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TAP HOLDER

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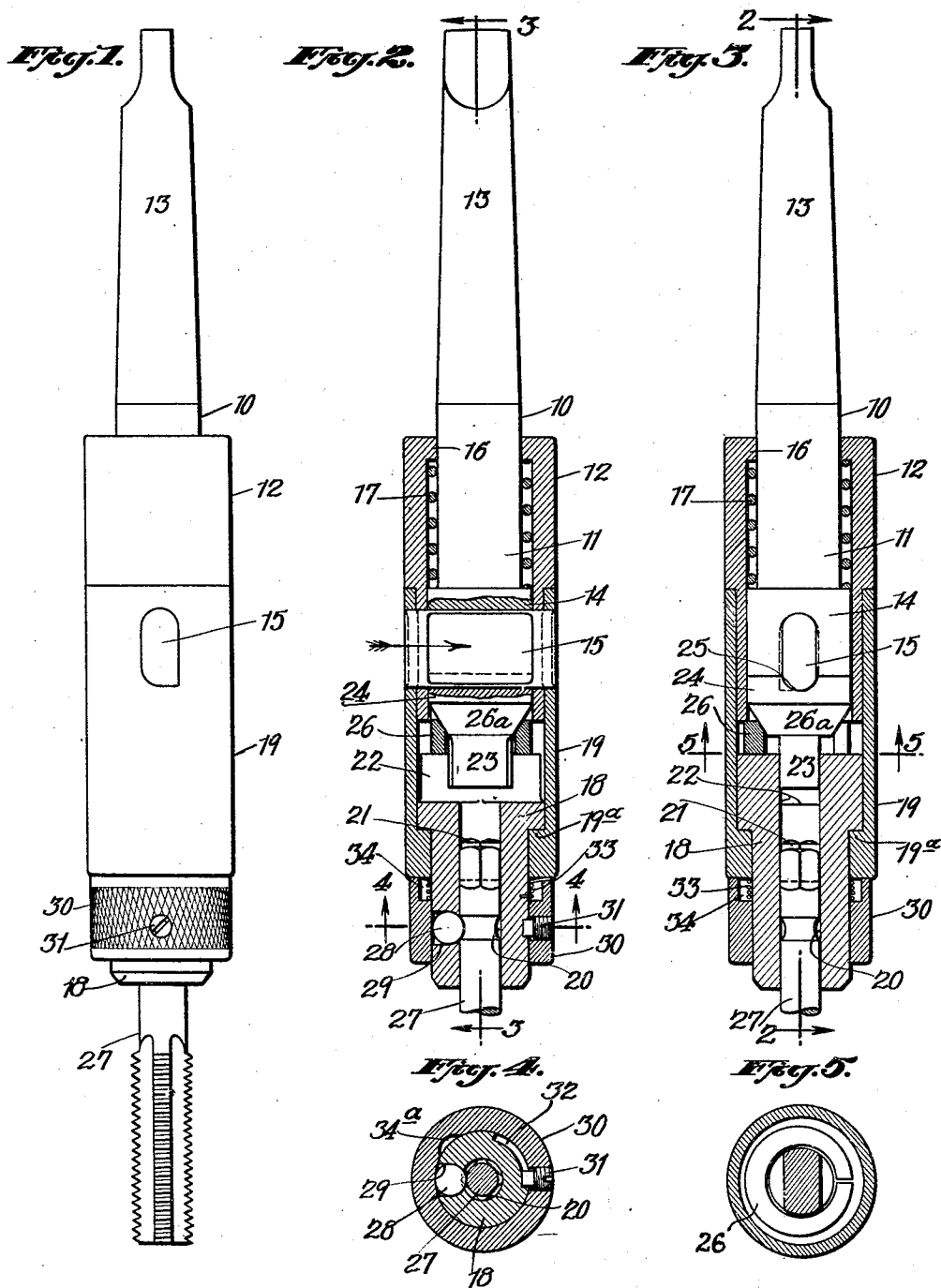


Fig. 4.

Fig. 5.

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TAP HOLDER

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This invention relates to a tap holder for drilling machines, multiple tappers, multiple drilling machines, lathes and similar apparatus for tapping screwthreads in holes. In tapping holes with threads of various leads or pitches, as is done in multiple tapping machines, the taps having threads of greater pitch or lead must advance more rapidly into the hole and thus be drawn ahead of the other taps having lesser leads. If a number of taps of different leads are driven from a common source, it is necessary that the tap holders move forwardly at proportionately varying rates. Moreover, in drilling blind holes, those taps having the greater lead will reach the bottom of the hole quicker than the taps having lesser leads and may thereby be broken unless their forward driving movement be stopped upon reaching the bottom of the hole.

An object of my invention is to provide a tap holder that may move longitudinally on the driving spindle and thus advance independently of the spindle.

Another object of the invention is to provide a tap holder having a positive drive which slips to prevent the tap from breaking, in the event that the tap reaches or strikes the bottom of a blind hole and is thereby stopped from further movement while the driving spindle continues to rotate.

Further objects and features of the invention are to provide a new and improved tap holding collet in which the tap may be securely held and released by a short, simple movement of the collet; to provide a tap holding mechanism that is normally held backwardly on the driving spindle, but which may float forwardly thereof under tension; and to provide a tap holding mechanism having a member transmitting rotational movement from a driving key, but movable to disconnect from said key upon the stopping of the tap holding elements.

With these and other objects in view which will more fully appear from the following detailed description, the invention comprises the tap holding means described and set forth in the following specification and claims.

The various features of the invention are

illustrated in the accompanying drawings, in which:

Fig. 1 is a longitudinal side view of a tap holder and tap embodying the preferred form of the invention.

Fig. 2 is a longitudinal sectional view of the tap holder taken on line 2—2 of Fig. 3.

Fig. 3 is a longitudinal sectional view taken at right angles to the section of Fig. 2, on the line 3—3.

Fig. 4 is a cross sectional view taken on line 4—4 of Fig. 2, and

Fig. 5 is a cross sectional view taken on line 5—5 of Fig. 3.

In my present invention, the tap holding means is so carried on a driving spindle that it may float or slide forwardly thereon while being rotated. The rotational driving movement is transmitted from the spindle to a driving key which is freely slidable longitudinally of the spindle, and from thence the movement is imparted to a connecting or transmitting element which is keyed to the tap securing elements. The connecting or transmitting element is pressed against the driving key and is provided at its end with a suitable groove in which the edge of the driving key is received so that the tap is driven from the key.

The transmitting element is free to move longitudinally of the driving key of the tap holding elements, and is held into engagement with a split friction spring which, in the event that the tap reaches the bottom of a blind hole, expands and permits the connecting element to move out of engagement with the driving key and thus disconnects the tap from a direct driving relation to the driving spindle.

Referring more particularly to the accompanying drawings, the tap holding means is provided with a spindle 10, which has a cylindrical portion 11 entering a holding sleeve or housing 12, and a tapered, projecting end portion 13 adapted to be inserted in the driving element of the drilling or similar machine. The end of the spindle within the sleeve or housing 12 is enlarged as at 14 to fit the inner surface of the sleeve, and is cleft or bifurcated to receive a longitudinally flat-

tened driving key 15 extending transversely through the sleeve 12. The sleeve 12 is provided, at one end, with an inturned flange 16 which serves to retain a spring 17 encircling the cylindrical portion 11 of the spindle and confined between the flange 16 and the projecting enlarged portion 14 of the spindle. The spring 17 serves to press or bias the sleeve 12 backwardly towards the tapering portion 13 of the spindle until the transverse driving key 15 reaches the bottom of the bifurcation or kerf in the end portion 14 of the spindle.

A tap collet 18 is mounted forwardly of the transverse key 15 by means of a sleeve element 19, one end of which is provided with an inwardly projecting retaining shoulder 19a engaging the collet 18, and the other end of which encircles a reduced portion of the sleeve 12 and is held thereon by the projecting ends of the key 15.

The tap collet 18 is provided at its forward end with a longitudinal hole 20 of a diameter to fit the tap and having a squared portion 21 to prevent the tap from rotating therein. At the inner or rear end of the tap holding collet 18, there is provided a transverse recess or key-way 22, in which is received a forwardly projecting key portion 23 of a transmitting element 24. The rear end portion of the transmitting element 24 closely fits the forward end of the sleeve 12, and is provided with a rounded recess 25 into which fits the rounded end of the transverse driving key 15. The transmitting element 24 is slidable within the sleeve 12, but is pressed tightly against the forward edge of the transverse key 15 by means of a split ring 26, one edge of which rests against the rear or inner end of the tap collet 18 and contracts about a friction cone surface 26a on the transmitting element 24. A tap 27 having a stem adapted to fit in the opening 20, may be inserted and held in the tap holding collet 18 by any suitable means.

In the preferred form of the invention, the tap is preferably held in the collet by means of a ball 28 positioned in a transverse socket 29 in the collet 18. The ball 28 is of somewhat greater diameter than the thickness of the wall of the collet 18 and is held inwardly to project into a suitable notch or groove in the stem of the tap 27 by means of a tap chuck or ring 30 encircling the tap collet.

The tap chuck or ring 30 is retained on the collet by means of a screw 31 which projects into an arcuate groove 32 in the circumference of the collet. A spring 33 encircling the collet 18 is mounted in a recess 34 at the rear edge of the chuck 30, and is secured at one end to the collet and at the other end to the chuck so as to draw the chuck to the position shown in Fig. 4. Upon turning the chuck counterclockwise on the collet to the limit of movement of the screw

31 in the groove 32, a depression 34a in the inner surface of the chuck is brought into alignment with the ball recess 29, permitting the ball to move outwardly and releasing the stem of the tap so that it may be withdrawn.

When the tap is mounted and secured in the collet 18 and the spindle 13 is positioned in the driving part of a machine, the tap is started in a hole to be tapped. If the tap has a greater pitch or lead than that at which the spindle is advanced, it will draw the collet 18 forwardly relative to the spindle and will, accordingly, draw forwardly the sleeve 12 and the driving key 15. The sleeve 12 will then float forwardly on the spindle 13, compressing the spring 17. The spindle 13 will still continue to drive the key 15 which is of sufficient width to remain in engagement with the fork end portion 14 of the spindle throughout the forward floating of the tap retaining collet. The key 15 remains in engagement with the notched end of the transmitting element 24 and, therefore, transmits the rotational, driving movement through the key 23 of this element to the collet 18 of the tap 27.

In the event that the end of the tap strikes the bottom of a blind hole and is, accordingly, prevented from further rotation or movement, the pressure of the rounded edge 25 of the key 15 against the transmitting element 24 will cause this element to move forwardly against the split ring 26 which expands under pressure until the key 15 is free of the notched end of the transmitting element. Thereafter, the spindle 13 continues to rotate without driving the tap collet and tap.

To remove the key 15 and stop the sleeve elements and spindle, the spindle is drawn outwardly against the pressure of the spring 17 and the key 15 is driven transversely of the sleeve in the direction of the arrow in Fig. 2.

By means of the above tap holder, a number of taps of different leads may be mounted in a multiple drilling or tap machine and all driven simultaneously from a common driving source. Thus, taps having the greater leads will advance more rapidly into the work independently of taps of lesser leads. The invention thereby provides a very simple and effective way of driving a number of taps of different leads.

As changes of construction could be made within the scope of my invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

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

1. A tap holder which comprises a sleeve, a driving key in said sleeve, a spindle ex-

tending into said sleeve and engaging said driving key and slidable longitudinally thereof, a tap holding means mounted in said sleeve, and coupling means engaging and slidable longitudinally of said holding means and biased into engagement with said driving key.

surface to yieldingly hold said connecting member into engagement with said key.

In testimony whereof, I have hereunto signed my name.

BERNARD LOUIS SMEUNINX.

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| 5 | and slidable longitudinally of said holding means and biased into engagement with said driving key. | |
| 10 | 2. A tap holder which comprises a sleeve, a transverse longitudinally flattened key in said sleeve, a projecting driving spindle slidably mounted in said sleeve and bifurcated to slidably engage said key, a spring biasing said spindle towards said key, a tap holding means mounted in said sleeve, a connecting member having a longitudinal slidable engagement with said tap holding means and notched to engage the edge of said driving key, and means yieldingly holding said connecting member against the edge of said driving key. | 70 |
| 15 | 3. A tap holder which comprises a sleeve, a transverse longitudinally flattened key in said sleeve, a projecting driving spindle slidably mounted in said sleeve and bifurcated to slidably engage said key, a spring biasing said spindle towards said key, a tap holding means mounted in said sleeve, a connecting member having a longitudinal slidable engagement with said tap holder and notched to engage the edge of said driving key, said connecting member having a cone friction surface, and a split friction ring contracted about said cone surface to yieldingly hold said connecting member into engagement with said key. | 75 |
| 20 | 4. A tap holder which comprises a sleeve, a transverse longitudinally flattened key in said sleeve, a projecting driving spindle slidably mounted in said sleeve and bifurcated to slidably engage said key, a spring biasing said spindle towards said key, a tap holding means mounted in said sleeve, and yieldable means for driving said tap holding means from said transverse key. | 80 |
| 25 | 5. A tap holder which comprises a driving key, a tap holding means, a connecting member between said driving key and said holder having a longitudinally slidable radially fixed engagement with said tap holder and notched to engage the edge of said driving key, and a spring yieldingly holding said connecting member against the edge of said driving key, the surfaces of said notch and said key imparting a longitudinal thrust against said spring when said key is rotated to drive said connecting member. | 85 |
| 30 | 6. A device of the type described, which comprises a tap holding means, a driving key transverse to the axis of said tap holding means, a connecting member having a longitudinally slidable engagement with said tap holder and notched to engage the edge of said driving key, said connecting member having a conical surface and a split spring ring contracted about said conical | 90 |
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