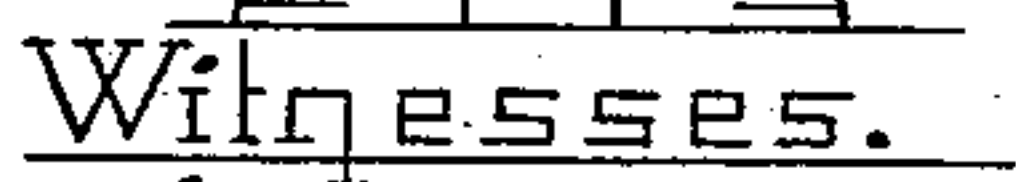


4 Sheets—Sheet 1.

No. 464,196.

Patented Dec. 1, 1891.



Edward F. Allen.
Fried S. Greenleaf.

Inventor

Charles W. Cadden
by Henry & Gregory Attys.

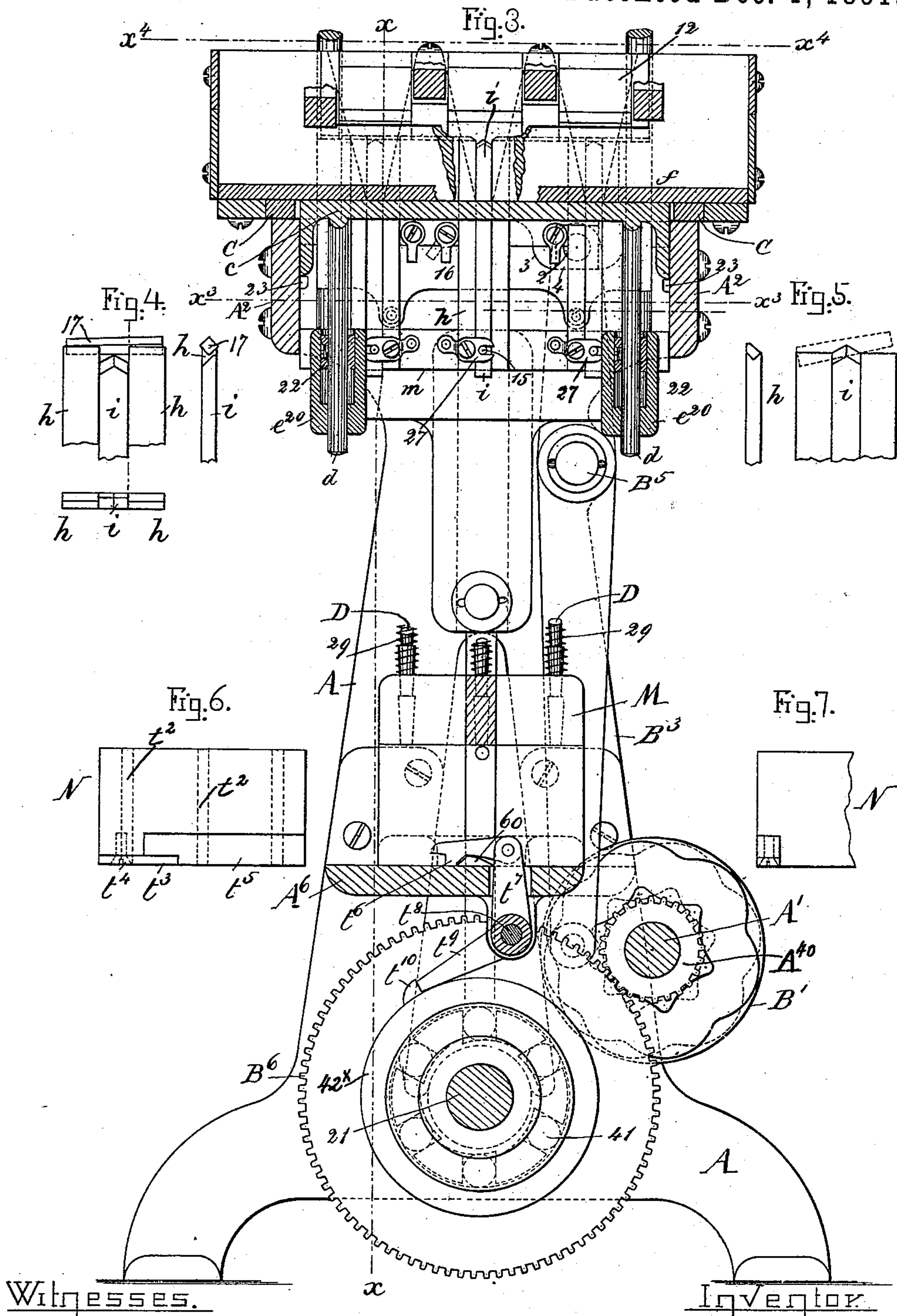
(No Model.)

4 Sheets—Sheet 2.

C. W. GLIDDEN.
NAIL ASSORTING MACHINE.

No. 464,196.

Patented Dec. 1, 1891.



Witnesses.

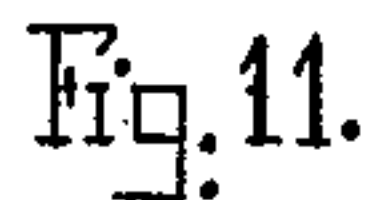
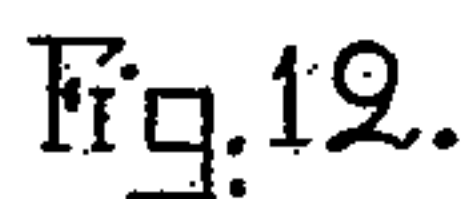
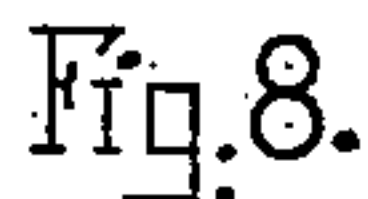
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4 Sheets—Sheet 3.

Patented Dec. 1, 1891.



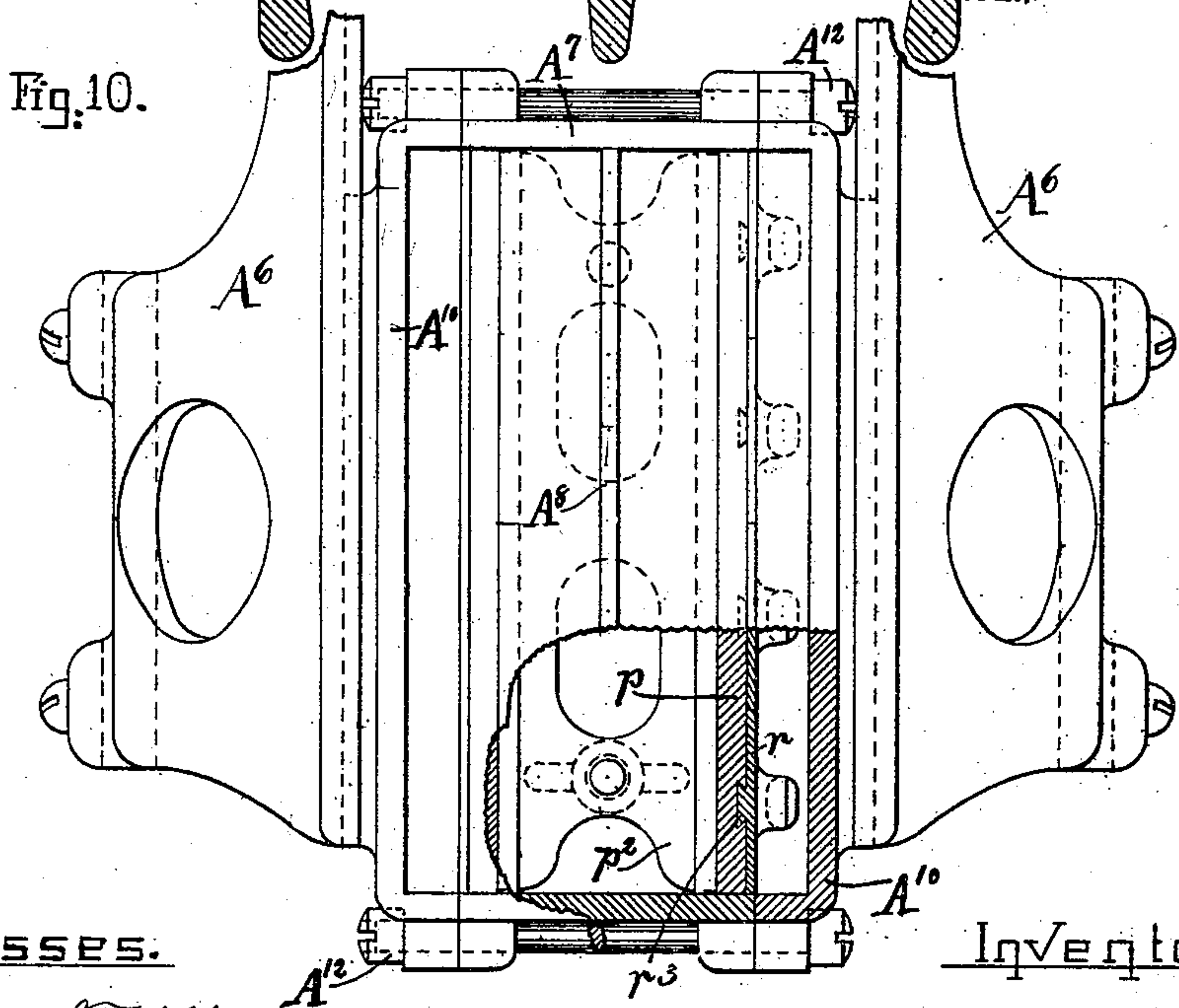
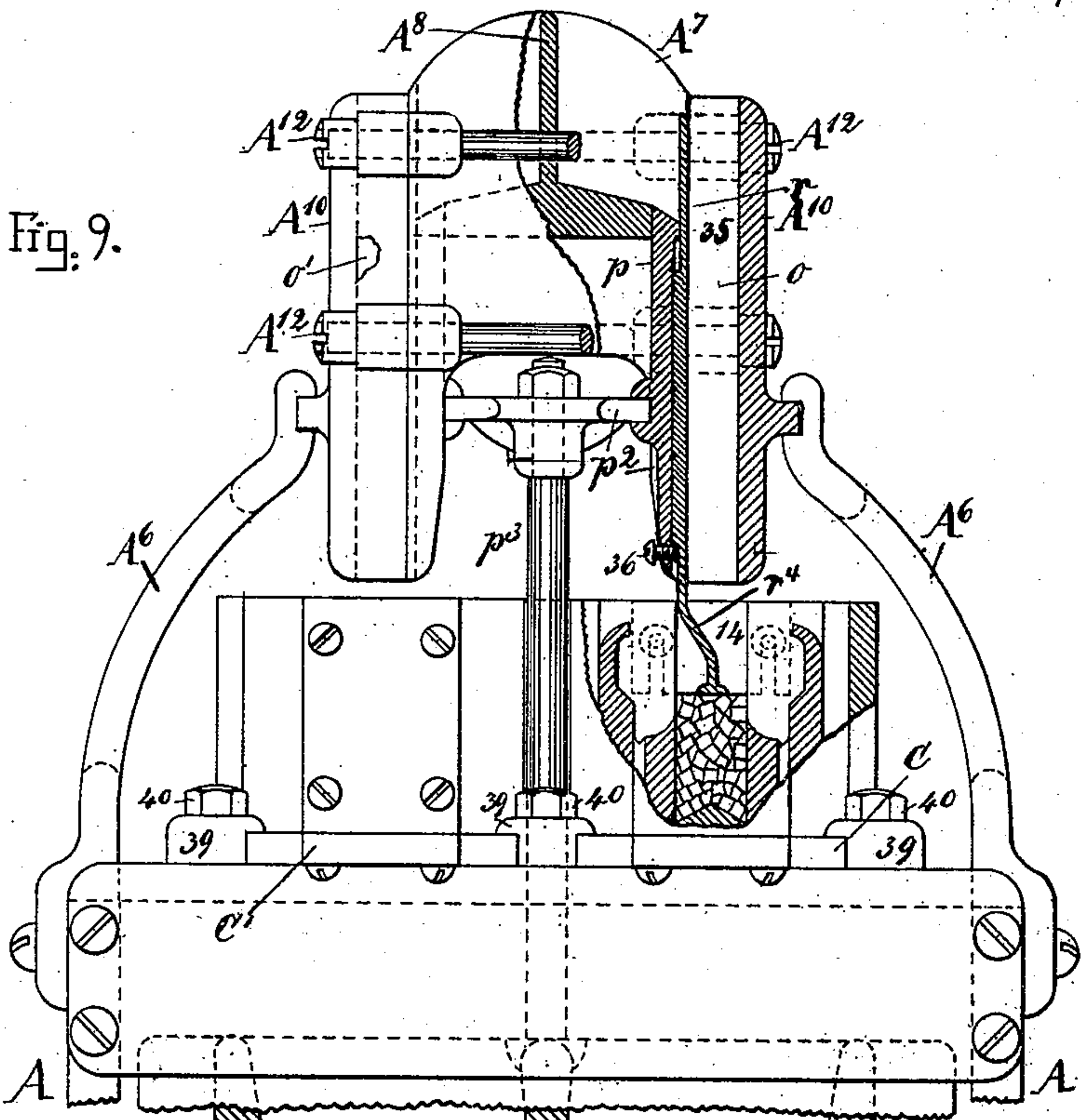
Inventor.

Charles W. Cadden
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C. W. GLIDDEN.
NAIL ASSORTING MACHINE.

No. 464,196.

Patented Dec. 1, 1891.



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES W. GLIDDEN, OF LYNN, ASSIGNOR TO JAMES W. BROOKS, TRUSTEE,
OF CAMBRIDGE, MASSACHUSETTS.

NAIL-ASSORTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 464,196, dated December 1, 1891.

Application filed March 3, 1891. Serial No. 383,575 (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. GLIDDEN, of Lynn, county of Essex, State of Massachusetts, have invented an Improvement in Nail-
5 Assorting 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.

10 This invention has for its object the production of a novel machine by which to assort and distribute nails with their points all turned in the same direction, to enable the nails to be led into position to be driven by
15 suitable drivers from suitable appliances—as, for instance, a nail loader or “skimmer,” into which the nails are distributed.

I have chosen to illustrate my invention in this instance as adapted to distribute nails
20 into a nail loader or skimmer of suitable shape to enable the nails to be driven therefrom into a heel. The nails to be assorted will preferably be placed in bulk in a basket in communication with a roadway, a gate and
25 an agitator being interposed in such manner that the agitator in its reciprocations in the basket lifts the loose nails and causes them to be tumbled over the top of the gate into the roadway, the quantity of nails entering
30 the roadway, however, depending on the position of the gate. The roadway is in communication with a hopper containing an elevator, which latter in its reciprocations keeps a pool or a series of pools next the hopper
35 supplied with nails. A lifter rises in the bottom of each pool and lifts the nails bodily one at a time, a discharging device shown as a reciprocating tongue and co-operating with the elevator acting, as will be described, to
40 discharge the lifted nail with its point foremost into a guide-tube, which leads it to the appliance which is to receive it. The gate referred to is put into position to determine the quantity of nails tumbled over it from
45 the basket through the action of the agitator, by or through the nails contained in the hopper fed by the roadway, as thereby the accumulation of too many nails in the hopper is avoided. The upper ends of the lifters are
50 notched to thus enable them to receive and lift a single nail from the pool. The dis-

charging device co-operating with the lifter is beveled near its end next the source of the nail-tube, and it occupies a substantially central position with relation to the lifter and
55 the length of the nail supported thereby, and this tongue actuated independently of the lifter first contacts with the lifted nail at about the center of its length; but as the head of the nail is the heavier, only the point end
60 thereof is carried out of the notch in the lifter in which it lies, and the beveled side of the tongue, as soon as the point end of the nail leaves the notch in the lifter, causes the point
65 end of the nail to be pushed laterally from above the lifter, and immediately thereafter, as the nail is supported only at its head end, its point descends by gravity and the nail enters, point first, into the source of the nail-tube
70 and travels into a hole previously made for its reception. The nail-tube shown is composed of a series of conical tubes telescopically connected end to end and inclosed within a spiral spring.

Figure 1 is a vertical section of part of a
75 machine embodying my invention, the section being taken near one side thereof in line x of Fig. 3, the upper part of the machine being, however, broken off, the nail-tubes being shown by dotted lines, said figure showing the foot of one of the gates, the elevators
80 being shown as somewhat differently constructed at different sides of the machine. Fig. 2 is a detail enlarged, showing one of the nail-tubes through which the nails are fed; 85
Fig. 2^a, a modification showing a different connection between the nail-tube and nozzle, to be referred to. Fig. 3 is a vertical section taken a little beyond the center of the machine shown in Fig. 1 in the dotted line x' . 90
Figs. 4 and 5 represent different views of the nail-lifter and the co-operating discharging device or tongue in different positions, Fig. 4 showing the nail supported at both ends by
95 the lifter before elevating the tongue, while Fig. 5 shows the tongue as elevated and as throwing the point of the nail from the lifter. Figs. 6 and 7 represent details of the nail holder or skimmer. Fig. 8 is a sectional detail looking down on the machine shown in
100 Figs. 1 and 3, one half of the figure being below the dotted line x^3 , Figs. 1 and 3, and the

other half below the dotted line x^4 , Fig. 3, that part below the dotted line x^4 also showing in section the series of gates to be described. Fig. 9 is a broken detail, partially in elevation, showing the top part of the machine not fully shown in Figs. 1 and 3. Fig. 10 is a plan view of the part shown in Fig. 9. Fig. 11 is a modification to be described representing a lifter with a notch of a different shape. Fig. 12 is a partial longitudinal section of the bar a , chiefly to show the sources b leading to the nozzles and nail-tubes.

The frame-work A is and may be of any usual shape to support the working part. This frame-work has suitable bearings for the reception of the power-shaft A' , which may be rotated in any usual manner.

The power-shaft has fast upon it two like cam-plates $B B'$, provided at their inner sides with irregular cam-grooves, the shape of the groove being shown in Fig. 3 by full lines, the dotted lines, however, in Fig. 3 showing the shape of the groove in the cam B , which is not shown in that figure, for a purpose to be hereinafter described. These cam-grooves receive rollers or other studs, respectively, of levers $B^2 B^3$, having their fulcrum at $B^4 B^5$, the upper ends of the said levers having suitable pins or projections 2 , one of the said pins being shown by dotted line, Fig. 3. These pins will preferably have upon them suitable loose blocks 4 , which enter notches between ears 3 depending from vibrating tables $C C'$, each of the said levers actuating one of the said tables and giving a short, quick reciprocating movement thereto, the tables sliding in guideways upon the head A^2 of the frame A . In practice the grooves in the cam $B B'$ for actuating the levers referred to, although of the same shape, will be so set one with relation to the other that the levers actuated by them will be moved simultaneously, but in opposite directions, to thus increase the stability of the machine by equalization of working strains. These two tables $C C'$, and the parts resting on and located above them, being alike, I need herein to describe but one of them—viz., the table C —and as to the other table and its co-operative parts I shall use like letters, but accent them with a $'$.

Referring now to table C , it has made fast to it two upright walls a , the inner sides of which are mortised or cut through vertically to leave a series of sources b , represented as tapering toward their lower end, as best shown in Fig. 12, each of the said sources communicating through a nozzle 6 with one of the nail-tubes D to be described, there being as many sources b and nail-tubes D in the machine as there are nail-holes in the nail holder or skimmer N which will be used. The table C is cut away centrally to receive an elevator c , represented at the right in Fig. 1 as provided with guide-rods d , extended through boxes in a vertical sliding frame E , actuated by pitman H , having straps which encircle eccentrics 20 on a shaft 21 parallel to a shaft A' .

Each rod d has on it a collar 22 , secured adjustably thereto by a suitable screw, (see Figs. 1 and 3,) by which to regulate the extent of vertical movement of the elevator over the frame E of the machine, the head A^2 of the machine having suitable stops 23 , by which to limit the descent of the elevator. The vertically-movable frame E has a series of sleeves or pockets e^{20} , into which are extended the lower ends of the rods d , and as the frame is lifted shoulders in the sleeves contact with the collars 22 and lift the elevator c . Referring to Fig. 8, the frame E has at its end suitable grooves to embrace and slide upon guiding projections F of the frame-work. This elevator, as herein shown, is represented as made in two pieces, the piece marked 24 , and directly upon which the nails in the hopper f rest, being made removable to enable the hopper to be readily cleansed from the nails by simply lifting up the piece 24 .

The spaces between the walls $a a$ on one side and the walls $a' a'$ on the other side constitute what I call the "hoppers," they being designated as f and f' . The wall-plates $a a'$ are mortised vertically at intervals, as seen in Figs. 1, 8, and 12, for the reception of the lifters composed, as herein represented, of fingers $h h$, a discharging device, represented as a tongue i , co-operating with the said lifters. These plates are also cut away opposite the upper end of said lifters to constitute pools 14 , through the bottoms of which rise the lifters, the said pools being separated from the sources b by a beveled-edge bar or wall 12 . The upper ends of the lifters have V-shaped notches, (shown best in Figs. 4 and 5,) in which rest the nails lifted by them until taken off by the discharging device i , which is represented as a tongue standing between the fingers constituting the elevator. The upper end of each tongue is beveled at that side next the source b with which it co-operates. The fingers comprising the lifters are fastened to cross-bars m , the ends of which are set loosely in notches of the rising and falling frame E , so that the said lifters may follow the reciprocations or jogging motions of the table through which they are extended and upon which the plates a rest. The tongues referred to are mounted in bearings located between the fingers constituting the lifters, and they are adapted to be lifted independently of or at a greater speed than the fingers, and to do this, as herein shown, the said tongues have combined with them tongue-lifters 27 . As represented, the tongues have each a projection 15 , which enters a slot (see Fig. 3) in the tongue-lifter, (shown as a lever,) the upper end of which, as the frame E approaches the upper end of its track, meets a suitable stop 16 , depending from the lower side of the table, the contact of the tongue-lifter with this stop turning the lever and causing the tongue to be moved quickly vertically between the lifter-fingers as the latter complete their upward stroke.

Fig. 4 shows a nail 17, supported by the fingers of the lifter, and as the tongue rises from its position Fig. 4 into the position Fig. 5 it first contacts with the nail, lifting the point end thereof from one of the fingers, but without lifting the head end, and having lifted the point end of the nail from the notch in which it rests, the beveled upper end of the tongue in its further upward movement acts against one side of the nail and throws the point end laterally off from the lifter, so that the said point end will quickly descend by gravity into a source *b* at one side of the upright portion 12, (see Fig. 1,) located between the groove in which the lifter reciprocates and the source *b*, and the nail by gravity will thereafter descend point first through the nail-tube.

The nail-tubes D, which conduct the nails from the source *b* into the holes made in the loader or skimmer, are composed each of a series of short conical tubes 28, which enter one another, the said tubes being surrounded loosely by a spiral spring 29, each represented as soldered or otherwise connected at one or another of its turns, as 5, with preferably each section of the tube. This construction enables the nail-tube to be elongated and also to be bent in any desired direction; in order that it may be led from the source *b* to any desired hole in the loader or skimmer, it being understood that said loaders or skimmers will have a different number of holes according to their shape and to the particular class of work to be done, or to the size or shape of heel into which the nails are ultimately to be driven. The uppermost section of each nail-tube is attached securely to a nozzle 6, connected to one of the tables, said nozzle forming an extension of a source *b* above. In Fig. 2 this connection is represented as made by means of a pin 29 in a slot, this constituting what is known as a "bayonet-joint;" but in Fig. 2^a the upper end of the uppermost section is split to present spring-arms 7, which clasp an annular projection shown by dotted lines at the lower end of the nozzle.

Referring now to the left of Fig. 1, it will be seen that the piece 30, lying in the bottom of the hopper *f'*, is attached to or forms a part of the table C' instead of upon the elevator, as shown at the right in said figure and as described of the table C. This piece 30 is represented as having a division-plate 31 to constitute a double hopper.

The elevator *c* at the right in Fig. 1 and co-operating with the table C forms the entire bottom of the hopper; but at the left in Fig. 1 the elevator is shown as composed of thin bars *c' c'*, which reciprocate vertically in the hopper *f'*, the said bars acting in their ascent to put nails into the pools 14 at the sides of the hopper, as described of the elevator *c*. These bars *c'* are herein represented as attached by suitable screws to the lifters *h' h'*, like the lifter *h* before referred to.

The parts so far specifically described by

letter will by themselves constitute an efficient nail-assorting machine; but I prefer to feed the hoppers *f f'* automatically, and to do this I have provided the parts which I shall now describe.

To the head A², I have connected by suitable screws an auxiliary or top frame A⁶. (Shown best in Figs. 9 and 10.) This top frame supports a basket A⁷, preferably divided longitudinally by a web or partition A⁸. The basket is supported between like side plates A¹⁰, resting upon and adapted to be moved longitudinally in suitable guideways of the top frame, (see Fig. 9,) the said plates being bolted together and to the basket by bolts A¹². These plates A¹⁰ are suitably chambered or shaped to present roadways *o o'*, through which to lead nails from the basket into the hoppers described.

Each division of the basket is provided with a like agitator *p*, mounted loosely in a groove therein and adapted to be reciprocated therein by a cross-head *p*², entering a slot in the agitator, (see Fig. 9,) the said cross-head being attached to a rod *p*³, secured at its lower end to one of the cross-bars of the frame E, so that as the said frame is lifted, as has been described, the agitators *p* will be lifted vertically to lift or tumble the nails placed in bulk in the basket over the top of the gates *r r* into the roadway. Each basket has a series of independent gates *r r*, having dovetailed projections *r*³ to enter dovetails or slots in the outer faces of the agitators, the said gates having feet *r*⁴ to contact with the nails in the hopper at each rise of the elevator *c*. The dovetailed projections referred to are shorter than the grooves in which they enter, and the upward movement of the gate is stopped by a projection 35, while its downward position is determined by a stop 36.

The nail-loader or skimmer N (represented in Figs. 6 and 7) has a series of holes *t*², in which the nails from the nail-tubes will be fed. This nail-holder has a stop *t*³, attached thereto by a suitable screw *t*⁴, and one side of the nail-holder is cut away, as at *t*⁵, to enable the pawl *t*⁶ to be engaged by the stop *t*³. The pawl *t*⁶ is pivoted upon an arm *t*⁷ of a crank-shaft *t*⁸, having a dog *t*⁹, which co-operates with a stop *t*¹⁰ on a clutch-ring 42^x containing suitable friction-rolls 41.

The shaft A' has a pinion A⁴⁰ fast thereon, which engages and rotates a toothed gear B⁶, loose on the shaft 21. This shaft 21 has joined to it a suitable hub 42, having a number of inclined faces upon which rest the rollers 41, carried by the clutch-ring referred to. This gear loose on the shaft, the hub fast on the shaft, the rolls and the clutch-ring to control them, it having the projection *t*¹⁰, constitute a clutch-pulley substantially such as known as the "Horton clutch," it being made the subject of United States Patent No. 260,394, granted to James A. Horton July 4, 1882, so it need not be herein more particularly described further than to say that the gear B⁶

is rotated continuously; but the shaft 21 remains at rest so long as the dog t^9 engages the projection t^{10} of the clutch-ring, but as soon as the said dog is elevated to free the clutch-ring the shaft 21 will be started in rotation, and as the pawl t^6 is moved backwardly a projection at its lower side meets a bunch 60 below it, (see Fig. 3,) which lifts the pawl, permitting the dog t^9 to drop, so that the projection t^{10} of the clutch-ring, which is then traveling with the shaft 21, as it again arrives at the end of the dog t^9 , will be caught against the dog, thus releasing the clutch and stopping the shaft 21, it having completed a single rotation. The lower ends of the nail-tubes are confined in what may be called a "templet" or "plate" M, secured to the framework or to suitable projections thereof.

In practice the nail loader or skimmer may be of any usual construction, and may have a suitable plate to prevent the nails dropping out of the holes therein. It is obvious that the nails would be dropped into holes in any block-like piece which may be inserted under the templet M.

Instead of the particular clutch-pulley shown, I may use any other equivalent clutch-pulley.

The gates r , made in series, have their feet struck by the nails in the hopper f as the elevator c rises, and these gates will be lifted more or less, according to the quantity of nails in the hopper f , immediately under the foot of each gate, and when the hopper is as full of nails as it should be the tops of the gates will be carried up so far that the agitator p in the basket will not tumble nails over them into the roadway. The division of the gates into a series prevents an undue accumulation of nails in any particular part of the hopper.

I claim—

1. In a nail-assorting-machine, the following instrumentalities, viz: a horizontally-reciprocating hopper, a pool, an elevator, and lifters, the elevator raising nails from the hopper into the pool, the lifters lifting the nails singly from the pool, substantially as described.

2. In a nail-assorting machine, the following instrumentalities, viz: a horizontally-reciprocating hopper, an elevator therein, a pool at one side of the hopper, a lifter co-operating with the nails in the pool to lift one of them bodily, and an independent discharging device to discharge the lifted nail from the lifter, substantially as described.

3. In a nail-assorting machine, the following instrumentalities, viz: a horizontally-reciprocating hopper, an elevator therein, a pool, a lifter to lift a nail bodily from the pool, a discharging device, a source, and a nail-tube with which the said source co-operates, substantially as described.

4. In a nail-assorting machine, a pool to contain a nail, a notched lifter to lift a nail from the pool, and a discharging device made as a

tongue having a beveled side and independent of and in line with the lifter to raise the point of the nail above the lifter, the head end of the nail being supported by the lifter, the beveled side of the tongue acting upon the side of the nail, the point thereof being thrown aside laterally from the lifter in order that it may descend by gravity point first, substantially as described.

5. A nail-assorting machine containing a horizontally-reciprocating hopper, an elevator therein, a series of pools on each side of and adjacent to said hopper, a series of independent lifters, a series of nail-discharging devices, and a series of nail-tubes, the said parts being combined to operate substantially as described.

6. In a nail-assorting machine, a pool and a lifter therein composed of notched fingers to lift a nail and support it bodily by its two ends only, combined with an independently-actuated discharging device intermediate said notched fingers and consisting of a tongue beveled at one side and a source, as b , into which the said nail is discharged, substantially as described.

7. In a nail-assorting machine, an automatic feed-supply consisting of the following instrumentalities, viz: a basket to receive the nails in bulk, a road or feed way, an intermediate agitator, a vertically-adjustable gate, and a hopper into which the nails tumbled over the gate by the agitator enter after passing through the road or feed way, substantially as described.

8. A nail-assorting machine containing the following instrumentalities, viz: a basket, a roadway, a gate having a foot and a hopper into which the foot of the gate enters, and an elevator to lift the nails into the said hopper to contact with the foot of the gate, thereby causing the gate to control the flow of nails from the basket into the roadway and hopper, substantially as described.

9. A nail-assorting machine containing the following instrumentalities, viz: a basket, an agitator, a roadway, and a series of movable gates having feet and arranged side by side, and a hopper containing nails and into which the feet of the gates are made to enter, substantially as described.

10. A nail-assorting machine containing the following instrumentalities, viz: two reciprocating tables having mounted thereon nail-receiving hoppers, and levers, and cams, arranged substantially as described with relation to each other to reciprocate the said tables simultaneously in opposite directions in a horizontal plane, combined with elevators co-operating with the hoppers carried by the said tables, substantially as described.

11. A nail-assorting machine containing the following instrumentalities, viz: the receiving-basket and its attached roadway, the agitator, connected by tongue and groove with its actuating device, and the top frame, connected

by a projection of the one entering a groove of the other, whereby the basket and its attached parts may be removed horizontally from above the hopper, substantially as described.

12. In an organized nail-assorting machine, a horizontally-reciprocating hopper combined with a loose plate or piece applied to its interior to form a false bottom for the hopper and upon which the nails in bulk rest, whereby

by removing the plate or piece all of the nails may be quickly removed from the hopper, substantially as described.

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

CHARLES W. GLIDDEN.

Witnesses:

W. C. WILLSON,
H. P. FAIRFIELD.