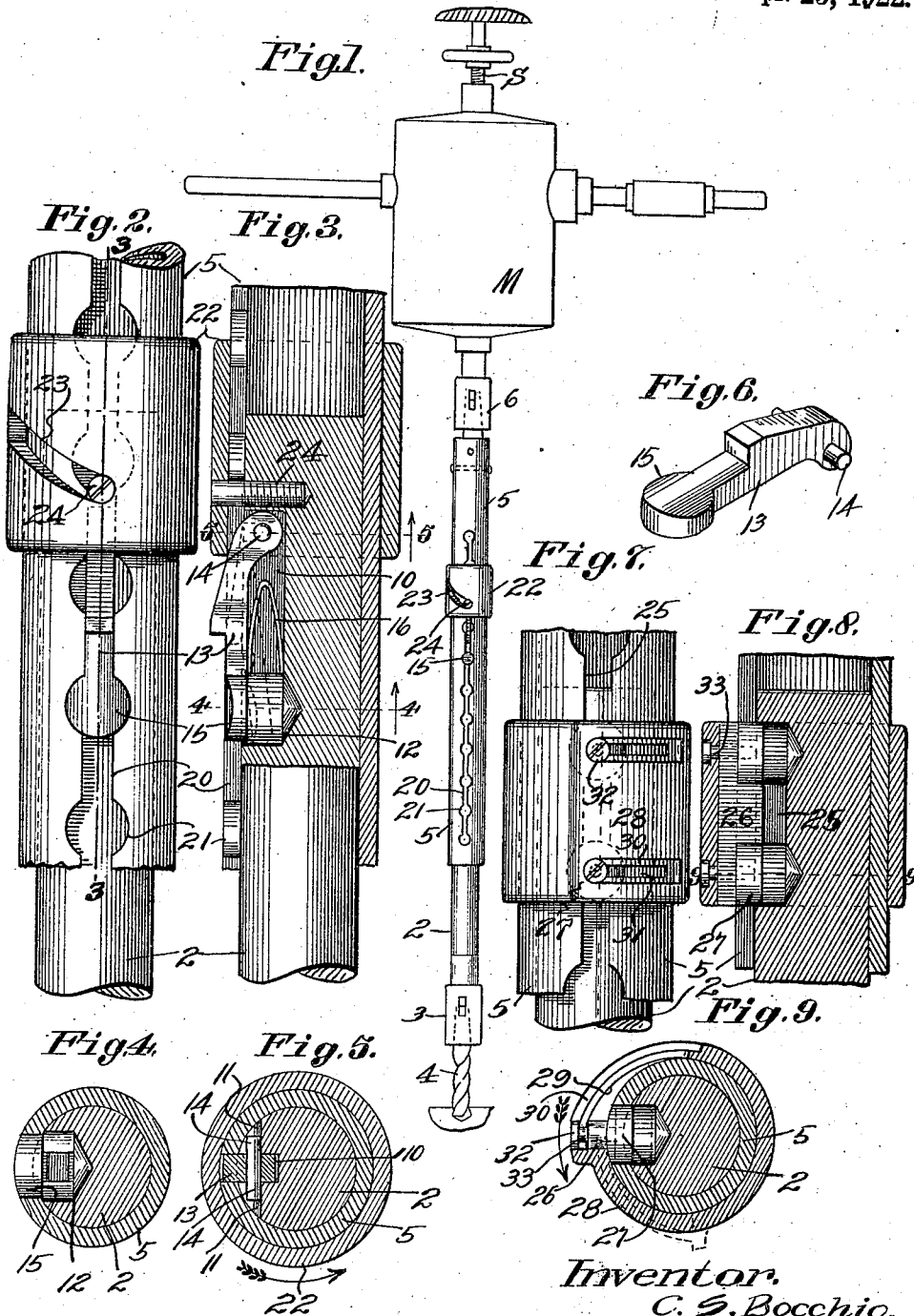


C. S. BOCCHIO,
 ROTARY DRILL EXTENSION.
 APPLICATION FILED OCT. 28, 1920.

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UNITED STATES PATENT OFFICE.

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To all whom it may concern:

Be it known that I, CHARLES S. BOCCHIO, a citizen of the United States, and a resident of Oakland, county of Alameda, State of California, have invented a new and useful Rotary-Drill Extension, of which the following is a specification.

This invention relates to extensible shank devices and more particularly to such a device as is readily applicable to portable power drills.

It is an object of the present invention to provide an extremely substantial, durable, inexpensive and simple device adapted to be connected to a suitable driving part as a shaft of a power driven drill machine and to which device is attachable any suitable chuck for the reception of a drilling or other rotatively operative tool.

A further object of the present invention is to provide a shank so constructed and arranged as to be readily extensible for varying its effective working length so that the drilling machine can be manipulated and applied with the greatest efficiency by the operators.

It is a further object of the invention to provide an extensible shank applicable to various types of tools and which is so constructed that the desired extension or longitudinal lengthening of the device may be secured without detaching or interchanging any of the parts and, in this connection, it is further an object of the invention to provide for the facile adjustment of members of the shank to various selective positions either to increase or decrease the length of the shank device as may be necessary in working at different positions upon a given structure or piece of work being operated upon.

It is a further object of the invention to provide an extensible shank device comprising elements which are in themselves of relatively simple construction and therefore may be efficiently standardized to be interchanged, renewed and replaced with but little loss of time and small expense.

The invention possesses other objects and features of advantage, some of which, with

the foregoing, will be made manifest in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood that it is not intended to limit the invention to the embodiment shown by the said drawings and description as variations may be adopted within the scope of the invention as set forth in the claims.

Referring to the drawings:

Fig. 1 is a side elevation of an assembled portable power drilling machine illustrating the adaptation of the improved extension device.

Fig. 2 is a longitudinal elevational view, partly broken away, of the extension device detached from the drill machine.

Fig. 3 is a longitudinal central section view, on line 3—3 of Fig. 2, and partial elevation of the device, the view being in a plane at right angles to Fig. 2.

Figs. 4 and 5 are cross sections on lines 4—4, and 5—5, Fig. 3.

Fig. 6 is a perspective of a detached locking element.

Fig. 7 is a plan of a modified form.

Fig. 8 is a sectional view through the modified form of locking device.

Fig. 9 is a cross section on line 9—9 of Fig. 8.

The invention in its preferred embodiment comprises a pair of substantial, relatively longitudinal shiftable member or sections to the ends of which are applicable any suitable attaching means, as for instance, sockets and socket shanks, by which the device may be secured in the one case to a driving element, as for instance, a motor shaft, and in the other instance, is adapted to receive a tool to be driven, such as a drill rotatively operable. Preferably the extension members are telescopic, one being in the form of a tube or barrel and the other of an inner rod or shank member, these parts being respectively provided with complementary locking devices by which the extension members can be secured readily at selected positions to increase or decrease the effective lengths of the shank. Means are also

provided for controlling the locking device or element and which may also be utilized to facilitate the relative longitudinal shifting movements of the extension members.

5 A simple, practicable and substantial form of the device is here represented as comprising an inner shank rod 2, to one end of which may be suitably connected a drill or other socket member 3 in which may be detachably secured a drill or other tool 4. The
10 extension member or rod 2 is telescopic within a barrel or sleeve 5 of suitable dimensions consistent with the necessary strength and having one end attachable by
15 suitable means to a socket 6 that is secured to the rotating shaft of a portable power drill machine M of any suitable type. The power drill has extending from one end a
20 jack screw S designed to be placed against any abutment and when rotated will serve to shift the drilling apparatus bodily to force the drill 4 into the work.

In the use of an apparatus of the character shown in Fig. 1 it is necessary in working
25 at different positions upon the work as the hull of a ship to provide for the extension of the shank between the tool 4 and the motor of the machine M, according to the height of the plate to which the tool 4 is applied from the platform or base upon which
30 the operators may be standing.

It is an object of this invention to provide an extensible shank device between the tool 4 and the motor of the machine which
35 will enable the effective lengthening of the shank without requiring the dismantling of the shank parts with the consequent loss of time, and further to provide for the selective adjustment longitudinally of the parts
40 to various positions between given extreme limits so that the operators can work with the maximum of efficiency without being required to bodily carry the weight of the machine and press the tool 4 against the
45 plate being worked upon.

To that end suitable locking means are employed to interlock the shank sections 2 and 5 at various relative longitudinal positions during the course of the work. One
50 of the members is provided with a series of seats to be interengaged with a locking element which will secure the parts not only against relative longitudinal shifting but also will secure them against relative circumferential movement. In Fig. 3 the rod
55 member 2 is shown as provided with a longitudinally extending pocket 10 having lateral recesses 11, Fig. 5, and a lateral enlargement 12 which latter may be conveniently
60 formed by drilling. In this pocket 10 there is placed a longitudinally extending bolt or latch element 13 the shank portion of which is provided with lateral trunnions or pins
14 to bear in the lateral notches 11 so that

the latch member 13 may oscillate without
65 endwise movement. One end of the latch 13 is provided with a laterally widened portion that may be in the form of a disk 15 freely depressible in the circular hole 12 of the rod 2. For the purpose of automatically
70 tending to press the latch head or disc 15 outwardly, a spring 16 is inserted between the bottom of the pocket 10 and the shank of the latch 13.

The sleeve or barrel 5 is provided with
75 a longitudinal key-way or slot 20 extending nearly the full length of the barrel. The width of the slot 20 is slightly greater than the thickness of the shank of the latch 13 which is therefore freely slidable longitudinally in the slot 20. The shank rod 2 and the shank barrel 5 may be securely interlocked together at various positions by permitting the outward movement of the latch
80 13 to carry the head 15 thereof into laterally widened portions of the slot 20; these portions being conveniently formed by drilling and thus provide circular lateral
85 seats 21 spaced at suitable distances along the slot 20. Each of the seats 21 are substantially semi-circular and being arranged in opposition are designed to snugly receive the circular head 15 of the latch when the
90 head is projected by the spring 16.

The outer or upper surface of the latch
95 13 projects materially beyond the top surface of the head 15 so that when the latch is in the extended position the top surface may be engaged by a finger or thumb of the operator and the head 15 depressed so
100 as to clear the seat 21 in the slot of the barrel and thus enable the latter to be shifted along the rod in either direction until the latch head 15 is again released and pressed outwardly to interlock with any
105 of the locking seats 21. Preferably means are provided to facilitate the depression of the latch 13 and also to be used for a relative longitudinal shifting of the members 2 and 5. Such means is here shown in Figs.
110 2 and 3 as comprising a ferrule 22 having a helical slot 23 of suitable length in which is disposed the head of a screw or pin 24 projecting radially from the inner end of the rod 2 and which is disposed just at
115 the rear end of the latch 13 so that a portion of the ferrule 22 beyond the forward end of the slot 23 bears over the adjacent heel or end of the latch 13. When the ferrule 22 is in its retracted position, Figs. 2
120 and 3, the spring 16 presses the latch 13 outwardly so that the head 15 locks the barrel and at this time the outer face of the shank of the latch extends obliquely from and beyond the surface of the barrel.
125 Therefore upon turning the ferrule 22 it is caused by the pin 24 to advance longitudinally and ride over and upon the latch 13

depressing it and withdrawing the head 15 from the locking seat 21. When so unlocked the parts may be shifted by the operator if he will hold the barrel 5 and grasp the ferrule 22 and shift it in either direction along the barrel 5; the pin 24 at this time being in the bottom of the slot 23. It is not necessary to shift the latch head 15 into direct register with the seat 21 before turning the ferrule 22 to retract it from the latch. It is only necessary to shift the latch head 15 to a position adjacent the desired seat 21 to be engaged, and then after the ferrule 22 is retracted, the ferrule can be shifted slightly longitudinally in either direction to bring the outwardly pressed head 15 to register with the desired seat 21 at which time it will be automatically snapped or thrust outwardly by the spring 16 and the parts will be interlocked.

In Figs. 7, 8 and 9 a slightly modified form is shown. Here the rod 2 has a longitudinal key-slot 25 in which there is radially movable a straight key 26 with locking end portions 27 of less height than the intermediate or main body portion of the key 26. Surrounding the barrel 5 is a ferrule 28 having a spiral portion 29 which is provided with straight circumferential slots 30 the outer portion of which is wider than the inner portions 31, Fig. 7, and in the wider portion of each slot 30 runs a countersunk screw head 32 of a screw 33 extending radially through the key-body 26. The screw head slots 30 are of a length about equal to the length of the spiral part 29 of the ferrule so that when the ferrule is rotated in one direction the spiral form results in moving the key 26 outwardly from its slot 25 and brings the head 27 into the locking seat in the barrel 5. When the ferrule 28 is moved in the opposite direction the key 26 is shifted radially inwardly toward the bottom of its key-way 25 to the position dotted in Fig. 9, thus clearing the heads 27 from the locking seats of the barrel and enabling the longitudinal shifting of the rod and the barrel.

What is claimed is:

1. An extensible shank device comprising telescopic sleeve and rod members, a latch pivotally mounted in a slot in the rod, a spring sunk in the rod and normally pressing the latch outwardly about its pivot; the sleeve having a series of longitudinally spaced seats engageable by said latch in its outer position, and a ferrule mounted on the sleeve for limiting the outward movement of the latch.
2. An extensible shank device comprising telescopic sleeve and rod members, a latch pivotally mounted in a slot in the rod, a spring sunk in the rod and normally pressing the latch outwardly about its pivot; the sleeve having a series of longitudinally

spaced seats engageable by said latch in its outer position, and a ferrule mounted on the sleeve and attached to the rod for limiting the outward movement of the latch.

3. An extensible shank device comprising telescopic sleeve and rod members, a latch pivotally mounted in a slot in the rod, a spring sunk in the rod and normally pressing the latch outwardly about its pivot; the sleeve having a series of longitudinally spaced seats engageable by said latch in its outer position, and a ferrule mounted on the sleeve for limiting the outward movement of the latch and for disengaging the latch from the sleeve.

4. An extensible shank device comprising a sleeve, a rod telescopic in the sleeve, a sleeve-locking latch pivotally connected to and mounted in the rod, and means mounted on the sleeve and connected to the rod for facilitating shifting the sleeve and rod relatively.

5. An extensible shank device comprising a sleeve, a rod telescopic in the sleeve, a sleeve-locking latch pivotally connected to and mounted in the rod, and means mounted on the sleeve and connected to the rod for facilitating shifting the sleeve and rod relatively and for disengaging the latch to unlock the parts.

6. An extensible shank device comprising longitudinally shiftable sleeve and shank members, means pivotally mounted in the inner shank member for locking the members at selective positions, by interlock with said sleeve, and means on the sleeve for tripping said means to unlock the parts.

7. An extensible shank device comprising longitudinally shiftable, telescopic sleeve and shank members, and means for locking the members at selective positions, the sleeve having a longitudinal slot with a notched edge for engagement by said means.

8. An extensible shank device comprising longitudinally shiftable sleeve and shank members, means for locking the members at selective positions, and a ferrule on the sleeve for facilitating the unlocking of said means and for shifting the members relatively.

9. An extensible shank device comprising telescopic sleeve and rod members the former of which is provided with a series of spaced seats, and the other with a countersunk, locking element having a head to interlock with the said seats.

10. An extensible shank device comprising telescopic members one of which is provided with a series of spaced seats, and the other with a locking element to interlock with the said seats, means for actuating the said element to lock the parts, and a tripping means for unlocking said element, and including a quick-acting ferrule.

11. An extensible shank device comprising

telescopic members one of which is provided with a series of spaced seats, and the other with a locking element to interlock with the said seats, and a tripping means engageable with and for unlocking said element and by which the members may be relatively shifted.

12. An extensible shank device comprising telescopic members one of which is provided

with a series of spaced seats, the other with an automatic locking element to interlock with the said seats, and a shiftable tripper for disengaging the said element to unlock the members.

In testimony whereof, I have hereunto set my hand.

CHARLES S. BOCCHIO.