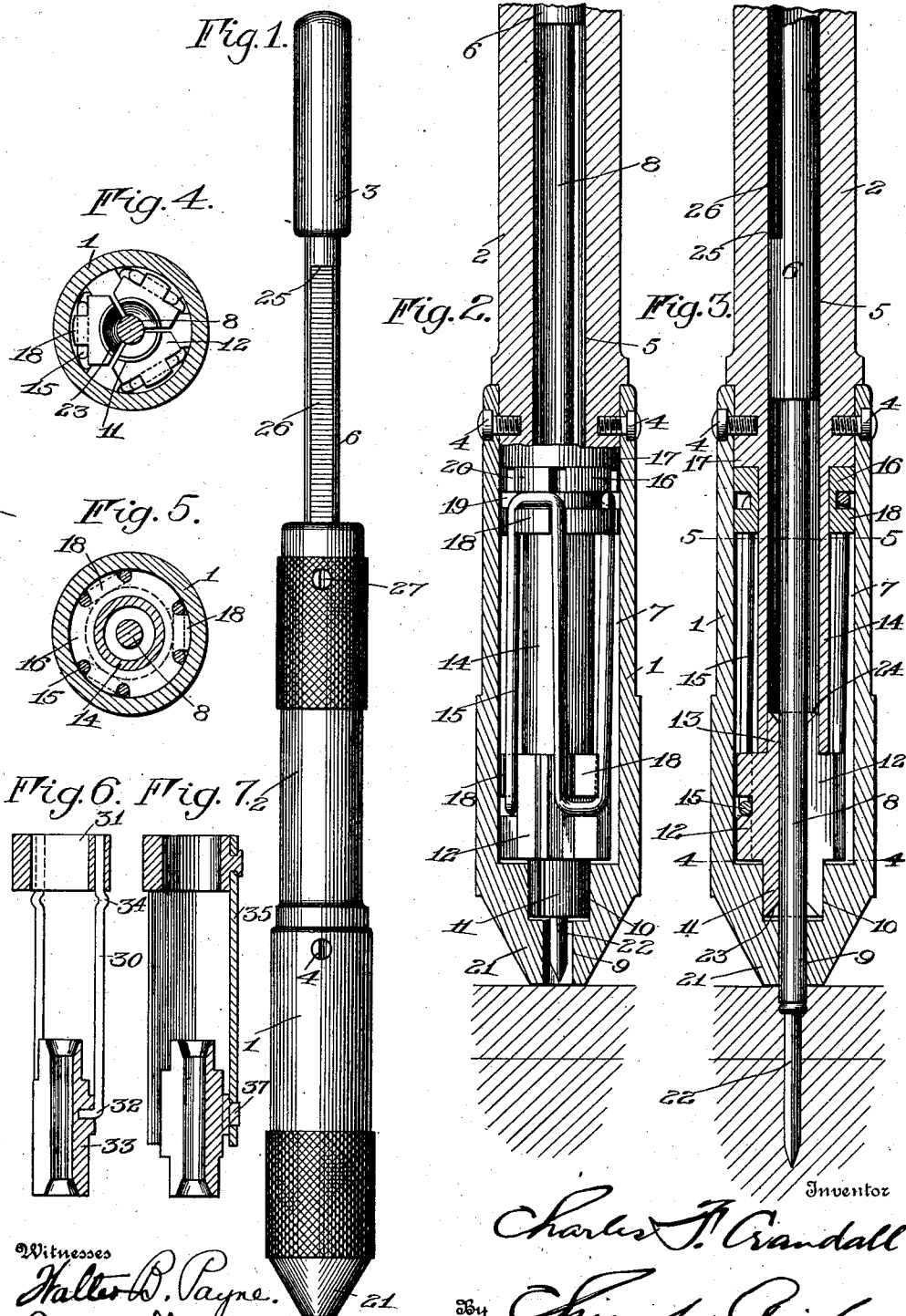


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NAILING IMPLEMENT.
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Patented May 16, 1911.



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To all whom it may concern:

Be it known that I, CHARLES F. CRANDALL, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Nailing Implements; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention relates to nail driving apparatus and it has for its object to provide a simple, light and convenient implement of this nature, particularly, though not exclusively, adapted for use in driving nails by hand.

Further objects of my invention are to provide an implement adapted for nails of different sizes within certain limits and wherein parts subject to wear or breakage may be easily removed and repaired or others substituted by persons of ordinary skill in such matters.

To these and other ends the invention consists in certain improvements and combinations of parts all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings: Figure 1 is a side elevation of a nailing implement constructed in accordance with and illustrating one embodiment of my invention; Fig. 2 is a longitudinal central sectional view of the same with the plunger set for operation and with the nail in place ready to be driven; Fig. 3 is a view similar to Fig. 2 with the parts in the positions occupied at the time the nail is driven home; Fig. 4 is a transverse section on the line 4—4 of Fig. 3 showing the chuck in end elevation; Fig. 5 is a transverse section on the line 5—5 of Fig. 3, and Figs. 6 and 7 are detail views of modifications.

Similar reference numerals throughout the figures indicate the same parts.

The device herein shown as an illustration of one embodiment of the invention is a tool designed particularly for carpenters to aid them in driving nails in remote and relatively inaccessible places, such as about carved wood work, corners and angles and at angular molding joints, although of course suitable for general use, and com-

prises in the present instance a body portion constructed in two parts, a lower stock section 1 and an upper section 2 which forms a guide for the driving plunger 3, and also constitutes a convenient handle portion whereat the tool may be safely gripped by the operator. Both of the parts 1 and 2 are preferably of a tubular nature, the lower end of the member 2 being secured within the adjacent end of the member 1, as by the screws 4, whereby the guiding bore 5 of the guide 2 in which the shank 6 of the plunger 3 reciprocates is arranged to open into the chamber 7 formed within the stock section 1 and the preferably attenuated driving point 8 is arranged to reciprocate in the chamber 7 and to project through a nail aperture 9 in the end of the stock and at the lower end of the chamber. This restricted end of the stock section 1 is provided with a recess 10 adjacent the nail aperture 9 forming a continuation of the chamber 7 and within this recess are centered extensions 11 of a series of relatively movable jaws 12 that form a nail chuck in which the nail is inserted and held to be steadied during the driving operation, the said recess being of sufficient diameter however to permit the hereinafter described necessary expansion of the jaws. Similar extensions 13 on the opposite ends of the jaws are similarly centered within the end of the tubular plunger guide 2 which, for this purpose, has a reduced tubular extension 14 that projects downwardly well within the chamber 7 in alinement with the nail aperture 9 so that the nail chuck 12 is retained between the restricted end of the chamber and the end of the plunger guide.

The relatively movable jaws of the chuck are normally pressed together by spring arms 15 arranged longitudinally of the plunger tube 14 within the chamber 7 and between said tube and the walls of the stock section 1, one end of each arm being secured to one of the jaws and the other end to a stationary part which, in the present instance, is supplied in the form of a collar 16 arranged about the extension 14 of the plunger guide adjacent to the shoulder 17 that marks the juncture of the extension and the body portion of the guide. I prefer a very simple manner of forming these spring arms 15 which consists in providing upon the collar 16 and the jaws 12, respec-

tively, projections 18 and looping about these projections back and forth between the parts a continuous resilient member, such as a length of spring wire. The spring arms being thus connected together take a tubular cage like form and if their collective diameter or the diameter of such cage be made relatively small, they will hold themselves in place when expanded about the peripheries of the collar 16 and the nail chuck, as shown, or they may be secured additionally to both parts in any suitable manner. The projections 18 may also be formed in a convenient manner upon the collar 16 by cutting peripheral and longitudinal grooves 19 and 20, respectively, therein whose intersections form the desired attaching portions and it will be further observed, particularly by reference to Fig. 4, that the nail chuck 12 is constructed, in the present embodiment, merely by splitting a somewhat similar collar and the projections thereon may therefore be formed in substantially the same manner.

Devices of this kind are used most extensively for driving finishing nails, that is nails having relatively small heads and in the operation of the implement of the present invention the parts are normally in the same position as that shown in Fig. 3 with the driving point 8 of the plunger 6 extending through the expanded jaws 12 of the nail chuck, through the nail aperture 9 and within the point or nose 21 of the stock. The head of the nail 22, when it is desired to insert the same in the implement, is pressed against the end of the plunger in substantially the same relation thereto as shown in Fig. 3, and the plunger is thereby retracted or pressed inwardly through the nail chuck, the lower terminations of the jaws 12 in the extensions 11 being preferably tapered as at 23 to form a concavity through the influence of which the jaws will be further expanded in the event that the head of the nail is of greater diameter than the driving point of the plunger. Or, by virtue of this taper on the jaws, the nail may be inserted with the plunger withdrawn entirely from the chuck. In the first instance, however, the plunger point travels through the chuck in advance of the nail and keeps the jaw expanded until the nail is properly supported, as shown in Fig. 2, during which expansion of the lower ends of the jaws, the opposite ends are held grouped together by the end of the plunger guide in which they are centered. The nose of the stock is then placed against the material to be nailed at the desired spot whereupon the impact of a blow communicated to the upper projecting end of the plunger 3 will actuate the driving point 8 and nail 22 back through the chuck and, if desired, not only drive the nail into the material but set

the same any desired distance below the surface according to the amount of projection beyond the nose 21 of the stock allowed the driving point 8.

The distance the nail may be set into the wood is primarily determined by the length which the driving point projects beyond the nose 21 when then driving plunger or head 3 abuts the end of the upper section 2 of the body, consequently the operator, in using the tool, may observe the distance between the proximate shoulders of the body portion 2 and the head 3 and as the latter approaches the former under the successive blows of the hammer, and carefully gage the distance the nail is being set and thus prevent marring the surface of the woodwork by indenting it with the nose 21.

The upper extremities of the chuck jaw 12 are also preferably tapered, as at 24, so that in the event that the driving point 8 is moved entirely out of the chuck by the extreme length of the nail, the jaws will be still safely spread upon its return movement.

A device constructed as shown will accommodate nails of great length, but I prefer to provide shoulders 25 on the shank 6 of the plunger 3 preferably formed by cutting a flat side 26 thereon which shoulders act as stops engaging a cooperating element 27 on the guide 2 to limit the movement of the plunger relatively to the guide and prevent it from being extended so far beyond the same as not to receive adequate support therefrom for the impact of the driving blow.

While I have described the spring actuating arms 15 of the clutch jaws 12 as being secured upon a separate collar 16, it is clear from an inspection of Figs. 2 and 3 that they might in some instances be otherwise mounted as directly upon the shoulder 17 of the plunger guide 2, but by the present construction the collar 16 fits, removably but tightly upon the reduced portion 14 of the guide 2 and may be withdrawn therewith from the stock section 1 and through the upper end thereof and subsequently removed together with the chuck as a unit from the guide.

In lieu of the continuous looped spring previously described, I may provide chuck jaw operating devices embodied in springs such as are shown in Figs. 6 and 7 and which have the same principle of operation as the spring shown in Figs. 2 and 3, namely, they serve to move the jaws relatively to each other and detachably connect them to the collar but prevent them from falling apart or becoming detached when the stock section 1 is removed.

In Fig. 6 I have shown the operating spring 30 as secured to the collar 31 at one end by being inserted in an aperture or drilled hole therein, and at its opposite end

being provided with a laterally projecting extremity 32 fitting a suitable aperture in the chuck jaw 33. In using this form of spring I prefer to provide it with a shoulder or offset 34 adapted to engage the lower face of the collar to maintain the latter at the proper spaced distance from the chuck jaws. A flat tempered leaf spring 35 might be used, as shown in Fig. 7, which can be riveted to the collar, as indicated at 36, and provided with an apertured lower end in which loosely fits a short lug or projection on the chuck jaw, such as is indicated by 37.

It will be seen that the implement resolves itself into four major parts readily detachable from one another, namely, the stock section 1, guide 2, plunger 3 and chuck 12 with connected parts, and this latter can easily be removed and replaced for purposes of substitution, adjustment or repair. The ease with which the device may be taken apart, it is also pointed out, enables mutilated nails or foreign substances that might find their way into the chuck or inner chamber to be easily and quickly removed.

I claim as my invention:

1. In a nailing implement the combination with a tubular stock section forming a chamber, and a tubular plunger guide rigid therewith and having a reduced end portion projecting into the chamber in spaced relation to the lateral walls thereof, of a nail chuck located in the chamber between the end wall thereof and the end of the plunger guide, and a spring arranged in the chamber between its lateral walls and the reduced portion of the plunger guide for moving the chuck jaws together.

2. In a nailing implement, the combination with a tubular stock section forming a chamber, a plunger guide, and a plunger arranged to reciprocate in the guide and chamber, of a nail chuck located in the latter comprising relatively movable jaws and a spring arranged in the chamber longitudinally of the plunger to support one of the jaws and operating laterally thereof to move the jaws together.

3. In a nailing implement, the combination with a stock section having a chamber therein, of a plunger guide having one end supported in the stock and the other projecting freely within the chamber, a nail chuck arranged at the free end thereof and comprising relatively movable jaws and a spring extending longitudinally of such free end between the guide and a wall of the chamber for moving the jaws together.

4. In a nailing implement, the combination with a stock section having a chamber therein, of a tubular plunger guide projecting within the chamber, a plunger adapted to reciprocate therein, a nail chuck arranged in the chamber and comprising relatively movable jaws, a collar carried on the plunger

guide and a spring arm connected with the collar and with a jaw of the chuck to operate said jaw relatively to the others.

5. In a nailing implement, the combination with a stock section having a chamber therein and a nail aperture leading from the chamber and a recess adjacent to the nail aperture, of a plunger guide leading into the chamber in alinement with the nail aperture and a nail chuck arranged in the chamber and comprising relatively movable jaws having opposite end portions centered in the recess and plunger guide, respectively.

6. In a nailing implement, the combination with a stock section having a chamber therein and a nail aperture leading from the chamber and provided with a recess adjacent to the nail aperture, of a tubular plunger guide projecting into the chamber in alinement with the nail aperture, a nail chuck arranged in the chamber and comprising relatively movable jaws having opposite end portions centered in the end of the plunger guide and in the recess, respectively, and a spring arm extending longitudinally of the plunger guide and connected with one of the chuck jaws for moving it relatively to the other.

7. In a nailing implement, the combination with a tubular plunger guide, of a nail chuck comprising relatively movable jaws having reduced end portions centered in the end of the tubular guide.

8. In a nailing implement, the combination with a tubular plunger guide, of a nail chuck comprising relatively movable jaws having reduced end portions centered in the end of the tubular guide and spring arms carried on the tube to extend longitudinally thereof and connected to the chuck jaws to move them relatively.

9. In a nailing implement, the combination with a tubular stock section forming a chamber and a tubular plunger guide having a reduced portion projecting into the chamber, of a collar on said reduced portion, a nail chuck at the end of the latter comprising relatively movable jaws and spring arms connecting the collar and jaws for operating the latter.

10. In a nailing implement, the combination with a tubular plunger guide, of a chuck embodying relatively movable jaws, a removable collar carried on the plunger guide and spring arms connecting the collar and jaws.

11. In a nailing implement, the combination with a plunger guide, of a chuck comprising relatively movable jaws, a collar carried on the guide and spring arms connecting the collar and jaws for operating the latter and embodying a continuous resilient member looped back and forth between the connected parts.

12. In a nailing implement, the combina-

tion with a plunger guide, of a chuck comprising relatively movable jaws having lateral projections thereon, a collar carried on the guide and provided with similar projections and spring arms connecting the collar and jaws for operating the latter embodying a continuous resilient member looped back and forth between the connected parts and having the loops engaging over the projections on the members.

13. In a nailing implement, the combination with a plunger guide and a nail chuck comprising relatively movable jaws, of an actuating spring connecting the guide and one of the jaws, said spring and jaw being provided with cooperating projecting and recessed portions adapted to be disengaged to effect the removal of the jaw.

14. In a nailing implement, the combination with a plunger guide, a nail chuck comprising a plurality of segmental and relatively movable jaws and a plunger adapted to reciprocate in the guide and chuck, of spring arms mounted on the guide to extend longitudinally of the plunger and operate the jaws laterally thereof, the jaws and their operating springs being provided with cooperating projecting and recessed portions adapted to be disengaged to effect the removal of the jaws from the spring and guide.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
