J. P. DUBOSH.

DEVICE FOR DRIVING OR POSITIONING NAILS OR THE LIKE WHERE DESIRED.

APPLICATION FILED APR. 30, 1918.

1,307,043.

Patented June 17, 1919.

4 SHEETS—SHEET 1.

Fig. 1.

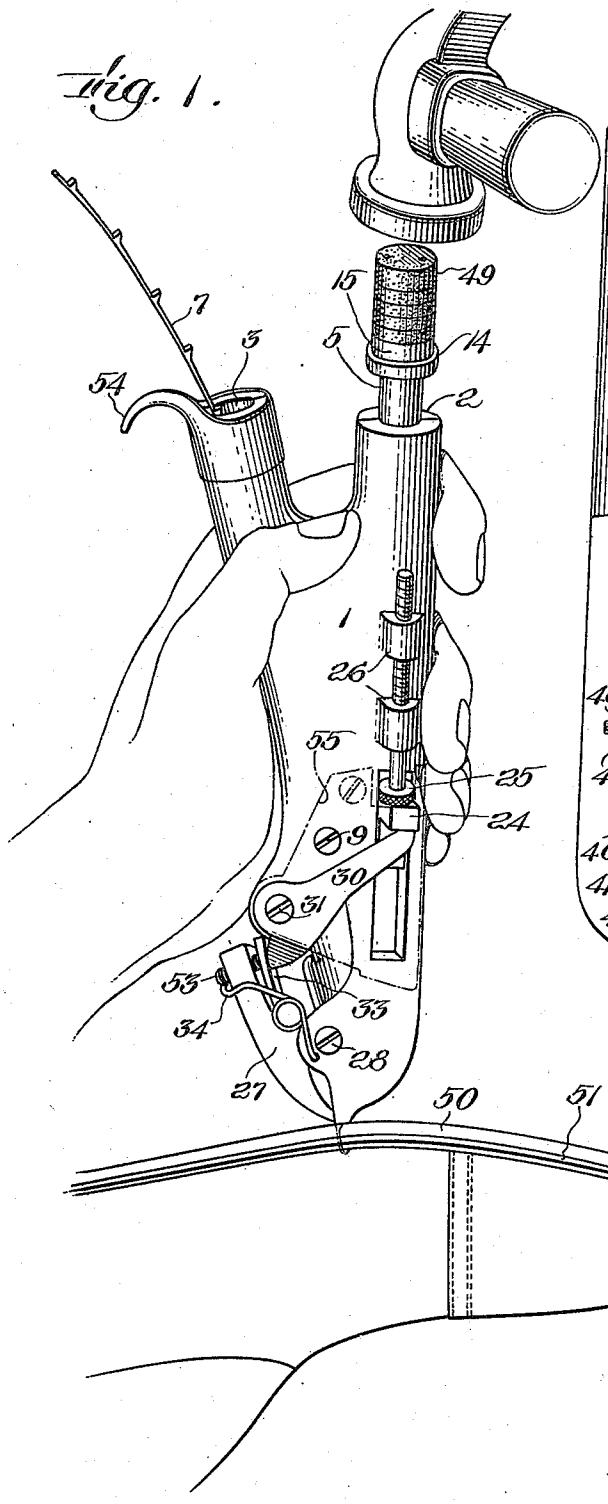


Fig. 2.

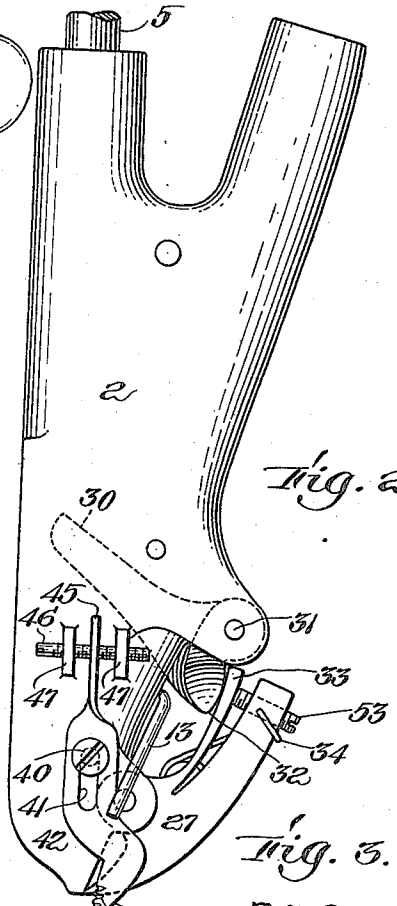
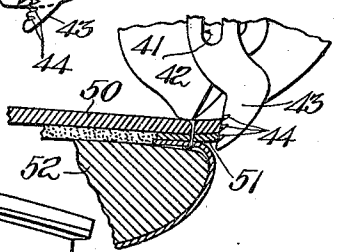


Fig. 3.



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Fig. 4.

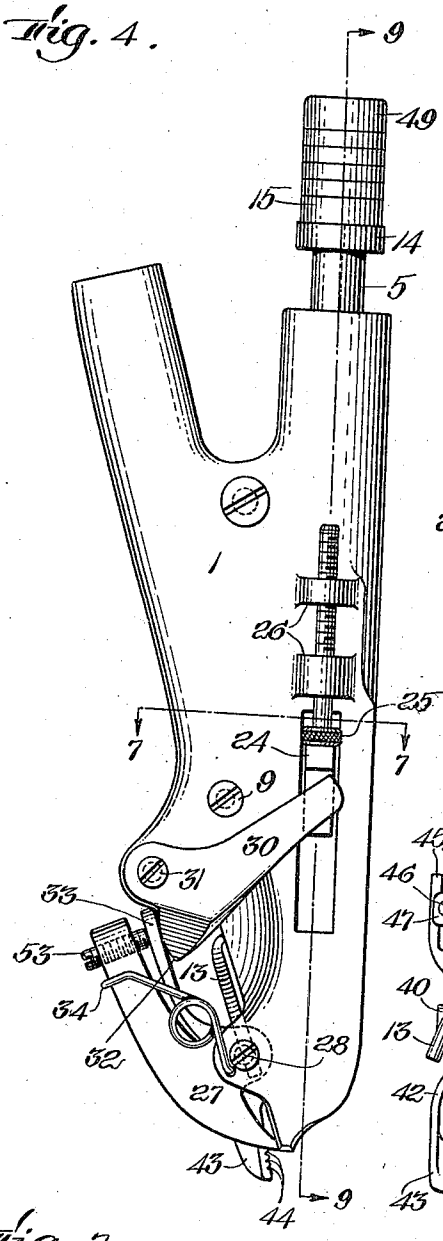


Fig. 5.

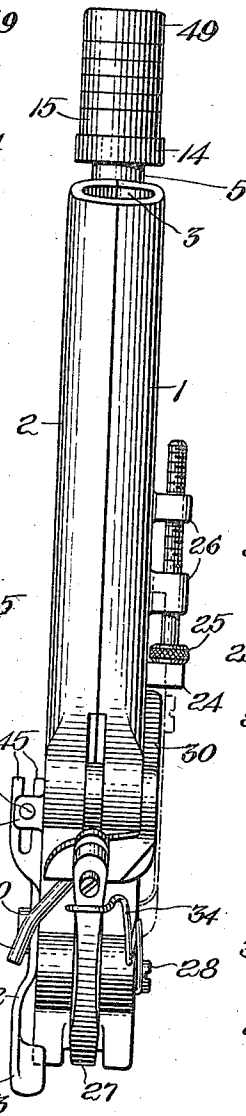


Fig. 6.

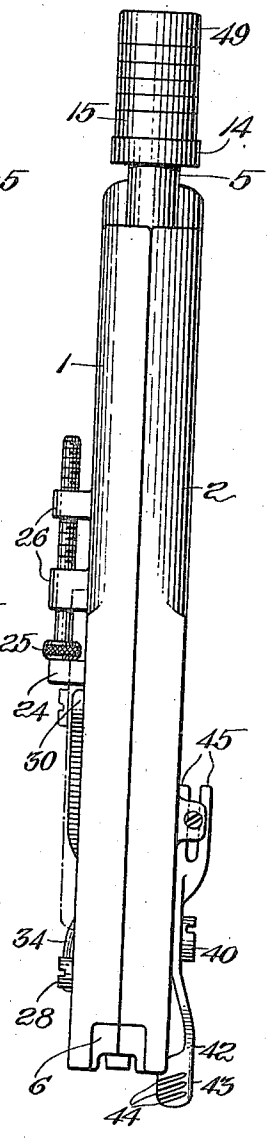
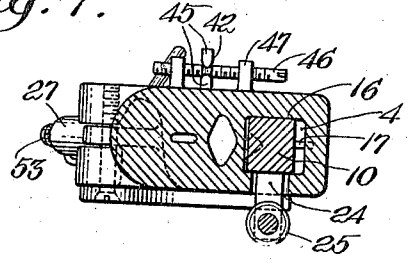


Fig. 7.



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4 SHEETS—SHEET 3.

Fig. 8.

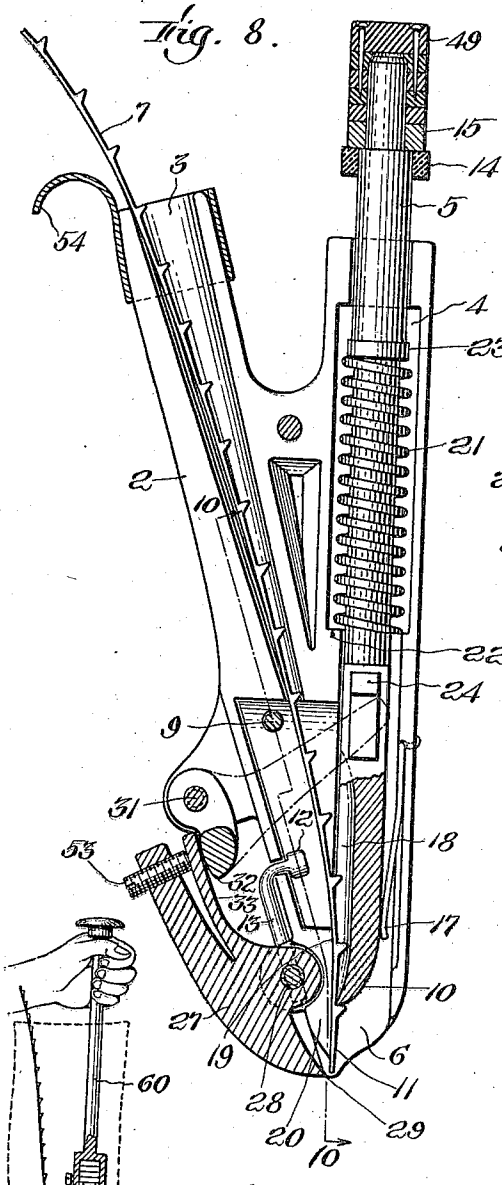


Fig. 9.

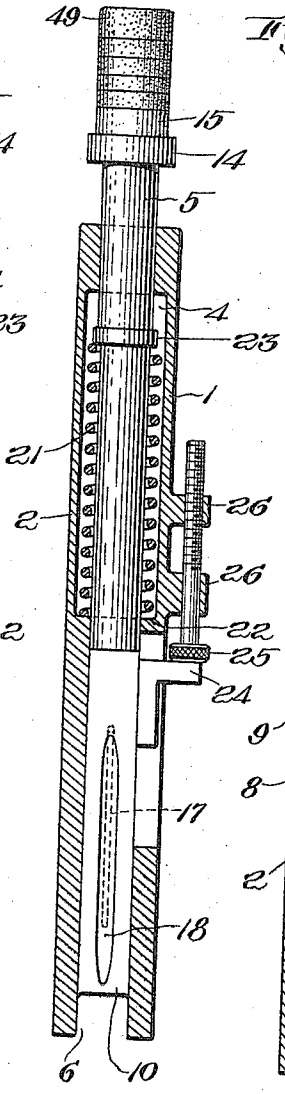


Fig. 10.

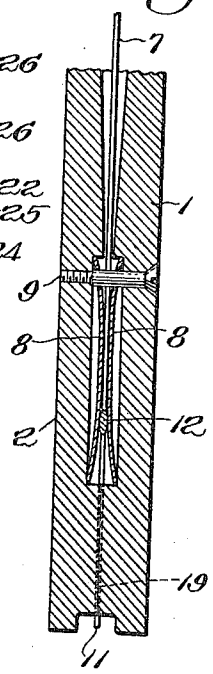


Fig. 11.

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4 SHEETS—SHEET 4.

Fig. 14.

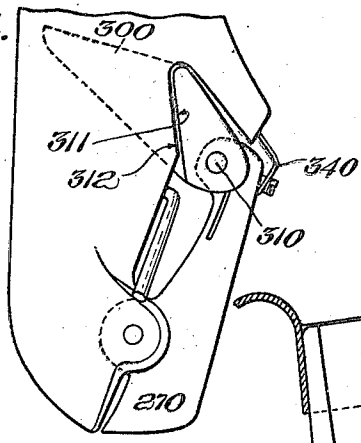


Fig. 15.

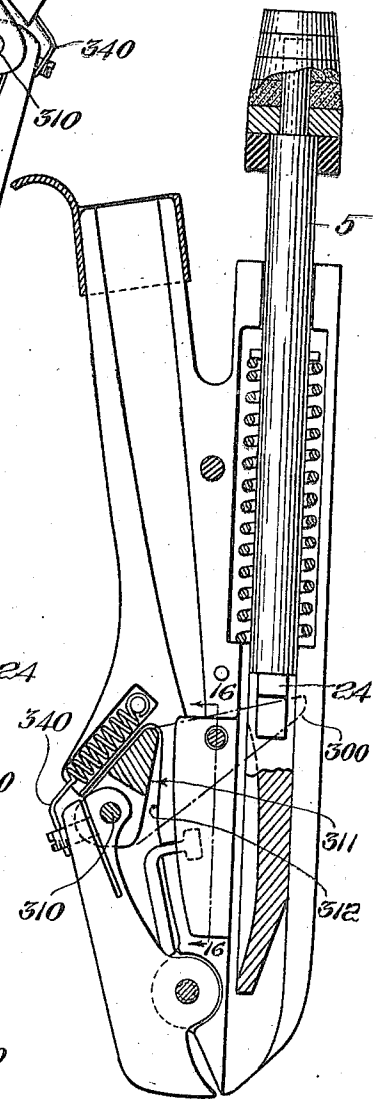


Fig. 12.

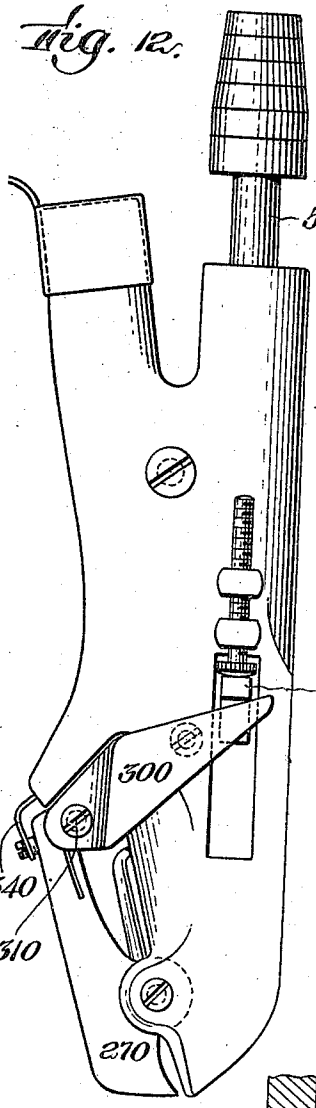


Fig. 13.

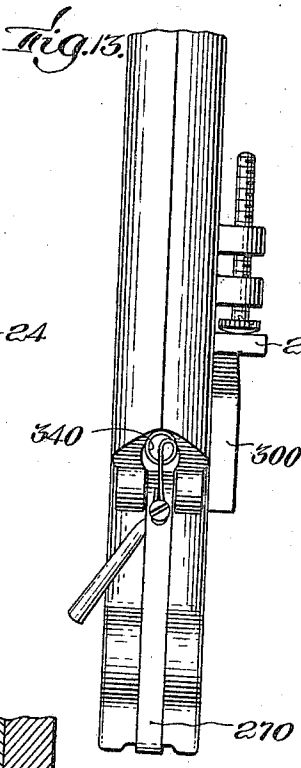
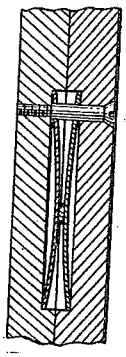


Fig. 16.



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DEVICE FOR DRIVING OR POSITIONING NAILS OR THE LIKE WHERE DESIRED.

1,307,043. Specification of Letters Patent. Patented June 17, 1919.

Application filed April 30, 1918. Serial No. 231,624.

To all whom it may concern:

Be it known that I, JOHN P. DUBOSH, a subject of the Austro-Hungarian Government, residing at Fall River, in the county of Bristol and State of Massachusetts, have invented certain new and useful Devices for Driving or Positioning Nails or the like Where Desired, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of my invention is to provide a manually operated, as distinguished from a motor driven nailer using string nails. While it is primarily designed for repairing boots and shoes, it is to be understood that it can be used in shoe factories, although it would not likely displace the motor-driven nailer there employed. It may be conveniently and easily grasped and held in one hand in operative position, and while the power required to drive and cut off the nail of the string, may be furnished by a hammer blow brought about, for example, by the other hand. Its construction is simple, strong and durable; and permits its being easily taken apart or put together. Its cost of manufacture is small, and its purchase within the means of cobblers and small repairers. With it, 128 nails per minute have been successfully driven; in fact, it will operate as fast as a man can hammer the device.

By means of this device, nails may be driven from the inside of a boot or shoe, excepting, however, the ball or the toe thereof. This is a great advantage. For instance, a counter may be nailed from the inside, to secure it to the sole underneath the heel, without first removing the heel from the sole.

This nailer also does away with the common habit among cobblers, of holding in their mouths separate steel nails ready for use. Consequently no dirt is conveyed to the mouth, and the teeth cannot become worn or blackened.

Further, the possible hammering and injury of the fingers are obviated by the use of this device.

That its usefulness would be of immense value in repairing army boots and shoes near the battle front, will become apparent, especially when one appreciates the fact that many of the soldiers could themselves use it to do their own repairing, and that of others.

It is also to be particularly noted that its utility does not depend upon its adaptability for use in the art of making boots and shoes of leather. It may be used for driving nails or equivalent articles, into any suitable material, such as leather, rubber, wood or the like.

In short, the broad purpose of my invention is to provide means, embodying the principle of my invention, whereby a blow, manual or not, will cause said means forcibly to drive from within itself, a piece of material and deliver it at a particular place, or in a particular position; and although the claims hereinafter made, may appear to be directed toward a manually-operated nailing machine, it is to be understood they contemplate any device or machine embodying the principles of my invention, and capable of being put to any use now known or unknown.

In the drawings illustrating the principle of my invention and the best known means now known to me, of embodying the same in operative structure,

Figure 1 is a perspective view of the nailer held by one hand of the operator, in working position upon the sole of the shoe, and about to be struck by hammer head for the purpose of driving a nail into the sole, and severing the nail from its string of nails;

Fig. 2 is a rear view of the nailer, the head of the nail-driving rod having been broken off;

Fig. 3 is a detail view showing the method of using a nailing gage and welt lifter;

Figs. 4, 5 and 6 show in elevation respectively, the front and opposite sides of the nailer;

Fig. 7 is a horizontal cross section on the line 7—7 of Fig. 4;

Fig. 8 is a longitudinal view, partly in vertical section; the front half of the shell or frame having been removed;

Fig. 9 is a vertical transverse section on line 9—9, Fig. 4;

Fig. 10 is a section on line 10—10 Fig. 8;

Fig. 11 shows how by using an extension rod, the nailer may be used inside a boot;

Figs. 12, 13, 14 and 15 illustrate a modified but preferred form of cutting means embraced in my invention;

Fig. 12 being the front view; Fig. 13 the rear; Fig. 14 a side view;

Fig. 15 a longitudinal view partly in section; the front shell having been removed. For the sake of clearness, the gage and welt-

lifting device, shown in Figs. 2, 3, 5, 6 and 7, is omitted from those showing said modified form;

Fig. 16 is a section on line 16—16, Fig. 15.

A reference to Fig. 1 shows my device given a shape suitable to be easily and conveniently held in one hand. Two side shell portions 1, 2, Figs. 1, 5, 6, 8 and 9, similar but of opposite formation, constitute the supporting frame of the device. Within these shells are a string-nail channel 3, Figs. 1 and 8, and a guide-way 4 for a nail-driving rod 5; the channel and guide-way converging downwardly and uniting near the base of the device to form an outlet 6 through which the nails of a string 7 are to be successively driven.

In the lower portion of the nail channel are mounted two flat controlling spring plates 8, 8, Figs. 8 and 10, held in place by a screw 9, and so positioned that the string of nails may be passed downward between, but in engagement with them, and there held frictionally; the driving end 10, of the nail-driving rod 5 preventing any upward withdrawal of the string of nails, by engaging the head of the nail 11. An unlocking cam 12, Figs. 8 and 12, lies between these plates, and by a movement of an arm 13, Figs. 2, 4 and 5, connected with the cam, the plates may be separated enough to permit the string of nails 7 to be inserted in the device, or to be withdrawn from the device upwardly, provided the driving head 10 is held down in its bottom position and there is no nail head to engage, as will later appear. The nail-driving rod 5 is reciprocatingly mounted in the guide-way. Its lower or driving end portion is designed to engage the head of a nail, when the rod is driven downward; the downward movement of the rod being determined by a rubber buffer 14 on the rod, and positioned there by a ring shoulder 15. A bearing 16, Fig. 7, for the rod in the lower portion of the guide-way 4 allows a slight lateral movement of the driving-head 10, which is rectangular in cross section; the width of the head being less than that of the bearing, while its depth is the same as that of the bearing. This enables the head to have a sidewise movement, so that when the head is drawn upward and pressed sidewise by a lateral positioning spring 17, the head slips along the adjacent face of the nail, as 11, and over its head, next to be driven.

It will be noted that in the plane of the string of nails 7, between the controlling plates 8, 8, Figs. 8 and 9, there is a guide-slot 18, cut in the adjacent vertical side face of the driving-head 10 to receive and hold in alinement the saw-teeth heads about to be delivered; while for the rear of the string of nails, is cut a guide-slot 19, in the face of a lip 20, toward which the driving-head constantly tends to move by reason of the lateral positioning spring 17. The bottom of this slot forms an acute angle with the axis of the string-nail guide-way, so that the elasticity of the slightly bent nail string, tends to cause the nail heads to seek the bottom of the guide-slot 18 in the driving-head 10.

A coil spring 21 abutting a shoulder 22 within the guide-way, and a ring shoulder 23 on the driving-rod, always tends to lift and hold the rod in its up or normal position, which is determined by a lug 24 on the rod, contacting a positioning screw 25 mounted in ears 26 on the outside of the shell member 1.

I have now described the means employed for delivering the nail, but before it is completely delivered, it must be severed from its string of nails. To bring about this severance, a cutter lever 27, Figs. 1, 4 and 8, is provided. It is pivoted to the frame at 28, and its cutting edge 29 is designed to be moved toward and through the nail 11, and to the driving-head 10 which becomes seated on the opposite side of the driving-head guideway. This movement is brought about by an operating cam lever 30 pivoted at 31 to the shell; the cam 32 engaging the under side of the rear spring portion 33 of the cutter lever 27, while its long arm engages the under side of the positioning lug 24 on the driving-rod 5. A spring 34 tends to hold the cutter lever 27 away from the nail string, but in contact with the operating lever cam 30, which, in turn, is held against said positioning lug 24.

On a screw 40, Figs. 2, 5 and 6, in the lower portion of the frame is slidably mounted, by means of a slot 41, a gage 42. Its lower or guide portion 43 has a slightly curved guiding face in a plane at about right angles to the plane of movement, say, of the nail-cutting lever 27, and is provided with slightly upwardly and outwardly inclined parallel gripping or welt-lifting grooves 44. The upper portion of the gage has a pair of fingers 45 between which is an adjusting screw 46, mounted in ears 47 on the side of the shell 2; the fingers engaging a ring channel 48 cut in the shank of the screw 46. Obviously, the slot and the space between the fingers allow the free end of the gage to occupy a position either in the transverse plane of the driving end of the nailer, as when resting on the sole as in Fig. 1; or outside, beyond it, as shown in Figs. 2 and 3. Also by adjusting the screw 46, the gage may be moved on its pivot screw 40 so that the face 43 of the gage 42 may be secured nearer or farther away from the path of nail delivery.

I will now describe the operation of my invention. It is assumed that a line of nails is to be driven along the path indicated in

Fig. 1. The operator grasps the device as shown, places it in position, and, with a hammer, strikes the leather washers 49 on the head of the driving-rod 5, the latter descends, hits the head of the lowest nail 11, Fig. 8, which moves downward, carrying along with it the string of nails 7 between the friction controlling plates 8, 8; but, in its descent, the positioning lug 24 operates the operating cam lever 30, Fig. 4, and the cutter lever 27, so that just as the nail leaves the device, it is severed from the string, in line with the top face of the head; the severed nail continuing its movement until its head becomes buried in the material, as the sole of the shoe. It will be here noticed that the cutter has formed the point of the next nail by so cutting the rear face of the nail as to make an acute angle with the front face, so that, when the nail is driven into the sole, the nail will, in its downward movement, tend also to move in the plane of the rear face of the point, and be clenched by the iron last 52, as appears in Fig. 3, for example.

The nail having been driven home, the impact of the rubber buffer 14, Fig. 8, on the shoulder of the device, has been so great, that the driving-rod has been bounced back toward normal position, where it is held by the retaining spring 21; this normal position being determined, as has already been said, by the lug 24 engaging the adjusting screw 25. During this upward movement, the driving-head moves over the face of the next nail, and snaps over its head by reason of the constantly-acting positioning spring 17; at the same time, the cutting lever and connecting mechanism return to their normal position, as shown. To drive the second and succeeding nails involves simply repetition of the above-described operation.

Where a series of nails is to be driven in a line, say parallel with the edge of the sole 50 of a shoe, the gage 42, Figs. 2 and 3, is set by a proper movement of the adjusting screw 46, so that the line of nails will be properly distanced from the said edge, the free end of the gage dropping below the bottom of the device as shown in Figs. 2 and 3. By the movement of the nailer away from the observer, the gage pressing against the edge of the sole 50 and welt 51, not only are the nails in proper alinement, but the welt is lifted into very intimate contact with the sole, before and while the nails are being delivered and clenched by the last 52.

Should it be desired to use a longer nail, then to adapt the device to a string of longer nails, the positioning screw 25 is moved enough to have the movement of the driving-rod correspond with the length of the longer nail. The cutting mechanism always operates seasonably, once it has been adjusted, regardless of the length of the nail, because the cutter lever, operating cam lever and the positioning lug always bear the same relation to each other; the cutting of the nail always happening just as the nail of any length is driven home.

If, for any reason, it is desirable to hasten or retard the instant of cutting, then a cutting adjusting screw 53 can be properly turned to vary the relative position of the surfaces of the contacting cam 32 and the spring portion 33, of the cutting lever 27.

It will be noted that the device has a removably secured hanger 54 whereby the device may remain supported by the hand although the fingers are not grasping it; also that there is provided a thin metal plate 55, Fig. 1, indicated in dotted lines, to cover the cam lever 30 and the lug 24, to prevent the accidental pinching of the skin of the operator between the coöperating parts.

It will also be observed that the size and shape of the device are such that it can be used inside of a boot or shoe; and also that, by means of an extension rod 60, Fig. 11, rigidly but removably connected by any suitable means to the driving rod 5, the device can be used on the inside of high boots; or in any other environment in which it may be useful; the extension rod, instead of the device itself, being grasped and held in one hand.

A modified but preferred form of nailer is shown in Figs. 12 to 16, inclusive, and resides in the means employed in operating the cutting lever 270; it being designed to reduce the extent of surface frictionally engaged between the cam lever 30 and the positioning lug 24, Figs. 1 and 4. This result is attained by having a cam lever 300 pivoted at 310 to the rear end portion of the cutting lever 270, and having a cam 311 engage a cam surface 312, on the frame. By this arrangement of parts the transverse movement of the cam lever 300 relative to the longitudinal movement of the positioning lug 24 on the nail-driving rod 5, is very much reduced; hence the extent of surface on the cam lever worn by the lug during the driving operations of the rod, is correspondingly reduced. A spring 340 connected to the shell and the rear of the cutting lever 270, tends to restore the cutting lever and cam lever to normal position.

Having now described the structure and operation of my invention, together with its advantages and the various objects attained by it, and desiring to protect said invention in the broadest manner legally possible,

What I now claim is:—

1. A nailing device having a channel through which a string of nails may be caused to pass; means in said channel to guide and control said nails in their movements in and through said channel; recipro-

cable driving means to engage, forcibly eject from said device and drive a nail, by one reciprocation; said driving means having a longitudinal movement, and being so constructed that it also has a slight lateral movement on its return to normal position, to permit its driving head to pass by the head of the nail in the next opposite movement; cutting means operatively connected with said driving means to sever the driven nail from the string; and means to restore said driving means to normal position by the other reciprocation.

2. A nailing device having a channel through which a string of nails may be caused to pass; means in said channel to guide and control said nails in their movements in and through said channel; means frictionally to restrain the movements of said string of nails; driving means to engage, forcibly eject from said device and drive a nail of said string; cutting means operatively connected to said driving means to sever the driven nail from the string; and means whereby the driving means may be so moved as to permit an upward withdrawal of the string of nails from the device.

3. A nailing device having a channel through which a string of nails may be caused to pass; means in said channel to guide and control said nails in their movements in and through said channel; spring plates frictionally to restrain the movements of said string of nails; driving means to engage, forcibly eject from said device and drive a nail of said string; a cam member to open said plates; cutting means operatively connected to said driving means to sever the driven nail from the string; and means whereby the driving means may be so moved as to permit an upward withdrawal of the string of nails from the device.

4. A nailing device having a channel through which a string of nails may be caused to pass; means in said channel to guide and control said nails in their movements in and through said channel; driving means to engage, forcibly eject from said device and drive a nail of said string; cutting means operatively connected with said driving means to sever the driven nail from the string; and adjusting means whereby the driving means and the cutting means may be so connected that the device may drive and cut the nails of strings having different lengths of nails.

5. A nailing device having a channel through which a string of nails may be caused to pass; means in said channel to guide and control said nails in their movements in and through said channel; driving means to engage, forcibly eject from said device and drive a nail of said string; cutting means operatively connected to said driving means to sever the driven nail from the string; and a gage to determine the path of movement of said device along the edge of a sole of a boot or shoe, and to lift and hold the welt and sole of the boot or shoe into intimate contact, during the process of nailing.

6. A nailing device having a channel through which a string of nails may be caused to pass; means in said channel to guide and control said nails in their movements in and through said channel; driving means to engage, forcibly eject from said device and drive a nail of said string; cutting means operatively connected to said driving means to sever the driven nail from the string; and a movably mounted gage to determine the path of movement of said device along the edge of a sole of a boot or shoe; said gage having welt-lifting grooves to lift and hold the welt and sole of the boot or shoe into intimate contact, during the process of nailing.

7. A nailing device having a channel through which a string of nails may be caused to pass; means in said channel to guide and control said nails in their movements in and through said channel; driving means to engage, forcibly eject from said device and drive a nail of said string; a cutting lever; a cam lever pivoted to the rear of the cutting lever, and operatively connected with said driving means; and a cam surface engaged by said cam lever; the cam lever and cam surface being so arranged in relation to the cutting lever and the driving means, as to reduce the extent of surface on the cam lever, frictionally engaged, by the driving means.

In testimony whereof I hereunto affix my signature.

JOHN P. DUBOSH.

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