J. H. BASTIAN & A. W. NORDGREEN.

EXPANDING TOOL HOLDER.

APPLICATION FILED JAN. 3, 1913.

1,075,753. Patented Oct. 14, 1913.

Fig. 1

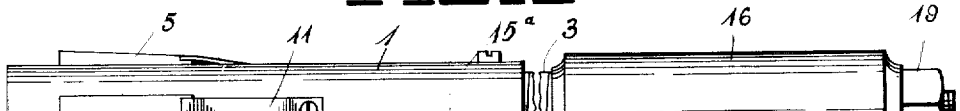

Fig. 2

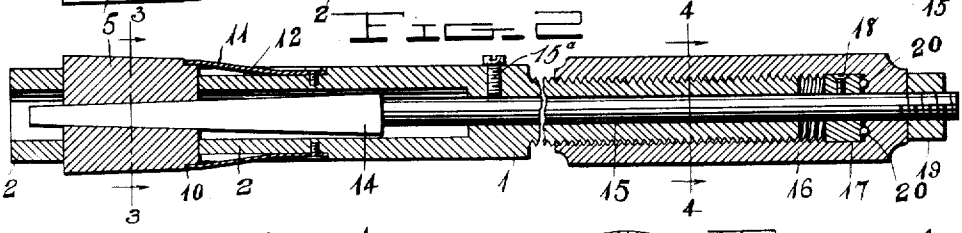

Fig. 3

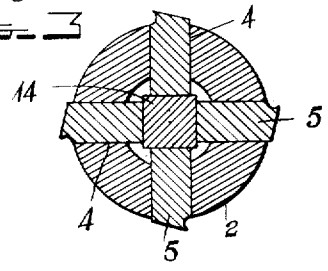

Fig. 4

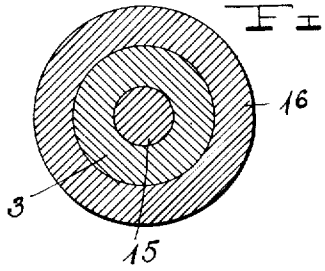

Fig. 5

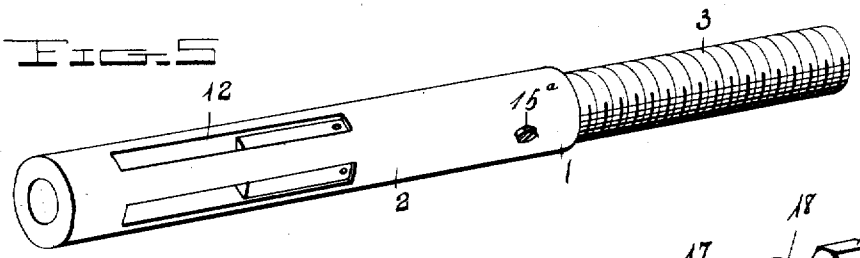

Fig. 6

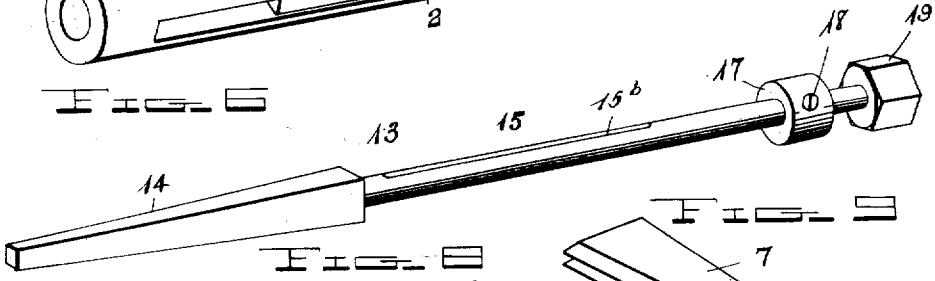

Fig. 8

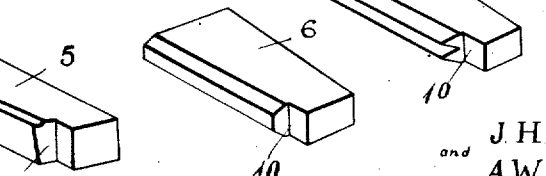

Fig. 7

Fig. 9

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EXPANDING TOOL-HOLDER.

1,075,753. Specification of Letters Patent. Patented Oct. 14, 1913.

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To all whom it may concern:

Be it known that we, JOSEPH H. BASTIAN and AXEL W. NORDGREEN, citizens of the United States, residing at Moorhead, in the county of Clay and State of Minnesota, have invented certain new and useful Improvements in Expanding Tool-Holders; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in expanding tool holders.

One object of the invention is to provide a tool holder having an improved construction and arrangement of bit holding and expanding mechanism whereby bits or tools of different kinds may be expanded or projected to a greater or less extent and firmly held in their projected positions.

Another object of the invention is to provide a tool holder of this character which will be simple, strong, durable and inexpensive in construction, efficient and reliable in operation and well adapted to the purpose for which it is designed.

With these and other objects in view the invention consists of certain novel features of construction, and the combination and arrangement of parts as will be more fully described and claimed.

In the accompanying drawings; Figure 1 is a side view of our improved tool holder, parts being broken out; Fig. 2 is a central longitudinal sectional view thereof; Fig. 3 is a cross sectional view taken on the line 3—3 of Fig. 2; Fig. 4 is a similar view taken on the line 4—4 of Fig. 2; Fig. 5 is a detail perspective view of the bit carrying member of the tool; Fig. 6 is a similar view of the bit expanding member of the tool; Figs. 7 and 8 and 9 are detail perspective views of different kinds of tools which may be employed in connection with our improved holder for performing various kinds of work.

Our improved tool holder comprises a bit-carrying member or stock 1 having a tubular cylindrical outer portion 2 and a reduced exteriorly threaded tubular shank 3. The bore of the outer tubular portion of the member 1 is larger or of greater diameter than the bore of the reduced threaded shank 3 thereof and in the tubular outer portion 2 near its outer end are formed a series of radially disposed slots 4 in which are adapted to be mounted bits or tools of different styles or for performing different kinds of work. In the principal figures of the drawings and in the detail Fig. 7 are shown reaming bits 5. In Fig. 8 of the drawing is shown a detail view of a die or tapping bit 6, while in Fig 9 of the drawings is shown a detail perspective view of a chuck bit 7 all of which may be operatively held and expanded by the tool holder.

While we have herein shown three different styles of bits or tools which may be held and operated by the holder, we do not wish to be understood as confining the use of the holder to the particular tools or bits herein shown as it is obvious that the holder may be employed for holding and operating various other tools for performing different kinds of work.

The tools or bits comprise a substantially oblong body portion which is adapted to fit and has a sliding engagement with the slots 4 in the stock and the inner edges of the oblong bodies of the bits preferably incline or taper slightly from the outer toward the inner ends of the bits as at 8, as do also the outer cutting edges 9 thereof. In the outer edges of the inner ends of the bits are formed notches or recesses 10 in which are secured the outer ends of flat bit-retaining springs 11, their inner ends being secured in longitudinal grooves or recesses 12 formed in the outer side of the stock at the inner ends of the slots 4 as shown. When the bits are in a normal or retracted position the springs lie in the grooves 12 and are flush with the outer surface of the stock. When the bits are expanded or projected the outer ends of the springs will give or yield and permit the bits to be forced outwardly, but at the same time said springs will hold the bits in operative engagement with the slots 4 as will be readily understood.

The expanding member 13 comprises a square head 14 which tapers gradually from its inner toward its outer end and has formed on its inner end a cylindrical shank 15. When the expanding member 13 is in position in the holder, the tapered head 14 is disposed in the enlarged bore of the outer portion 2 of said member while the cylindrical shank 15 of the expanding member has a sliding engagement with the bore in the reduced threaded portion 3 of the mem-

ber 1 as clearly shown in Fig. 2 of the drawings. When the expanding member is thus arranged in the holder the tapered head 14 of the expanding member slidably engages the tapered inner edges 8 of the bits, so that when the expanding member is projected or forced outwardly in the tool carrying member, said tapered head 14 will gradually expand the bits and thus project the cutting edges 9 thereof to a greater or less extent. When the expanding member is retracted the springs 11 will force the bits back into the slots 4 as will be readily understood. The expanding member 13 is positively held against turning in the holder by a set screw 15^a which is arranged in the body of the holder and has its inner end engaged with a shallow longitudinal groove 15^b formed in the shank 15 of the expanding member as shown.

The expanding member of the holder is projected and retracted by a tubular feeding socket 16 which is interiorly threaded and has an operative engagement with the threaded shank 3 on the inner end of the tool carrying member 1 as shown. The socket 16 is adjustably and swivelly secured to the projecting end of the shank 15 of the expanding member 13 by an inner collar 17 which is held in adjustable engagement with the shank 15 by a counter-sunk set screw 18, and by a stop nut 19 which has a threaded engagement with the outer end of the shank 15 as shown. In arranging the socket 16 on the shank 15 the collar 17 is first adjusted and fastened at the desired position on said shank, after which the socket 16 is passed over the outer end of the shank 15 of the expanding member and is screwed inwardly on the threaded shank 3 of the tool carrying member until the inner end of the socket comes into engagement with the outer end of the collar. The stop nut 19 is then screwed into the projecting end of the shank 15. When the collar 17 and the nut 19 are thus engaged with the shank 15 it will be seen that the socket 16 is held against longitudinal movement on said shank but is permitted to revolve freely thereon so that when the socket is screwed inwardly or outwardly on the threaded shank 3 of the tool carrying member 1 the expanding member will be carried with or adjusted inwardly or outwardly by the movement of the socket. In order to cause the socket to revolve freely on the shank 15 of the expanding member and between the collar 17 and the nut 19 a ball bearing 20 is preferably arranged between the opposing surfaces of the collar 17 and inner end of the socket, said ball bearing relieving the friction which would occur between these parts when the socket 16 is screwed inwardly on the shank 3 of the member 1.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention as claimed.

Having thus described our invention, what we claim is:

A tool holder of the class described comprising a tubular stock having radial slots near its outer end and peripheral grooves alining with said slots, the inner end of said stock being externally reduced and threaded and its bore being reduced, bits mounted loosely in said slots and having notches in their outer edges, leaf springs secured at their outer ends in said notches and at their inner ends in said grooves, an expander having a tapering head within the larger portion of the bore of said stock and a cylindrical shank within the smaller portion thereof, said shank having a longitudinal groove, a set screw through the stock loosely engaging said groove, a tubular internally threaded socket engaging said threaded portion of the stock and having its rear end closed except by a hole through which said shank passes, a collar adjustably mounted on said shank within the socket, and a nut on the shank in rear of the closed end of said socket, the whole constructed for the purpose set forth.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

JOSEPH H. BASTIAN.
AXEL W. NORDGREEN.

Witnesses:
F. H. PETERSON,
ERVIN ADAMS.