

F. E. CARLSON.  
BIT EXTENSION.  
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899,203.

FIG. 1.

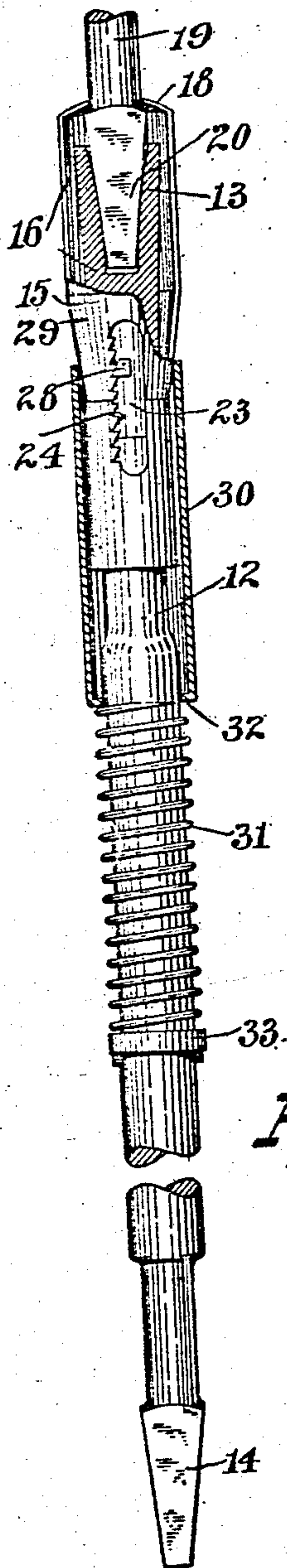


FIG. 2 FIG. 4. FIG. 3.

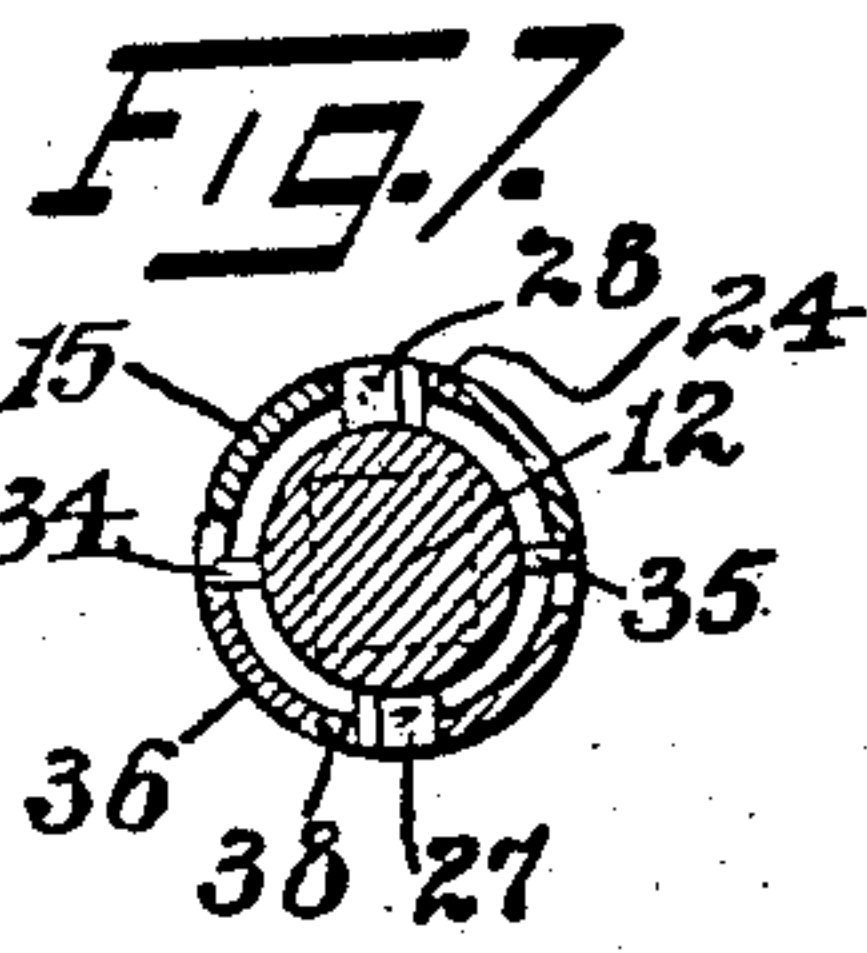
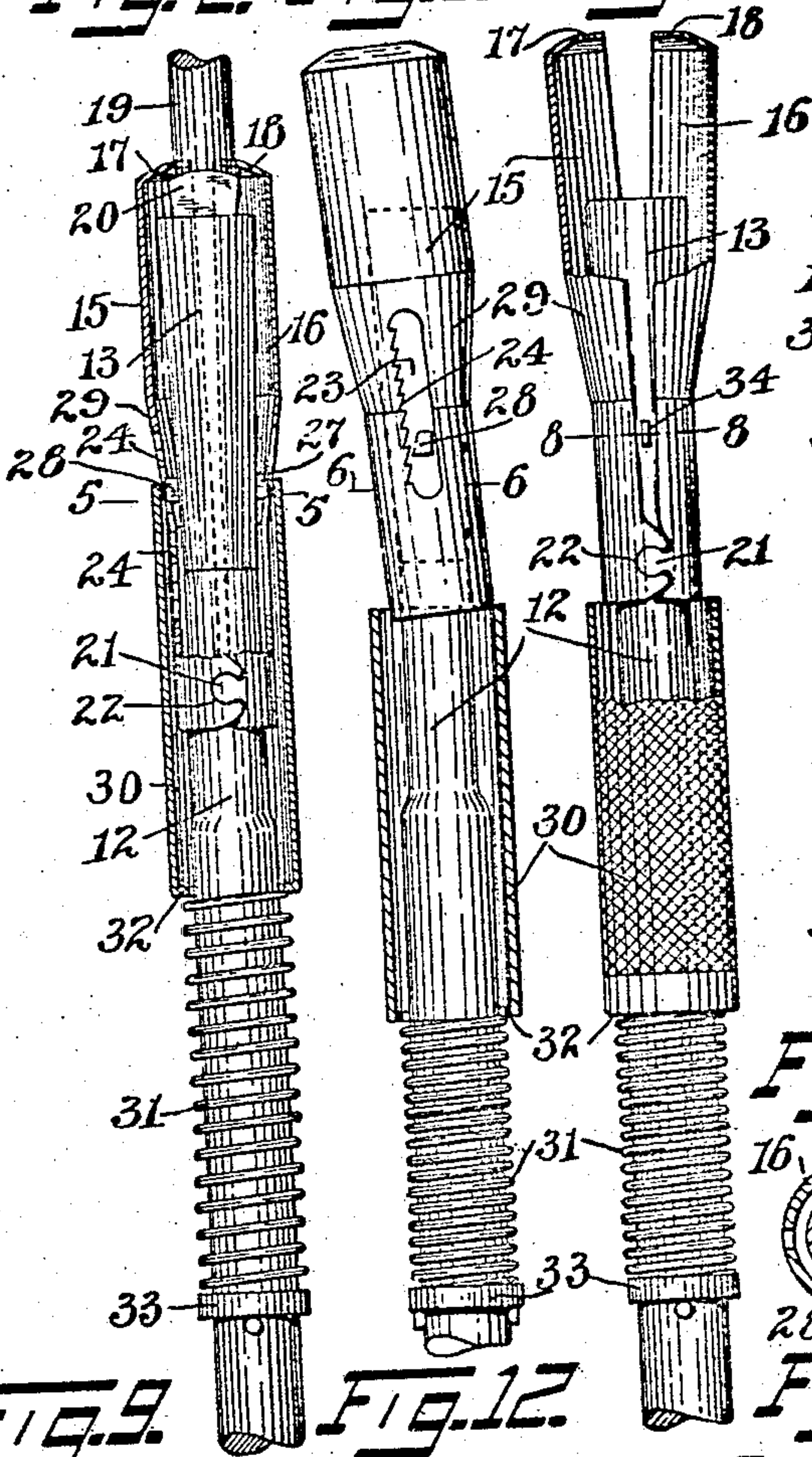


FIG. 8.

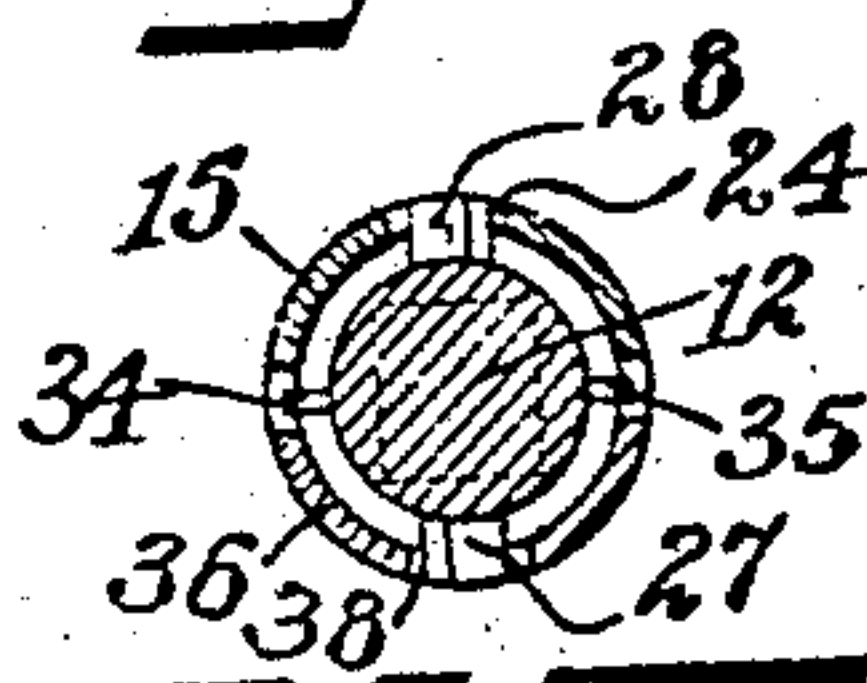


FIG. 5 FIG. 6.

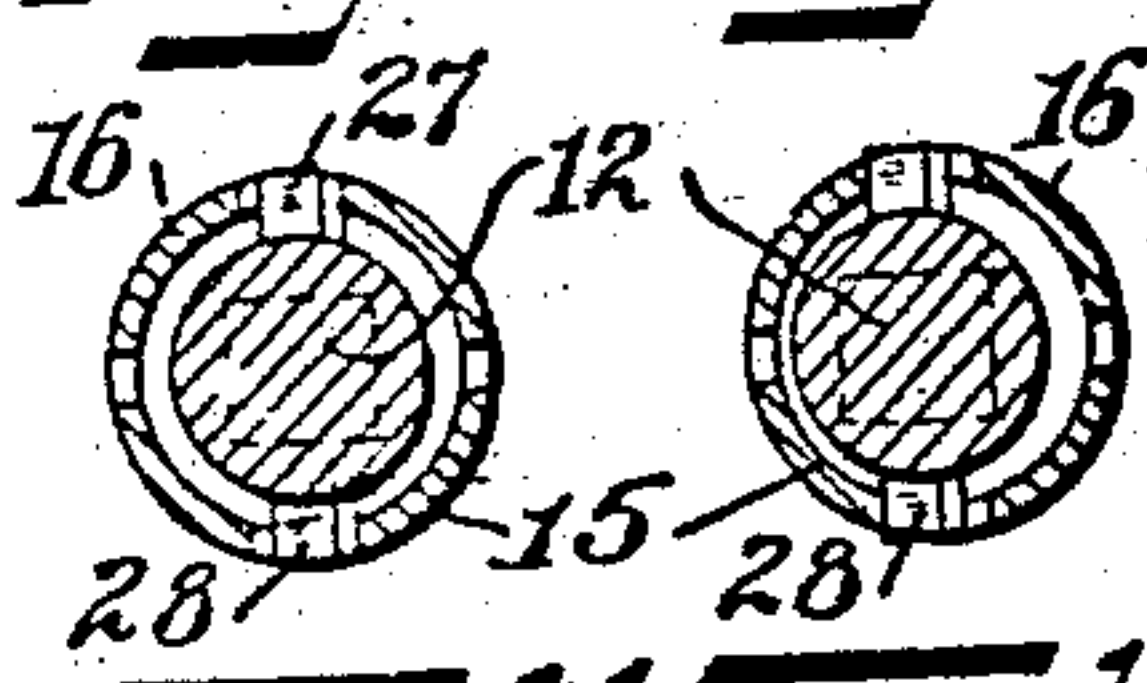


FIG. 9. FIG. 12.

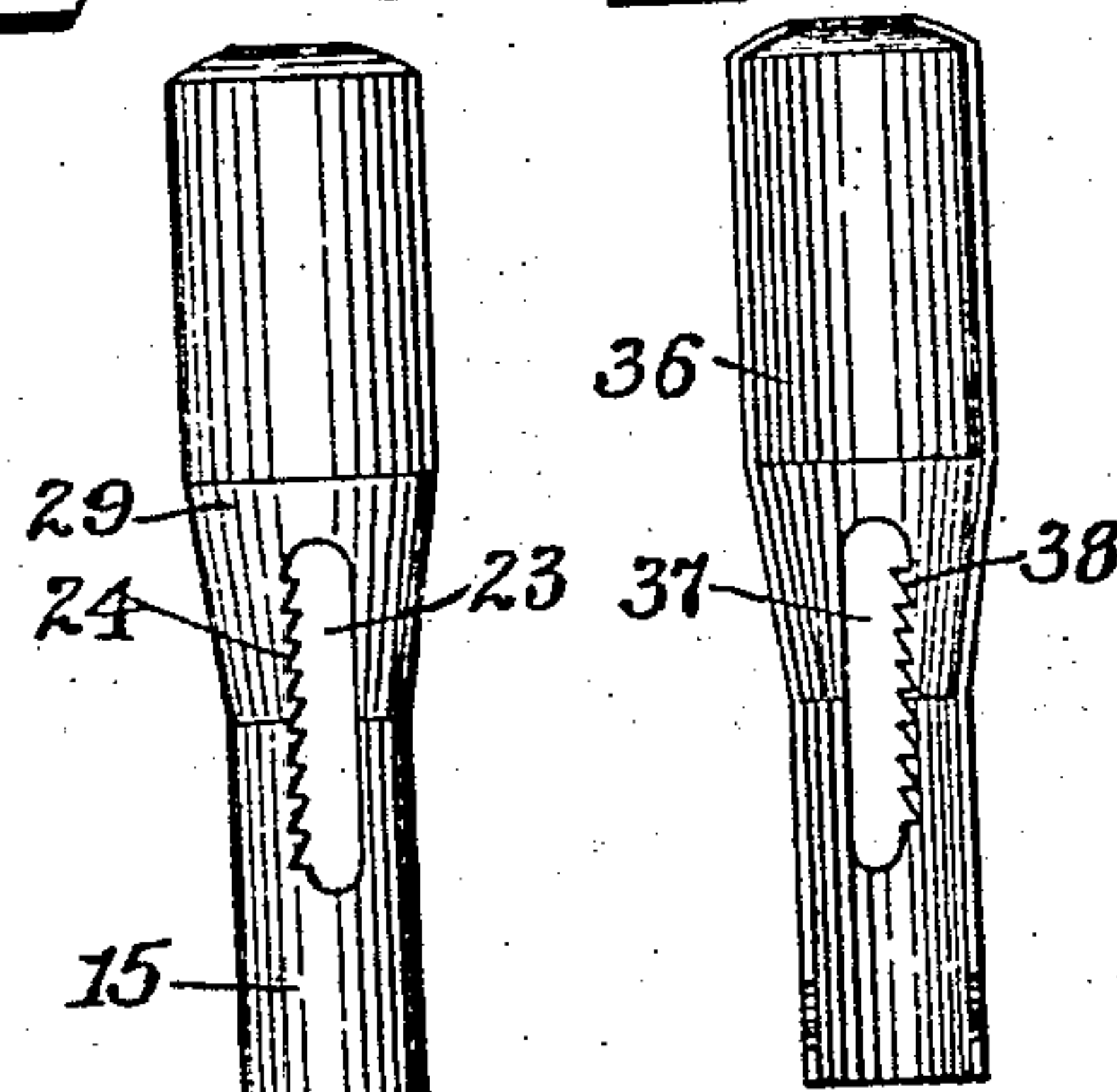
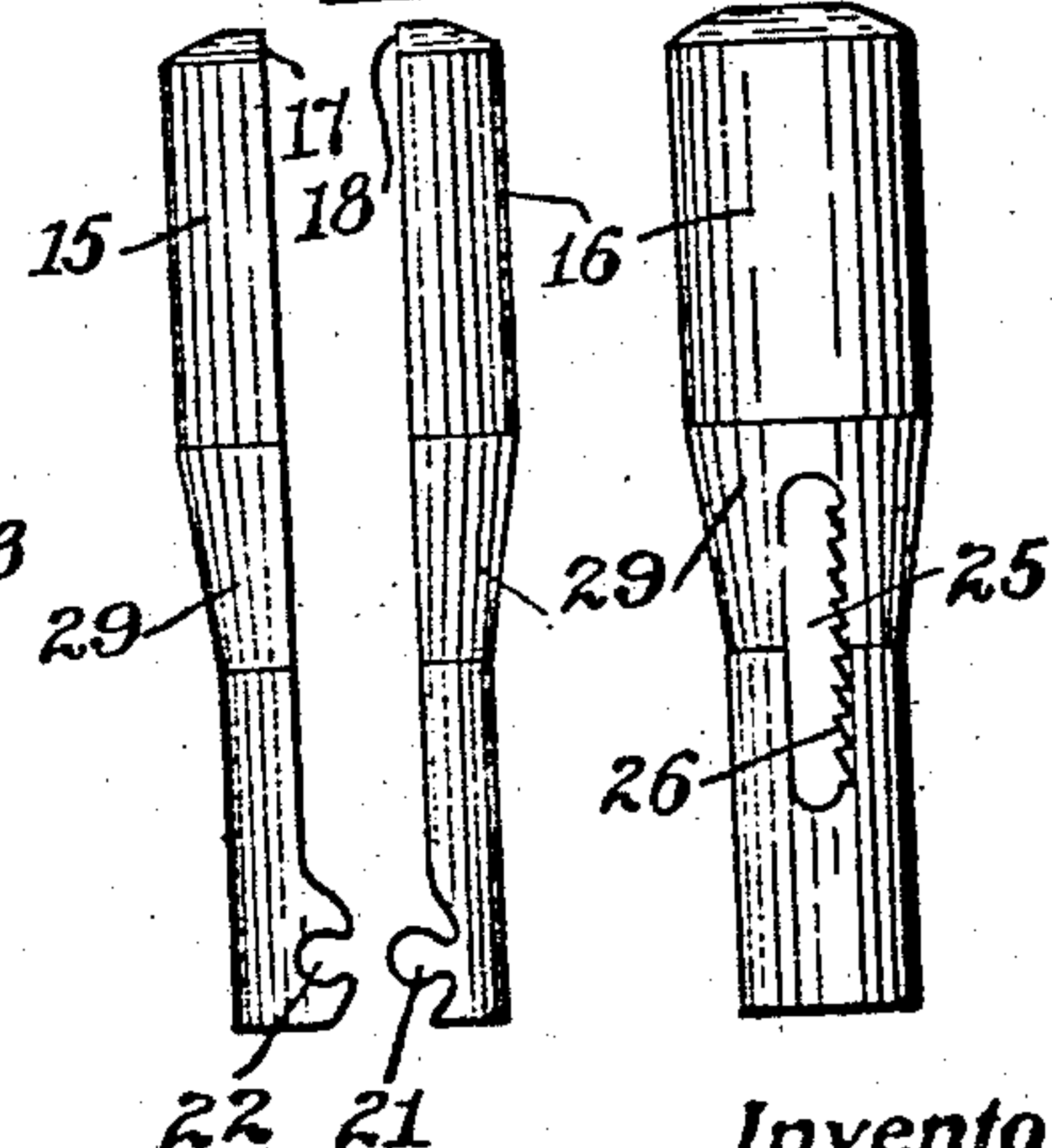


FIG. 11 FIG. 10.



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# UNITED STATES PATENT OFFICE.

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## BIT EXTENSION.

No. 899,203.

Specification of Letters Patent.

Patented Sept. 22, 1908.

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*To all whom it may concern:*

Be it known that I, FREDERECK E. CARLSON, a citizen of the United States, residing in New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Bit Extensions, of which the following is a specification.

This improvement relates to extensions for bits or augers of boring tools, such as used by carpenters and others for boring holes of considerable depth or length with bits of ordinary length, by the use of ordinary bit stocks or other handle devices by which the bit is rotated; the extension being adapted to follow the bit into the hole, whereby holes of considerably greater length than that of ordinary bits can be bored.

One of the objects of my present improvement is to furnish a strong and reliable implement of this class in which the bit shall be driven after the manner of applying a wrench to the shank thereof, and in which a quick acting chuck device can be caused to positively and strongly grip the bit, and serve to efficiently remove the bit as well as to effect the positive driving thereof.

A further object of the invention is to provide means in such a device whereby bits having different sizes or forms of socket ends can be clamped in the device without special adjustment being made therefor.

A further object of the invention is to provide means whereby bits in which the head is of different tapers can be properly retained in the socket of the stem; and also by which bits having the head bent out of alinement with the shank will still be retained in the socket.

In the drawings accompanying and forming a part of this specification, showing one embodiment of my present invention, Figure 1 is a side elevation, partly in section showing the device in use, the shank of the bit being broken off just beyond the jaws. Fig. 2 is a side elevation, partly in section, of Fig. 1, taken at right angles to the view shown in Fig. 1. Fig. 3 is a view similar to Fig. 2 with the parts in open position and the bit removed. Fig. 4 is a view similar to Fig. 1 showing the jaws swung laterally for adjustment. Fig. 5 is a section on the line 5—5 of Fig. 2 showing the jaws when first opened. Fig. 6 is a similar view but showing the sleeve as swung laterally on the shank to bring the

locking lugs into engagement with the jaw members respectively. Fig. 7 is a similar view with the jaws closed. Fig. 8 is a section on line 8—8 of Fig. 3. Fig. 9 is a side elevation of one of the jaw members. Fig. 10 is an elevation showing the other jaw member. Fig. 11 shows the two jaw members in elevation and slightly removed; and Fig. 12 shows a modified jaw in inside elevation.

The invention comprises essentially a stem or shank member having a socket at one end of polygonal section and preferably made tapering for engagement with the corresponding tapering end of a bit, the shank acting in the nature of a socket wrench; and a pair of jaw members slidable on the socket and having inturned end portions for engaging the shank of the bit beyond its head or socket engaging portion, the jaws being slidable on the shank and provided with means for securing them to grasp the shank of the bit and retain it in the socket, by preventing endwise movement of the bit out of the socket portion of the shank or stem.

The implement is primarily designed as an extension bit, adapted for engaging the shank end of a boring bit at its jaw end, while its other end portion is provided with a tapered square end portion similar to that of the head or stock engaging portion of the bit, whereby such end can be secured in the ordinary brace or bit stock. And the extension is made of an external diameter less than that of the boring bit whereby it can follow the bit into the hole. But the invention is also applicable as a chuck member for other purposes; for instance it could form the bit-engaging end of an ordinary bit stock, or of a socket wrench, whereby to drive the bit into the hole, and remove the same; and can be used for other tools than boring bits, such as screw-driver, files or reamers.

In the present embodiment, the invention is shown as having a stem or shank 12 provided with a tapered square socket 13 at one end, while the other end is provided with a socket-engaging tapered head 14, similar to the conventional or standard socket-engaging head of the bits generally in use. A plurality of jaws are provided at the socket end, preferably two jaws 15 and 16, that are slidable on the stem 12, and normally connected together at their rear ends, whereby the shank engaging ends 17 and 18 can rela-



tively swing to and fro, to engage the shank 19 beyond the head 20 of a bit, a portion only of which is shown. The ends 17 and 18 are intumed, to engage the shank 19 when the jaws are in the closed position, as indicated in Figs. 1 and 2.

The socket 13 has the walls preferably made curved or convex relative to the axis of the socket or stem, as shown in Fig. 1, for the purpose of accommodating heads having different angles of taper, and also for the purpose of accommodating bits wherein the head is distorted or bent to one side of the axis of the bit or shank.

One form of movable jaw connection is shown in the drawings, in which the jaw member 16 is provided with a pair of heads or tongues 21 fitting into socket portions 22 in the jaw 15, as indicated in Figs. 2, 3, and 11. Such hinge portions can be readily formed by stamping, the heads being inserted in the socket portion by a lateral movement before the jaws are inserted on the stem. By this means the jaw members have a slight swing on each other to open and close. They are also given a play on the stem to bodily swing laterally as a whole as indicated in Fig. 4. The portion 12 of the stem where engaged by the hinged portion of the jaws may in practice be only slightly if any less in diameter than the main portion of the stem; since this reduction is chiefly for the purpose of permitting some freedom of lateral movement of the jaws, as illustrated for instance in Figs. 3, 4 and 6.

After the bit has its head inserted in the socket 13, with the jaws in the open position as shown in Fig. 3, the jaws are then moved inward to engage the stem 19 adjacent the head 20 of the bit where the enlargement begins. Means are provided for locking the jaws in this position, both to prevent their opening, and to prevent their longitudinal movement on the stem, whereby the bit is securely locked in the socket portion of the stem. In the construction illustrated, the jaw member 15 is provided with a slot 23, at one side of which are ratchet teeth 24, and the other jaw 16 is provided with a similar slot 25 having at one side ratchet teeth 26. These teeth are arranged in the jaws so that they are not on diametrically opposite sides of the slots, but are on adjacent sides as shown in Figs. 9 and 10. To engage these teeth in the jaws, a pair of lugs 27 and 28 are arranged on the stem 12, diametrically opposite and projecting into the slots 23 and 25 respectively. The lugs have one side beveled corresponding to that of the teeth and are of a less width than the slot, whereby the lateral swing of the jaws as a whole, on the stem will simultaneously move the lugs into and out of engagement with the teeth as shown in Fig. 4. When the jaws are swung so that the lugs engage the sides not provided

with teeth, the jaws are free to be moved endwise on the stem, for receiving the bit. Then when the bit has been inserted and the jaws are returned to axial position to engage the bit head, as indicated in Figs. 1 and 2, the jaws will bring the lugs into engagement with the teeth in the slot portions, which, from the direction of slant of the ratchet teeth will prevent the jaws being moved outwardly to release the bit.

If desired, the toothed portions 24 and 26 of the respective jaws can be relatively arranged so that they are not opposite, but staggered relative to a transverse plane, that will permit of a somewhat finer adjustment; as will be seen by comparing Figs. 9 and 12. But if desired, the teeth can be omitted in one of the jaw members, and the other tooth portion of the jaw member alone serve to lock the jaws in adjusted positions. To secure the jaws in this position, a sleeve 30 is provided that is slidable over the rear end of the jaws, and over the shank, and is preferably forced downward onto the intermediate tapering portion 29 of the jaws by a coil spring 31 engaging the intumed end 32 of the sleeve by one end, while its other end engages a stop collar 33 secured on the stem. This sleeve will serve to press the jaws together by reason of their tapered or conical portion, and prevent their opening to release the bit. To engage the bit in the device, the sleeve 30 is slid back compressing the coil spring, the jaws are opened, and the head of the bit inserted in the socket 13 of the stem. Then the jaws as a whole are swung on an axis substantially at right angles with the axis of their hinged joint as indicated in Fig. 4. This will swing the teeth in the slots away from the lugs 27 and 28, and the jaws are moved inward to bring their intumed ends in engagement with the head of the bit, as indicated in Fig. 2. Thereupon the jaws are returned to their position of alignment with the stem and the sleeve 30 is permitted to be forced down onto the tapering portion of the jaws by the coil spring 31. The movement into alignment of the jaws will bring the ratchet teeth into engagement with the lugs, and this will prevent endwise movement of the jaws outward that would release the bit in the socket.

A slight modification is shown in which guide pins 34 are placed on the stem on each side between the adjacent edges of the jaws. In this modification, the jaw 36 is substituted for the jaw 16, in which the ratchet teeth 38 are placed on the opposite side of the slot, as further indicated in Figs. 7 and 8. In this form the sleeve will not of itself serve to prevent turning of the jaws whereby the lugs might disengage with the teeth of the jaw members. The guide pins 34 and 35 are of a width to snugly fit between the jaw members in their closed position, and there-



by prevent turning of the jaws on the stem, and also serve to guide the jaws in their longitudinal movement. These pins are located on the stem relatively to the teeth engaging the lugs 27 and 28, whereby when the jaws are brought together engaging the pins the said lugs will be forced to enter between the teeth and engage therewith, preventing endwise movement of the jaws. When the jaws are opened from the closed position, they will separate an equal distance from the pins on each side, as indicated in Fig. 8, the sleeve 30 having been drawn backward previously and retained in such position permitting the jaws to open, the jaw member is now turned to shift the lugs away from the teeth, which will bring the pins to engage opposite portions of the respective jaws as indicated in Fig. 7. Consequently, the jaw member is now free from the lugs, and can be moved outward to open wider for the purpose of receiving the bit. After the bit has been inserted, the jaws are drawn inward to a position for engagement with the shank adjacent the head of the bit, and then the jaws are brought together, and the sleeve 30 permitted to be forced down onto them at their tapered portion by the spring 31. The act of closing the jaws, will bring them both into engagement with the guide pins 34 and 35 and consequently the jaws will be turned so that the toothed portion will be forced into engagement with their respective lugs 27 and 28, thereby locking the jaws in such position. Having thus described my invention, I claim:

1. In a device of the character described, the combination of a stem having a bit engaging socket in one end, a pair of jaws movably connected together at one end and slidable on the stem exteriorly at the socket end portion, the jaws having their other end portions intumed and arranged to move to and fro to engage the shank of a bit inserted in the stem socket, a member slidable on the stem to engage the jaws and hold them closed upon the bit shank, and means for preventing endwise movement of the jaws when closed on the bit.

2. In a device of the character described, the combination of a stem having a bit engaging socket in one end, a pair of jaws movably connected together at one end and slidable on the stem at the socket end portion, the jaws having their other end portions intumed and arranged to move to and fro to engage the shank of a bit inserted in the stem socket, a member slidable on the stem to engage the jaws and hold them closed upon the bit shank, locking means for preventing endwise movement of the jaws when closed on the bit in different longitudinal positions.

3. In a device of the character described, the combination of a stem having a bit engaging socket in one end, a pair of jaws mov-

connected together at one end and slidable on the stem at the socket end portion, the jaws having their other end portions intumed and arranged to move to and fro to engage the shank of a bit inserted in the stem socket, a member slidable on the stem to engage the jaws and hold them closed upon the bit shank, a resilient member for retaining said latter member engaging the jaws, and means for preventing endwise movement of the jaws when engaged by said retaining member.

4. In a device of the character described, the combination of a stem having a bit engaging socket in one end portion, a pair of jaws movably connected together at one end and slidable on the stem, the other ends of the jaws being intumed and movable to and fro to engage the shank of a bit inserted in the stem socket, the jaws having an external tapering portion converging toward the hinged end, a sleeve slidable on the jaw member to engage the conical portion and retain the jaws in engagement with the bit shank and means for preventing endwise movement of the jaws when closed on the bit.

5. In a device of the character described, the combination of a stem having a bit-engaging socket in one end portion, a pair of jaws movably connected together at one end and slidable on the stem, the other ends of the jaws being intumed and movable to and fro to engage the shank of a bit inserted in the stem socket, the jaws having an external tapering portion converging toward the hinged end, a sleeve slidable on the jaws to engage the conical portion and retain the jaws in engagement with the bit shank, a coil spring on the stem engaging said sleeve to force it into engagement with the conical portion of the jaws and means for preventing endwise movement of the jaws when closed on the bit.

6. In a device of the character described, the combination of a stem having a bit-engaging socket in one end, a pair of jaws movably connected together at one end and slidable on the stem, the jaws having their other ends intumed and located to engage the shank of a bit inserted in the stem socket, a member arranged to hold the jaws in closed position, one of the jaw members having a longitudinal slot provided with teeth at one side, and a lug on the stem projecting into said slot arranged to engage the teeth to lock the jaws from endwise movement.

7. In a device of the character described, the combination of a stem having a bit-engaging socket in one end, a pair of jaws movably connected together at one end and slidable on the stem with their other ends intumed to engage the shank of a bit inserted in the stem socket, each of the jaws having a longitudinal slot having teeth at one side, and a pair of lugs on the stem projecting into the respective sockets and arranged to engage the saw



teeth upon lateral movement of the jaws on the stem.

8. In a device of the character described, the combination of a stem having a bit engaging socket in one end, the socket having its walls formed convex toward the axis of the stem, a pair of jaws movably connected together at one end and slidable on the stem at the socket end portions, the jaws having their other end portions intumed and arranged to move to and fro to engage the shank of a bit inserted in the stem socket, a member slidable on the stem to engage the jaws and hold them closed upon the bit shank, and means for preventing endwise movement of the jaws when closed on the bit.

9. In a device of the character described, a stem having a bit engaging socket at one end, and a tubular jaw member slidable on the stem exteriorly and consisting of two parts hinged to each other by integral interlocking tongue and socket portions, thereby retaining the jaws in engagement with each other

and on the stem to have a swinging movement to open and close, and means adapted to engage the jaw members and hold them closed.

10. In a device of the character described, the combination of a stem having a bit engaging socket at one end, a tubular jaw member slidable on the stem exteriorly and consisting of two parts hinged to each other to retain the jaws in engagement with each other and on the stem for swinging movement to open and close, the outer ends of said jaws constructed to engage the shank of the bit inserted in the stem socket, means slidable on the stem to engage the jaws and hold them closed on the bit shank, and means for preventing endwise movement of the jaws when closed on the bit.

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