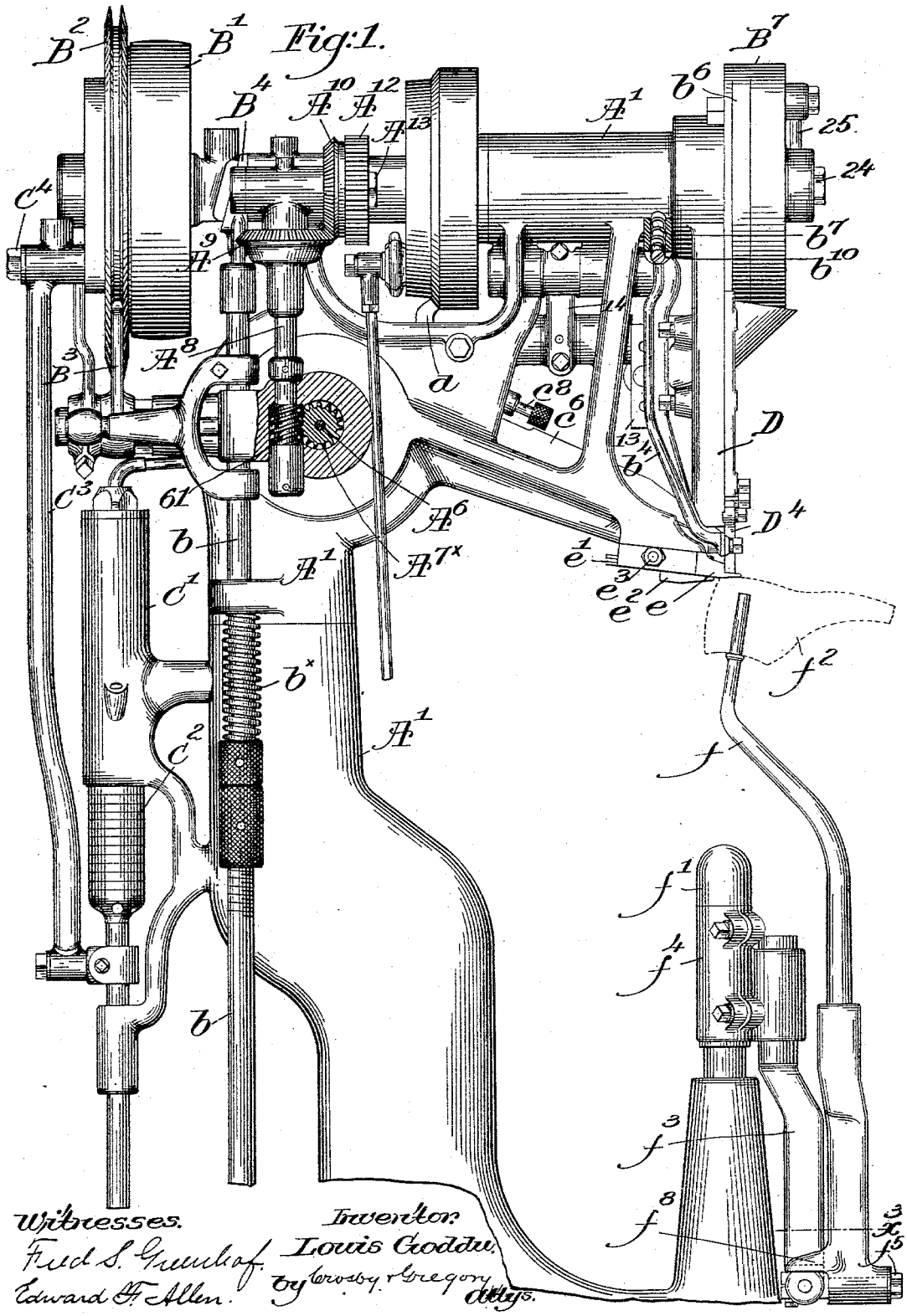
(No Model.) 4 Sheets—Sheet 1.

L. GODDU.

NAILING MACHINE.

No. 565,074. Patented Aug. 4, 1896.

Fig. 1.



Witnesses.
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Edward F. Allen.

Inventor:
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Attys.

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L. GODDU.

NAILING MACHINE.

No. 565,074. Patented Aug. 4, 1896.

Fig: 2

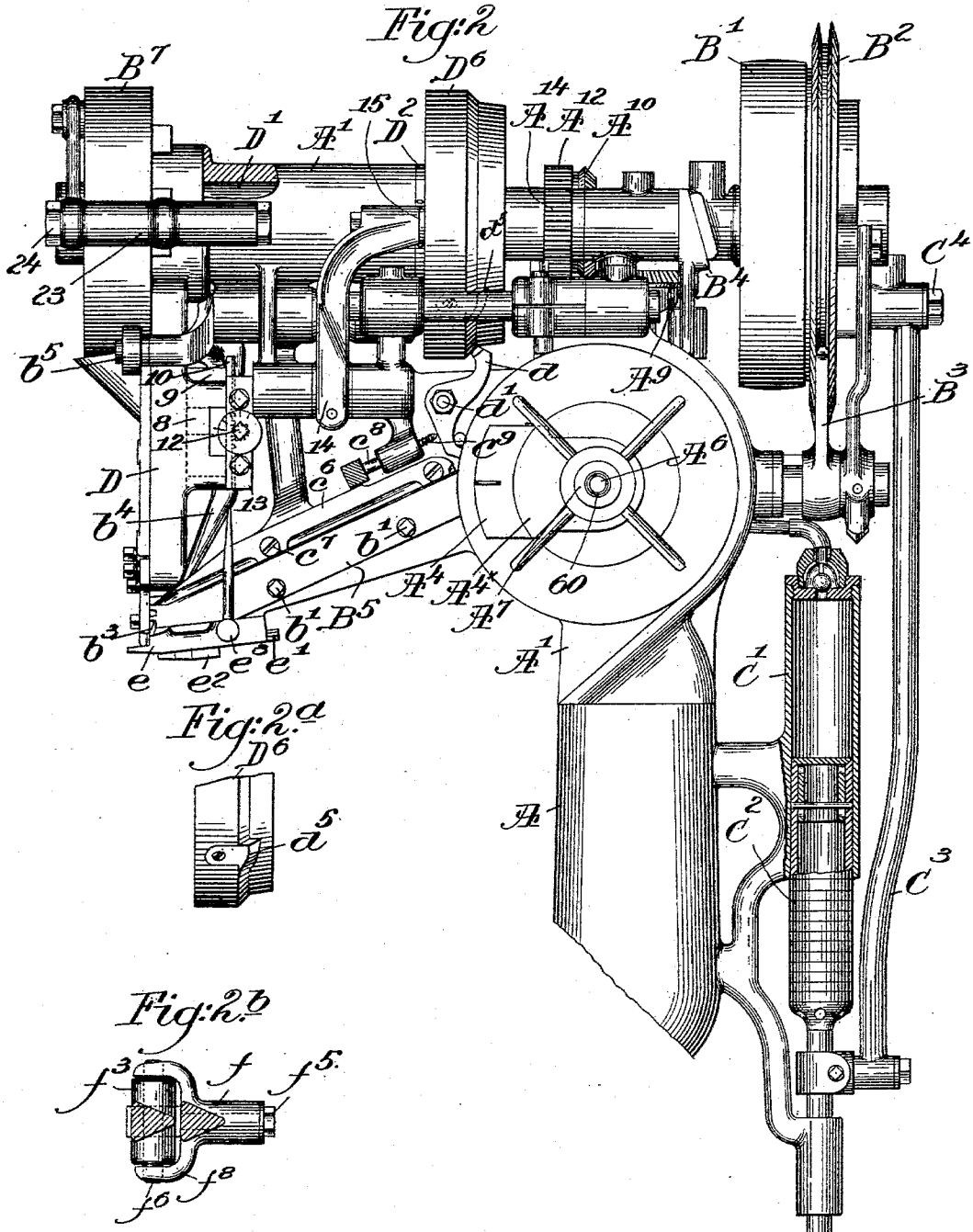

Fig: 2a

Fig: 2b

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(No Model.) 4 Sheets—Sheet 3.

L. GODDU.

NAILING MACHINE.

No. 565,074. Patented Aug. 4, 1896.

Fig: 3.

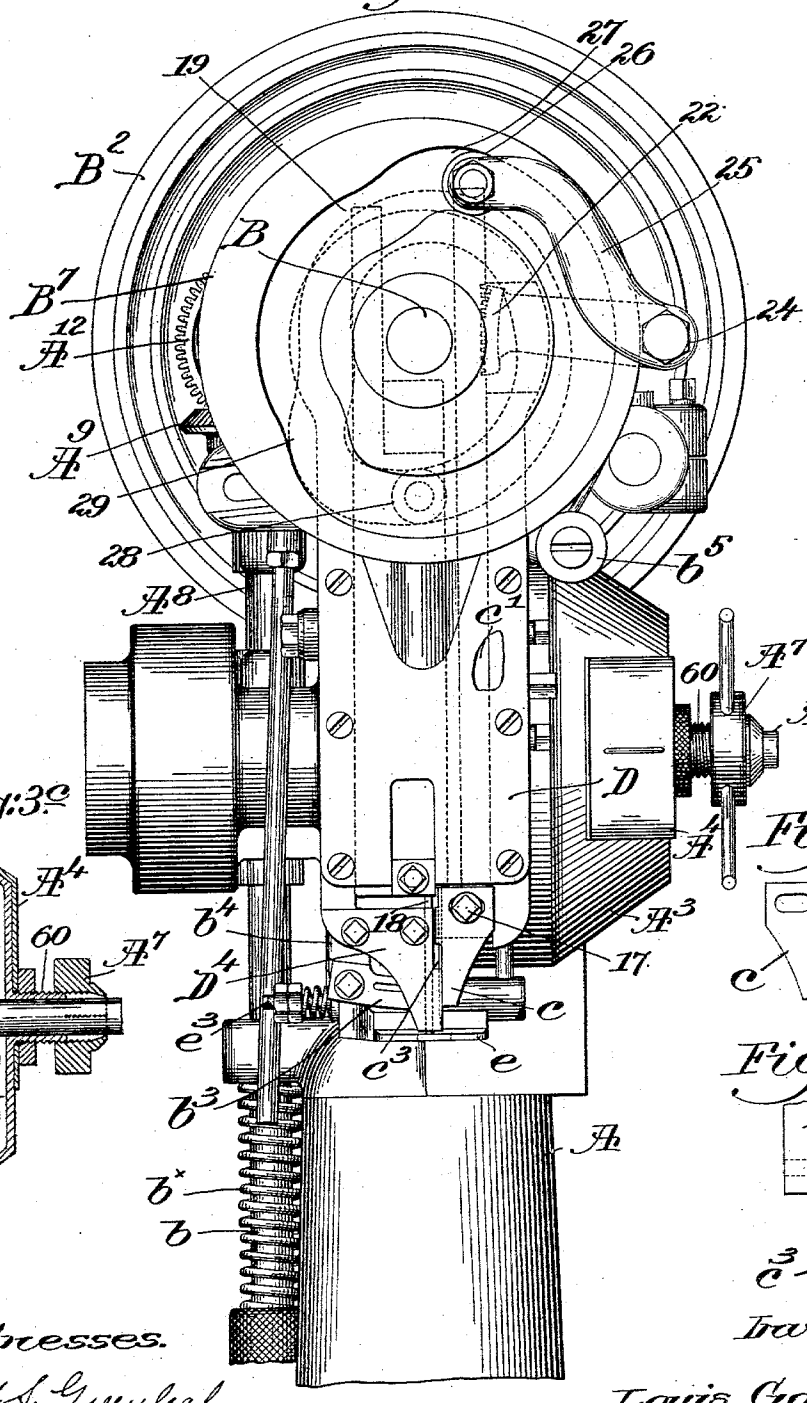


Fig: 3c.

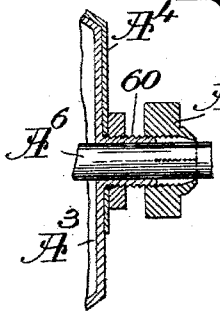


Fig: 3a.

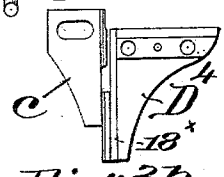
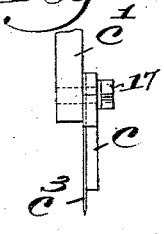


Fig: 3b.



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(No Model.) 4 Sheets—Sheet 4.

L. GODDU.

NAILING MACHINE.

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Fig: 4.

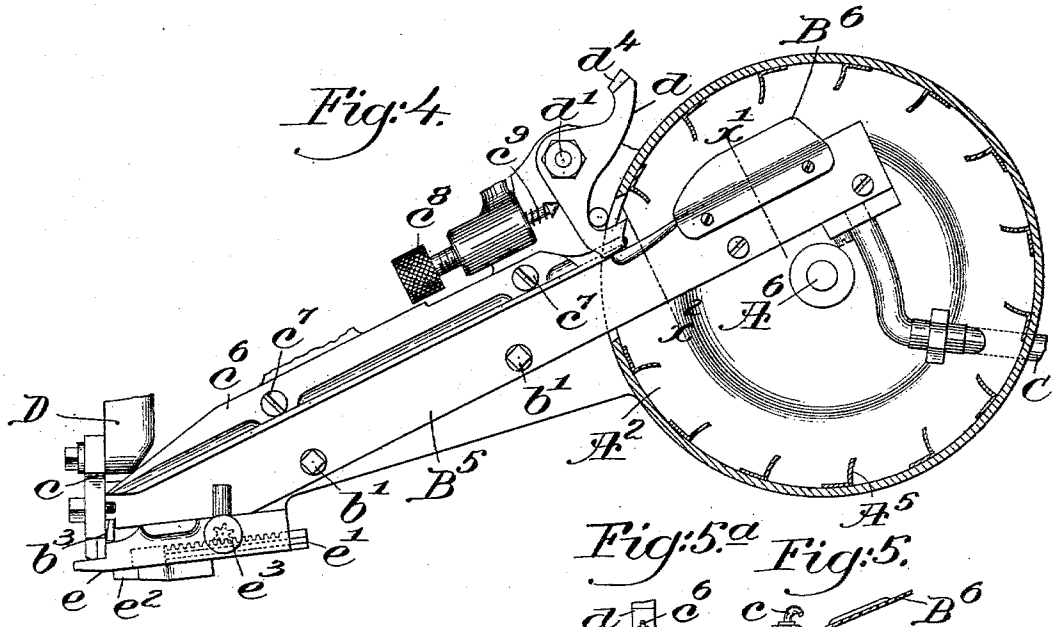


Fig: 5.a

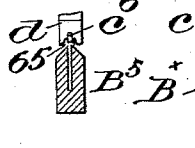


Fig: 5.

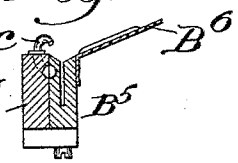


Fig: 6.

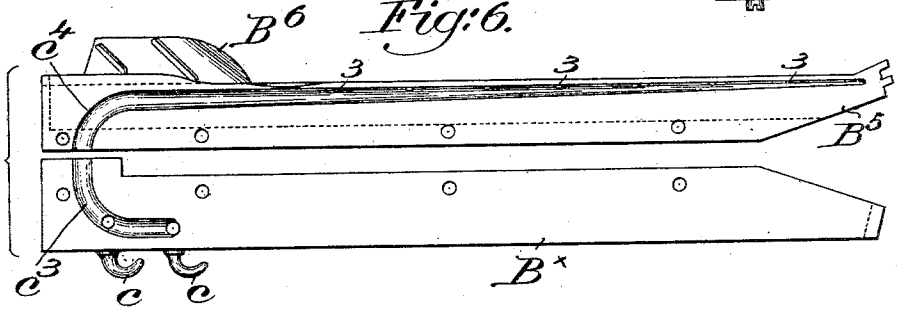
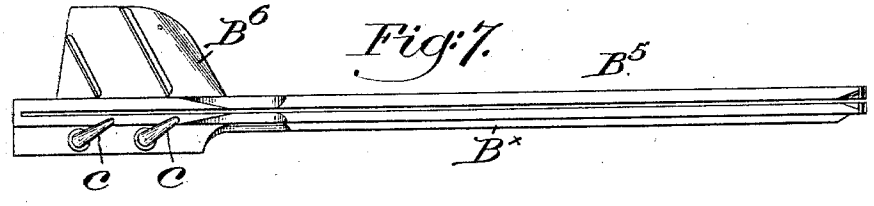


Fig: 7.



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UNITED STATES PATENT OFFICE.

LOUIS GODDU, OF WINCHESTER, MASSACHUSETTS, ASSIGNOR TO JAMES W. BROOKS, TRUSTEE, OF PETERSHAM, MASSACHUSETTS.

NAILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 565,074, dated August 4, 1896.

Application filed June 25, 1894. Serial No. 515,679. (No model.)

To all whom it may concern:

Be it known that I, LOUIS GODDU, of Winchester, county of Middlesex, State of Massachusetts, have invented an Improvement in Nailing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

In this invention I have aimed to improve and simplify that class or nailing-machine wherein nails, in bulk, are placed in a hopper, the latter in its rotation acting to deliver the nails to a roadway down which they are made to travel, said nails being subsequently let off the end of the roadway, one at a time, by a separator, which acts to put the nails in a nail-passage in the path of movement of a driver to be driven therefrom into the work resting on a suitable support. To facilitate the passage of the nails down the roadway, I have combined therewith an air-feed, or an apparatus whereby a current of air is made to act on and aid in feeding nails along the roadway. I have also combined with said roadway a clearer of peculiar construction whereby any nails the heads of which are of abnormal size or thickness, or the bodies of which are laid across the roadway, or the points of which are wedged in among other nails or partially in the roadway, may be thrown out of said roadway. I have also combined with the roadway an air-compressing mechanism. I have also improved the construction of the horn, whereby the latter may sustain a last with a shoe upon it and enable any part of the sole of the shoe on the last to be brought into position under the driver.

The special features in which my invention consists will be hereinafter more fully described, and designated in the claims at the end of this specification.

Figure 1 is a left-hand side elevation of the main part of a nailing-machine with my improvements added. Fig. 2 is a right-hand side elevation, the horn being omitted, the air-compresser being broken out; Fig. 2^a, a detail of cam-hub D^6 and its attached cam-lug to actuate the clearer; Fig. 2^b, a section in the line x^3, Fig. 1. Fig. 3 is a front elevation of the upper part of the machine, somewhat enlarged; Fig. 3^a, a detail showing the inner sides of the nose and the awl-steadying device; Fig. 3^b, a detail showing part of the awl-bar with the awl and its holding-cap and steadying device; Fig. 3^c, a detail showing the manner of attaching the hopper-shell A^3 to its actuating-shaft. Fig. 4 is an enlarged detail chiefly to show the roadway and its parts, the rotatable part of the hopper being in section; Fig. 5, a section in the line x', Fig. 4; Fig. 5^a, a section in the line x^2. Fig. 6 is a detail showing the nail-roadway tipped over from the channel-covering bar. Fig. 7 shows the roadway in top view alongside of said bar.

The column A has at its upper end a head A′, provided with numerous bearings for the operative parts to be described, said head being cast with a concaved recess A^2 therein, as shown best in Fig. 4, it forming part of the hopper-space in which are placed the loose nails which are to be automatically selected and driven.

The rotatable part A^3 of the hopper, a concavo-convex shell, having a sliding-door A^4 formed as a plate having an extension $A^{4\times}$, is provided at its interior with a series of lifters A^5.

The shell A^3 has a connected externally-threaded slotted hub, forming a chuck by which to connect the shell to the shaft A^6, said chuck (see Fig. 3^c) substantially fitting the said shaft, the rotation of a suitable nut A^7, embracing the slotted hub, forcing its arms firmly against said shaft, but this invention is not limited to the exact form of chuck or clutch device shown and described.

The shaft A^6, extended through to the opposite side of the machine, (see Fig. 1,) has connected to or forming part of it a worm-gear $A^{7\times}$, engaged by a worm 61 at the lower end of a shaft A^8, provided at its upper end with a bevel-gear A^9, engaged and rotated by a bevel-gear A^{10}, connected to or forming part of a toothed gear A^{12}, adapted to be rotated about a suitable stud A^{13}, fixed in the framework, said gear being driven by a pinion A^{14}, fast on the main shaft B of the machine.

The main shaft has upon it at one end a clutch-pulley mechanism B′ B^2 and a brake

B^3, the loose pulley B′ of the clutch-pulley being driven constantly, and being controlled in usual manner by a wedge-shaped fork B^4, fast on a rod *b*, surrounded by a spring $b^\times$ and under the control of a treadle, (not shown,) to thereby enable the operator to start the machine when desired. The clutch-pulley mechanism is not herein claimed.

The upper end of the roadway B^5, extended into the hopper and provided with a suitable shelf or apron b^6, has attached to it by suitable bolts *b*′ a channel-covering plate $B^\times$.

The lifters A^5 deposit the nails on the way B^6 and they slide therefrom into the slot of the roadway, and if the shanks of the nails fully and correctly enter said slot, so that they are properly suspended therein, said nails pass down said roadway to the end thereof, where I have placed a separator b^3, made as a slotted blade attached to a lever b^4, (see Fig. 1,) having a roller or other stud b^5, (see Fig. 2,) which is acted upon by the cam portion b^6 of the cam-wheel b^7, fast upon the forward end of the main shaft, a suitable spring b^7, resting at one end against the head or frame and at its other end an adjustable abutment b^{10}, made as a screw and carried by lever b^4, serving to normally keep the roll b^5 against said cam.

Viewing Fig. 4 it will be seen that the stationary part A^2 of the hopper has leading into it a pipe C, in communication with a suitable source for air, said air aiding in feeding the nails along the roadway, the quantity of air discharged through the pipe being determined by a suitable valve therein. (Not shown.)

I have provided two nozzles *c c* to discharge air against the nails on or below the apron and aid in starting them therefrom down the roadway. In this instance of my invention I have shown the pipe C as leading from an air-compressor C′, represented as an air-pump, the cylinder of the pump having in it a reciprocating piston C^2, connected by a link C^3 with a crank-pin C^4 on the fast pulley B^2; but instead of employing an air-pump to establish the current of air I may employ any other device usually employed to create a blast or air-pressure, such, for instance, as a blower. The pipe C, besides leading air through the nozzles *c*, supplies air to an air-duct c^4 c^3, made, it may be, in the contiguous faces of the roadway and its attached channel-covering plate or bar $B^\times$, as best shown in Fig. 6, where one side of the roadway is shown as turned partly over away from said plate.

The air-duct c^4 has a series of small diagonal holes 3 3, leading therefrom directly into the regular nail-channel of the roadway, said holes being inclined toward the lower end of the roadway to thus afford a continuous discharge of air therein and cause the nails to follow down the nail-channel of the roadway, said air coming through said holes constituting what I denominate an "air-feed."

The heads of nails, the bodies of which have properly entered and hang in the roadway, slide freely past a vibrating-clearer or device *d*, and under the roadway-covering plate c^6, held in place by a screw c^7. The clearer is represented as an elbow-lever, pivoted at *d*′ and having its acting face slotted (see Fig. 5^a) to straddle the upper end of said covering-plate. The slot in the clearer enables it to reach down close to the top of the roadway, and it in its movement acts against the heads of nails of improper shape or size, and against any nails laid across the roadway, or any nails the points of which become wedged between other nails, or between the nails and partially in the roadway, and pulls said nails out of the roadway. If the heads of the nails are unusually large or thick, they cannot pass through the gateway 65 (see Fig. 5^a) cut in the end of the clearer. Nails lying crosswise of the roadway will be struck by the beveled face of the clearer and be pushed laterally from the top of the roadway.

The clearer is acted upon by a spring-pin c^9, made adjustable as to its strength by or through a suitable adjusting-screw c^8, and the upper beveled end d^4 of the clearer is acted upon by a cam lug or projection d^5, (shown partially by dotted lines in Fig. 2 and in detail in Fig. 2^a,) fast on cam D^6.

The rocking feeding-head D has a long sleeve-like hub D′, (shown in Fig. 2 by breaking out part of the head A′,) which is extended through a portion of the head, where it has screwed upon it a nut D^2, said hub constituting the real bearing for the main shaft B.

The feeding-head D has a backwardly-projecting ear 8, (see Fig. 2,) which is slotted to form a guideway for the reception of a swivel-block 9, mounted on a dovetailed slide 10, having suitable teeth which are engaged by the teeth of a stud-gear 12, mounted in a slotted arm 13, forming part of a short rock-shaft, having connected to it an arm 14, having a suitable roller or other stud 15, which enters a suitable cam-groove at the front side of the cam D^6, fast on the main or cam shaft, said cam in its rotation rocking the feeding-head, so that the awl c^3, carried by the awl-bar *c*′, may feed the material for the proper distance, according to the space desired between nails, the different spacing being determined by adjusting the slide 10 in the arm 13.

The awl c^3 is connected to the awl-bar *c*′ by a suitable screw 17, extended through a slot in a binding-cap *c*, having its lower end extended down alongside of and to steady or strengthen the awl while the latter is feeding the work.

The rocking-head D has at its lower end a suitable nose D^4, provided at its inner side (see Fig. 3^a) with a groove $18^\times$, which constitutes both a nail-passage and a passage for the driver 18, connected to the driver-bar 19.

The delivery end of the roadway is stationary, and it has two notches, (see Fig. 6,) which are entered by the two prongs of the separator.

The nose D, having a passage-way at its

rear side for the reception of a nail from the end of the roadway and also for the driver, is attached to a vibrating head, said head also carrying in a suitable groove therein an awl-bar provided with an awl, which is secured to the awl-bar by a suitable screw extended through, as shown, a support *c* for said awl, said support also acting as a cap to aid in holding the awl firmly in place. The awl-bar has simply a vertical motion in said head, and the work is fed while the awl is in it by the swinging of the head.

While the nail and driver passage $18^{\times}$ is out of line with the roadway, the endmost nail in the roadway is permitted to rest against the smooth rear side of the nose, but just before the said driver-passage comes opposite the said roadway the separator is moved forward and its end is thrust between the endmost nail and the one next back of it, to thus form a wall between them, so that as soon as the said nail and driver passage arrives opposite the roadway said endmost nail, by the further movement of the said separator, is forced laterally from the roadway into the said passage, this lateral movement being insured by the beveled end of the separator. As soon as the driver has driven the nail from the driver-passage the separator, which during the driving operation closed the open side of said nail or driver passage, is retracted, to thus allow the endmost nail previously held back by it to go to the end of the roadway and contact with the smooth inner part of the nose while the driver is being elevated and the head is being swung to enable the awl then in the leather to feed the part of the leather entered by it into a position at the end of the roadway. As or about as the awl completes its feeding stroke, or just as the head is swinging back, the separator is again moved to put its extremity between the endmost nail and the one next back of it, so that by the time the nail or driver passage is again in line with the roadway the nail can enter it, as before described.

The awl-bar *c'* is provided near its upper end at one edge with suitable teeth, (see dotted lines Fig. 3,) which are engaged by teeth of a sector-like arm 22 of a two-armed or elbow lever having its hub 23 fulcrumed on a stud 24, the other arm, 25, of said lever having a roller or other stud 26, which enters a cam-groove 27 in the outer face of the cam-wheel B^7.

The driver-bar 19 (see Fig. 3) has a suitable roller or other stud 28, (represented by dotted lines,) which enters a cam-groove 29, (also represented by dotted lines,) of such shape as to raise and lower the driver positively at the proper times to drive a nail, all springs for operating the driver being dispensed with.

The foot *e*, which bears on the work and which is located immediately below the delivery end of the roadway, is connected rigidly with the framework, and is grooved to receive the toothed shank *e'* of a gage e^2, said toothed shank being engaged by teeth of a suitable rock-shaft e^3, so that said gage may be moved backward or forward according to the distance it is desired to place the row of nails from the edge of the sole.

The horn *f* is mounted loosely on the horn-shaft *f'*, and the horn-shaft may be raised and lowered automatically, substantially as practiced in United States Patent No. 403,835, dated May 21, 1889.

In the present embodiment of my invention the shoe to be nailed may be mounted upon a last f^2, (represented in Fig. 1 by dotted lines as placed upon the upper end of said horn.)

The horn shown is what I designate as a "compound" horn, that is, the part *f* is swivel-jointed to a depending arm f^3, secured to a collar or clamping device f^4, clamped on the horn-shaft *f'*, the last f^2 being free to swing around on the top of the said horn, the stud f^5, supporting the lower end of the horn *f*, being in turn mounted upon a pivot f^6, held in the arm f^3, so that the said stud can tip, while the horn tips around its own stud f^5, the extent of the tipping motion of the horn *f* on the stud f^5 being controlled or regulated by suitable stops f^8, (see Figs. 1 and 2^b,) connected thereto and coöperating with the sides of the depending arm f^3.

I have not herein deemed it necessary to fully show or to describe the devices which will connect with the lower part of the horn-spindle to raise and lower the same automatically, as such devices are common to and fully described in earlier patents granted to me.

The joint between the depending arm f^3 and the lower end of the horn *f*, and composed, essentially, of the devices f^5 f^6, constitutes what may be called a "gimbal-joint."

The machine may be provided with any usual or suitable hammering mechanism to strike a blow against or so as to jar the roadway to keep the nails in agitation.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for driving nails, a roadway having a channel for the depending shanks of the nails suspended by their heads, combined with an air-feed to deliver air into said channel beneath the nail-heads, tending to lift and thereby aid in feeding them along the said roadway, substantially as described.

2. In a nailing-machine, a roadway, an apron coöperating with its upper end, and a device to lift and discharge nails upon said roadway, combined with a nozzle to discharge a blast, as air, upon the nails lifted by the hopper to aid in putting them into the roadway, substantially as described.

3. In a nailing-machine, a roadway having a channel for the shanks of the nails, suspended by their heads, and an air-passage having a series of mouths to deliver air at nu-

merous points into the channel of the roadway, below the nail-heads, substantially as described.

4. In a nailing-machine, a roadway, a hopper-carrying shaft, means to rotate it, and a hopper having a split sleeve, combined with a nut to clamp said sleeve frictionally onto said shaft, to operate, substantially as described.

5. In a nailing-machine, a horn, a last mounted on the upper end of said horn, combined with a horn-shaft, a removable depending arm pivotally mounted thereon and offset therefrom, and a gimbal-joint mechanism to unite said horn and the lower end of said depending arm, to operate, substantially as described.

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

LOUIS GODDU.

Witnesses:
GEO. W. GREGORY,
EMMA J. BENNETT.