes the inner sleeve to be propelled or projected outwardly and repelled or withdrawn upon rotation of the intermediate sleeve.

Referring to the drawings, I have shown a casing 1 of a pneumatic drill which may be any general type, in which the telescopic feed screw is incorporated. The feed screw projects in part through an opening 2 defined by a flange 3 on the upper part of the casing 1 and is arranged in the casing in axial alinement with a drill-carrying spindle 4.

The outer sleeve 5 of the feed screw abuts the flange 3 at the top of the casing and the other end rests upon a ball bearing 6 in which the spindle 4 turns. It is supported intermediate the ends by an upstanding wall 7 of the casing 1 and is rigidly secured in that position by being keyed as at 8 to the wall 7. Throughout the major portion of the length of the outer sleeve 5, the sleeve is provided with internal right hand threads, the threads ending at an internal abutment 9 having a central angular opening 10. Positioned within the outer sleeve 5 and in telescopic relation thereto is an outer feed member 11 and an inner feed member 12 which normally rest against the abutment 9. The outer feed member 11 is somewhat longer than the outer sleeve 5 and extends through the opening 2 in the casing 1 fitting snugly therein.

Adjacent the inner end, the outer feed member is externally enlarged and threaded, these threads being the interengaging means between the outer sleeve and the outer feed member and being right hand in character. A manually operable means for imparting a rotational motion to the outer feed member is rigidly secured to the projecting end of the member. This means is shown here as a handle 13 secured to the outer feed member 11 by a key 14. With the exception of the upper end portion of the outer feed member 11 to which the handle is secured, the outer feed member is internally left hand threaded throughout. Thus, upon rotation of the handle 13 on the outer feed member 11, the member 11 will, because of its threaded relation with the sleeve 5, be projected outwardly from or withdrawn into the sleeve 5 and the casing 1.

The inner feed member 12 is positioned within the outer feed member 11 and extends outwardly through 15 and beyond the projecting end of the outer feed member. The inner feed screw 12 is externally enlarged at its inner end and is provided with left hand threads over the enlarged surface. The inner feed member 12 has broached in the lower portion of its bore an angular opening 16

which is a continuation of the bore and which coincides with the angular opening 10 in the internal abutment 9 of the outer sleeve 5.

An extractor pin 17, having an angular cross section similar to the angular opening 10 in the abutment 9 and the opening 16 in the inner feed member 12 is held therein against rotation by the angular opening in the abutment, but is not prevented from sliding longitudinally in the apertures. Also the inner feed member 12, through the same agency of angular relations is held slidably upon but against rotational movement by the extractor pin 17. As a result, when the outer feed member 11 is rotated by means of the handle 13, the inner feed member 12, being held slidably on the extractor pin 17 and having a threaded relation with the outer member 11, will be forced to travel through the outer member. The outer end of the inner feed member 12 is closed by a threaded bearing plug or feed sleeve center 18 which is used as a guide when placing the tool in operation.

The inner or lower end of the outer sleeve 5 is counterbored as at 19 to receive a bushing 20 for the spindle 4. The lower end of the angular extractor pin 17 is turned down cylindrically as shown in dotted lines at 21 and fits through a cylindrical bore in the spindle and is adapted to be forced into the taper drill socket 22 to extract a drill therefrom.

A stop means such as a pin 23 driven into the extractor pin is adapted to limit the longitudinal movement of the extractor pin by contact with the spindle 4 or the abutment 9.

The feed screw as a unit is mounted in the casing in such a manner as to provide a fixed bearing for the spindle 4 and to be a direct longitudinal continuation of the spindle and subsequently the drill when the machine is operating. Thus positioned, the drill, spindle and feed screw, form a unit extending through and perpendicular to a horizontal cross sectional plane in the tool.

The outer sleeve 5 of the feed screw, being keyed to the casing and being further held against displacement by the flange 3 and the ball bearing member 6 has no movement relative to the casing. The extractor pin 17 extending through the angular opening 10 in the abutment 9 in the outer sleeve is held against rotational movement by the angular shape of the opening. The extractor pin also having an angular engagement with the angular surface 16 broached in the inner feed member prevents rotational movement of the inner member. The intermediate or outer feed member 11 having a right hand threaded engagement with the outer sleeve 5 and a left hand threaded engagement with the inner feed member 12 is capable of both rotational and longitudinal movement relative thereto

To operate the feed screw which is in effect to cause the inner feed member to be propelled outwardly, the handle 13 is rotated counter-clockwise. The outer feed member 11, being in right hand threaded engagement with the stationary feed sleeve 5, will rotate and travel outwardly through the flange 3 in the casing. At the same time the inner feed member 12 being slidably mounted on the extractor pin 17 cannot rotate with the outer feed member 11 and having a left hand threaded engagement therewith is propelled outwardly through the outer feed member. Consequently, for every given distance traveled by the outer feed member 11 the inner feed member 12, being carried by the outer feed member and at the same time traveling through the outer feed member, will traverse approximately twice that distance. Thus, a multiplication of the movement imparted to the handle 13 is effected, producing a rapid operating feed.

The simultaneous action of the inner and outer feed members eliminates any chance of either member becoming entirely extended before the other begins to operate. As a result, each member acts to brace the other throughout the distance traveled.

The feed sleeve center 18 being rigid with the inner feed member, does not rotate, thus eliminating the undue wear of this part which has heretofore been encountered.

I claim as my invention:

1. A telescopic feed screw for a pneumatic drill having, in combination, a casing, a telescopic feed screw mounted in said casing, said feed screw comprising three concentrically arranged sleeves, one of said sleeves being rigidly mounted integral with said casing, the second sleeve mounted to permit longitudinal and rotational movement, the third sleeve adapted to move longitudinally only, manually operated means on said second sleeve to impart rotational movement to said second sleeve, said three sleeves having an interengaging relation whereby upon rotation of said second sleeve said third sleeve and said second sleeve will move longitudinally of the feed screw.

2. A pneumatic drill having, in combination, a casing, a telescopic feed screw mounted in said casing, said feed screw comprising two concentrically arranged members, a single means engaging both of said members to prevent relative rotation therebetween, and a third member positioned intermediate the first two members, said third intermediate member having a right hand threaded engagement with one of said first two members and having a left hand threaded engagement with the other member.

3. A pneumatic drill having, in combination, a casing, a telescopic feed screw secured in said casing and projecting therethrough, said telescopic feed screw comprising three concentrically arranged sleeves, means rigidly securing the outer sleeve to said casing,

nonrotating means within the inner sleeve to hold said inner sleeve against rotation, the intermediate sleeve having a coacting threaded relation with said outer sleeve and also with said inner sleeve.

4. In a telescopic feed screw, in combination, a non-rotatably mounted extractor pin, a plurality of cylindrical relatively rotatable sleeves concentrically disposed about said pin and operable upon relative rotation to vary the total length of said feed screw, the inner sleeve being associated with said pin so as to move longitudinally but non-rotatably on said pin.

5. The combination with a pneumatic drill having a casing and a rotatable spindle with a drill socket adapted to removably receive a drill, of feeding means comprising three concentrically arranged sleeves mounted in said casing coaxially with said spindle, means securing one of said sleeves against longitudinal and rotational movement relative to said casing, a pin mounted within said sleeves for limited longitudinal movement to extract a drill from said socket, said pin engaging said fixed sleeve and one of said other sleeves to prevent relative rotation, and oppositely disposed threaded means on the third one of said sleeves engaging said non-rotatable sleeves whereby said sleeves may be moved longitudinally of each other into an extended position by turning said rotatable sleeve.

6. In a pneumatic drill having a casing, a rotatable spindle with a drill socket therein adapted to removably receive a drill, the combination of feeding means comprising two concentric sleeves fixed against rotation relative to each other and relative to said casing, a third sleeve concentric with and rotatable relative to said first two sleeves, said third sleeve having oppositely disposed threads engaging said other two sleeves whereby said sleeves may be moved longitudinally into extended relation by rotating said third sleeve, and an extractor pin mounted within said sleeves and movable longitudinally thereof to extract a tool from said drill socket.

In testimony whereof, I have hereunto affixed my signature.

GUSTAF SIGURD BRANTINGSON.