W. A. PECK.

PUSH DRILL.

APPLICATION FILED DEC. 23, 1911.

1,033,615. Patented July 23, 1912.

Fig. 1.

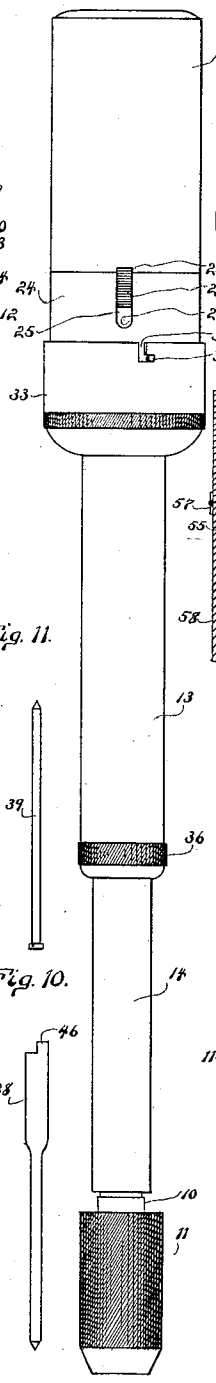

Fig. 2.

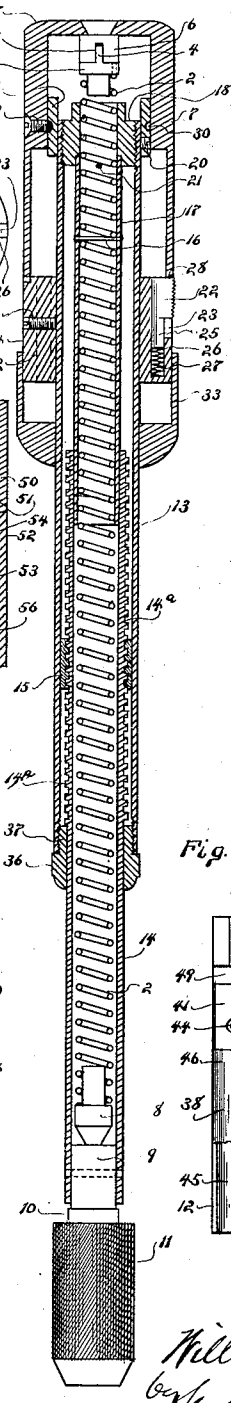

Fig. 3.

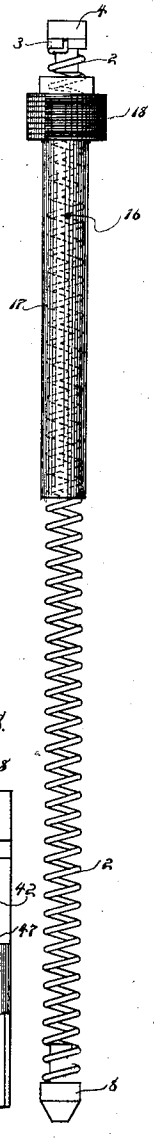

Fig. 4.

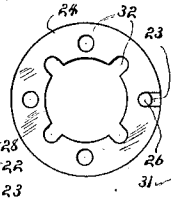

Fig. 12.

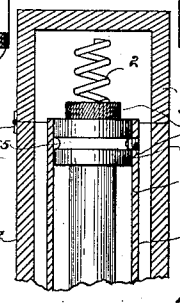

Fig. 6.

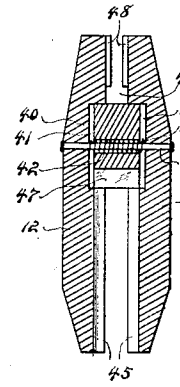

Fig. 7.

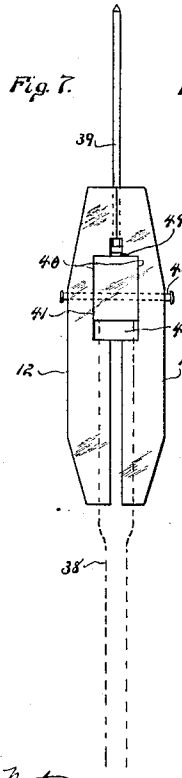

Fig. 11.

Fig. 10.

Fig. 5.

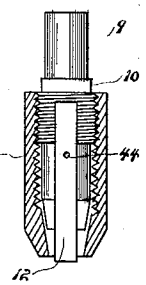

Fig. 9.

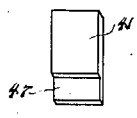

Fig. 8.

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PUSH-DRILL.

1,033,615. Specification of Letters Patent. Patented July 23, 1912.

Application filed December 23, 1911. Serial No. 667,520.

To all whom it may concern:

Be it known that I, WILLIAM A. PECK, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Push-Drills; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1 a view in side elevation of a push-drill constructed in accordance with my invention. Fig. 2 a view thereof in central longitudinal section. Fig. 3 a detached view in side elevation of the power-spring and spring-carrier shown at a right angle to the positions in which they are shown in Fig. 2. Fig. 4 a detached plan view of the drill-bit. Fig. 5 a detached view partly in side elevation, and partly in section, of the chuck, Fig. 6 a view in longitudinal central section on an enlarged scale of the reversible chuck-jaws, shown at a right angle to the position in which they are shown in Fig. 5. Fig. 7 a detached view in elevation of the reversible chuck-jaws shown in full lines as holding a brad, and in broken lines as holding a drill. Fig. 8 a view in inside elevation of one of the reversible chuck-jaws showing the co-action between the depending stop-finger of the abutment-block and the stop-finger formed upon the shank of the drill-bit. Fig. 9 a detached perspective view of the abutment-block. Fig. 10 a detached view in side elevation of one of the drill-bits. Fig. 11 a detached view in side elevation of a wire brad such as my improved push-drill is adapted to insert, and leave in position for being driven home. Fig. 12 a broken view in longitudinal section showing the modified form of the means employed for adjusting the tension of the power spring.

My invention relates to an improvement in that class of hand-boring tools known as push-drills, the object being to produce a push-drill of superior simplicity, durability, convenience and efficiency, with particular reference to the regulation of the tension of its power-spring, and to adapting the drill to be used for the insertion of ordinary wire brads.

With these ends in view, my invention consists in a push-drill having certain details of construction and combinations of parts as will be hereinafter described and pointed out in the claims.

In carrying out my invention as herein shown, I employ a long helical power-spring 2 having a coupling-plug 3 inserted into, and fixed within its outer end, this coupling-plug being furnished with a blade 4 entering a transverse slot 5 formed in a coupling-block 6 fixed within the center of the outer end of the cup-like hand grip 7 of the drill. At its opposite or inner end the said power-spring 2 receives a bearing-plug 8 which is maintained in constant engagement with, and turns upon, the inner end of the stem 9 of the bifurcated body or core 10 of the drill chuck, the said body or core being formed with external threads for the application and adjustment of the chuck-sleeve 11 which operates the reversible chuck-jaws 12, which will be described later on. The said power-spring 2 is located within the tubular body or driving member 13 and the tubular chuck-carrier or driven member 14 of the drill, with the exception of its passive outer end which extends into the hand-grip 7, it being understood that the driving-member 13 and the driven-member 14 are telescoped one within the other against the tension of the spring 2 by endwise pressure applied by the user of the drill, whereby the driven member 14 is rotated in one direction and the said spring compressed. When the pressure applied by the user of the drill is removed, the spring 2, which is now under tension, as described, asserts itself, and not only rotates the driven-member 14 in the opposite direction, but expels it, so to speak, from the driving-member 13 and restores it to its normal position of extension in which it is in position to be again driven back into the driving-member when the user of the drill again applies endwise pressure thereto in the ordinary manner. In this connection,

it may be explained that the driven-member 14 is furnished at its outer end with coarsely pitched screw threads 14ª which pass through a correspondingly grooved nut 15 fixed within the tubular driving-member 13, whereby rotary movement is imparted to the driven-member or chuck-carrier 14.

Coming now to the chief feature of my present invention, it is necessary to provide for the regulation of the tension, of the power-spring 2 in order to adapt the push-drill to be used to the best advantage with drill bits varying in size and in drilling wood or other objects varying in density or resistance. For this purpose I vary the tension of the spring by virtually changing the length of it by varying the number of its coils in active use at any one time.

For the purpose above described, I provide, as herein shown, a spring-regulation abutment in the form of a pin 16 passing between the coils of the said power-spring 2 at a right angle to the longitudinal axis thereof, and fixed at its ends within a housing-tube 17 located within the driving-member 13. The said tube 17, which is a trifle larger in diameter than the diameter of the spring 2 and controls any tendency that the same may have to buckle in its middle portion, is held in place by being furnished with an externally threaded collar 18 which is screwed into a collar 19 fixed upon the outer end of the driving-member 13 and furnished with a set screw 20 impinging against the collar 19. A pin 21 corresponding to the pin 16, but arranged at a right angle thereto in the housing tube 17, takes up, so to speak, the back-lash of the passive outer end of the power spring 2 and prevents the same from turning with respect to the pin 16 in the use of the push drill, since it is conceived that in the constant operation of the device the power spring 2 might be jarred back to a certain extent after being once adjusted. The coils of the power spring 2 in front of the pin 16 are alone compressed in operating the drill, and hence form the operative or active portion of the spring while those coils of the spring that lie above the said pin 16 are left inert and form the passive portion or end of the spring which I shall hereafter speak of as having active and passive ends separated by the pin 16 or its equivalent. It will therefore be understood that the pin 16 virtually divides the power spring into an active and a passive portion since in the operation of the device the only portion of the spring that is placed under tension is that portion of it in front of the pin 16, while the portion of it back of the pin 16 is left passive so far as the operation of the drill is concerned. It follows from this that the power of the spring at any time depends upon the number of coils of the spring that are in front of the pin 16 and therefore available for compression in the use of the device. Therefore all that is necessary to do for the regulation of the power of the spring 2 is to bodily turn the spring with reference to the pin 16 so as to increase or decrease the number of its coils ahead of the pin 16.

For turning the power-spring 2 bodily in either direction as may be required for increasing or decreasing the power supplied by it for the operation of the push-drill, the hand-grip 7 is rotated in one direction or the other, the said hand-grip being coupled with the spring by means of the coupling-plug 3 and block 6 already described.

The hand-grip 7 is normally locked against rotation by means of a dog 22 having its outer edge serrated and located in a recess 23 formed in the periphery of the cylindrical drill-bit magazine 24, the shank 25 of the dog entering a bore 26 leading out of the bottom of the recess 23 and receiving a small helical spring 27 which exerts a constant effort to push the dog outward and enter its outer end into a locking-notch 28 in the adjacent edge of the hand-grip 7, the said edge of which, as I may here point out, bears upon the edge of the flat upper face of the magazine 24. The said hand-grip 7 is fastened to the driving-member 13 by means of a set-screw 29 mounted in one of the side walls of the grip and entering a circumferential groove 30 in the outer face of the collar 19 which, as aforesaid, is permanently fastened to the outer end of the driving-member 13.

The cylindrical drill-bit magazine 24 corresponds in diameter to the diameter of the hand-grip 7 and is fastened to the driving-member 13 by means of a set screw 31 as seen in Fig. 2. As shown, the magazine 24 is formed with a circular series of bit-receiving pockets 32 consisting of alternately arranged grooves and holes, but the particular adaptation of the magazine for the reception of the drill-bits may be varied as desired. The bits are stopped from longitudinal outward movement by the adjacent edge of the collar 19 and are held against inward displacement by means of a magazine cover 33 the outer edge of which fits snugly over the inner edge of the magazine, while its inner end is rounded and adapted to bear, as shown in Fig. 2, upon the periphery of the driving-member 13. The cover is held in place by its provision with a bayonet slot 34 receiving a pin 35 mounted in the periphery of the magazine 24.

A knurled plug 36 mounted in the inner end of the driving-member 13 provides a stop for the outward movement of the tubular driven-member 14 under the power of the spring 2, the threaded sleeve 37 of the plug 36 forming a shoulder for co-action

with the inner ends of the coarse screw threads 14ª before mentioned.

The reversible jaws 12 of the chuck are adapted to be reversed end for end in the bifurcated chuck-body 10 for the purpose of adapting the push-drill to be used with ordinary drill-bits like the bit 38, or to be used for inserting ordinary wire brads like the wire brad 39, preparatory to being driven home. Each jaw 12 is formed at a point to one side of its longitudinal center with a recess 40, these recesses being located opposite each other and receiving a steel abutment-block or anvil 41 traversed by a circular transverse passage 42 receiving a helical spring 43 which in turn receives a long coupling-pin 44 the outer ends of which are headed down upon the outer face of the respective jaws, whereby the same are coupled together, but normally held slightly separated from each other by the spring 43 the ends of which by bearing upon the bottoms of the said recesses 38 exert a constant effort to hold the jaws apart in position for the reception between them of the shank of a drill-bit or the head of a wire brad, as the case may be. The longer ends of the jaws are formed with the usual complementary grooves 45 for the reception of the shanks of the bits which are held against turning by their provision with stop-wings 46 co-acting with a stop-wing 47 offsetting from the inner end or bottom of the abutment 41 which forms ar endwise stop for the drill bits.

The shorter ends of the jaws are formed with short V-shaped grooves 48 adapted to grip brads adjacent to their heads for which clearance is made by cutting away the jaws adjacent to the outer end of the said abutment or anvil 41, to form a small clearance opening 49 just large enough to receive the head of a brad. A brad being grasped adjacent to its head, but not by its head, is inserted into the woodwork, whatever its character may be, in precisely the same manner as a drill bit would be inserted into the woodwork. Then when the chuck-jaws are loosened and the push-drill removed, the brad will be found sticking out of the woodwork for a distance represented by the length of the head and so much of the brad as was gripped by the jaws. In this position the brad can be driven home with a hammer without any danger of bending the brad. At this point I may say that in inserting brads it is necessary to operate the push-drill with the spring at a light tension since there is no temper in the ordinary commercial brad. By providing my improved push-drill with a power-spring easily regulated in tension and with reversible chuck-jaws, I endow it with the unusual function of inserting ordinary brads. For the reversal of the chuck-jaws 12 end for end, it is necessary merely to remove the chuck-sleeve 11 when the jaws 12 and their abutment-block or anvil 41 may be slipped out as one piece and reversed end for end.

In the modification shown by Fig. 12 of the drawings, I have provided for changing the tension of the power-spring 2 other than through the medium of the hand-grip 7. In the said modified construction, the hand-grip 50 when swung back exposes the outer end of the power-spring 2 which may then be seized by the fingers and turned in one direction or the other, or the said spring may be adjusted by gripping the knurled stem 51 of a nut 52 mounted so as to be rotatable in the outer end of the driving-member 53 of the device and held in place by a set screw 54 entering its circumferential groove 55. The said nut 52 is formed with an internal spiral groove (not shown) but pitched in accordance with the pitch of the coils of the spring 2, and carries a tubular housing 56 to prevent the said spring 2 from buckling. The cap 48 is secured, as shown, by a hinge 57 to the outer end of the magazine 58. The nut 52 in this case takes the place of the pin 16 as the spring-regulating abutment and is turned for varying the number of spring coils in front of it instead of turning the spring bodily itself.

In one case the power-spring 2 is bodily rotated by the manual rotation of the hand-grip 7, whereby the number of coils of the spring in front of the fixed pin 16 is increased or diminished, according as it is desired to increase or diminish the power of the active portion of the spring. In the other case, the power of the said spring 2 is regulated not by rotating the spring bodily by means of the hand-grip 7, but by bodily moving the individual coils of the spring to one side or the other of the nut 52 by manually rotating the nut, which, although free to rotate, does not move with respect to the longitudinal axis of the spring. In other words, by means of the hand-grip 7, the entire spring is bodily rotated for changing the number of its coils on the opposite sides of the abutment pin 16; while in the other case, without turning the entire spring, certain of its coils are shifted to opposite side of the abutment nut 52. In either case the effect is the same, because the number of coils in the active and passive portions of the spring is changed to give more or less power. Only the coils in front of the abutment, be it the pin 16 or the nut 52, may be said to be in play; the remaining coils are inert because not compressed by the telescoping of the driving and driven members of the device.

I claim:—

1. In a push drill, the combination with the driving and driven members thereof, of a power spring, a pin engaging with the

coils of the spring between the ends thereof and fixed in position with reference to the longitudinal axis of the drill, and means connected with the outer end of the spring for bodily rotating the same so as to vary the number of its coils on the opposite sides of the said pin, whereby the number of coils of the spring in play at any one time may be varied, according to the power desired, by the bodily rotation of the spring itself.

2. In a push drill, the combination with the driving and driven members thereof, of a power spring, a housing tube connected with the said driving member, a pin carried by the housing tube and extending transversely through the said spring, and a hand grip carried by the said driving member and connected with the outer end of the spring for the bodily rotation of the spring with reference to the said pin, whereby the active portion of the spring may be lengthened or shortened by the turning of the hand grip so as to differentiate the number of coils of the spring on the opposite sides of the said pin.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

WILLIAM A. PECK.

Witnesses:
CLARA L. WEED,
MALCOLM P. NICHOLS.