(No Model.)

4 Sheets—Sheet 1.

E. WOODWARD.

TACKING MACHINE.

No. 468,379. Patented Feb. 9, 1892.

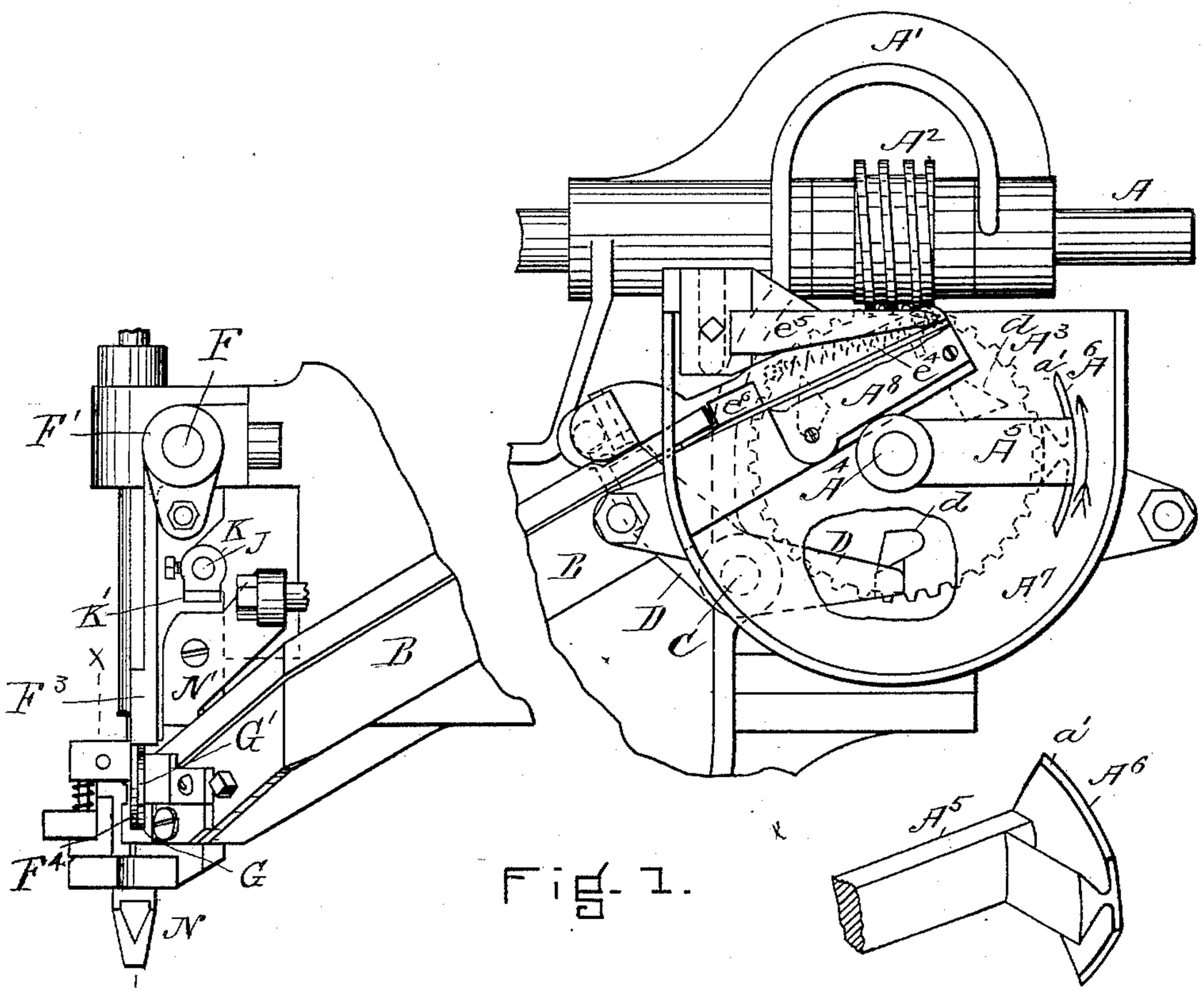

Fig. 1.

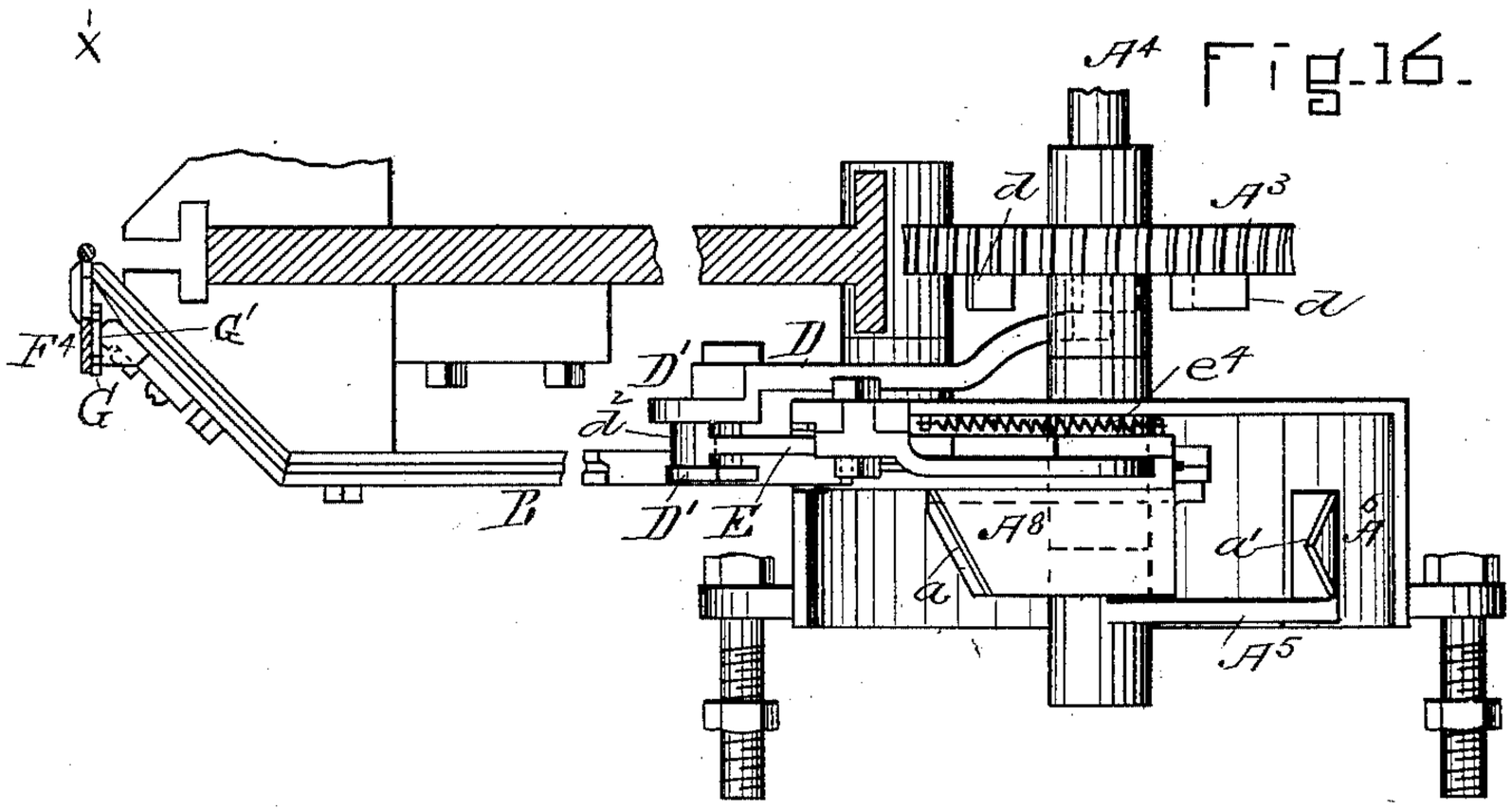

Fig. 16.

Fig. 2.

WITNESSES.

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Eva A. Guilds

INVENTOR.

Gustus Woodward.

by Geo. O. G. Tinn

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(No Model.) 4 Sheets—Sheet 2.

E. WOODWARD.

TACKING MACHINE.

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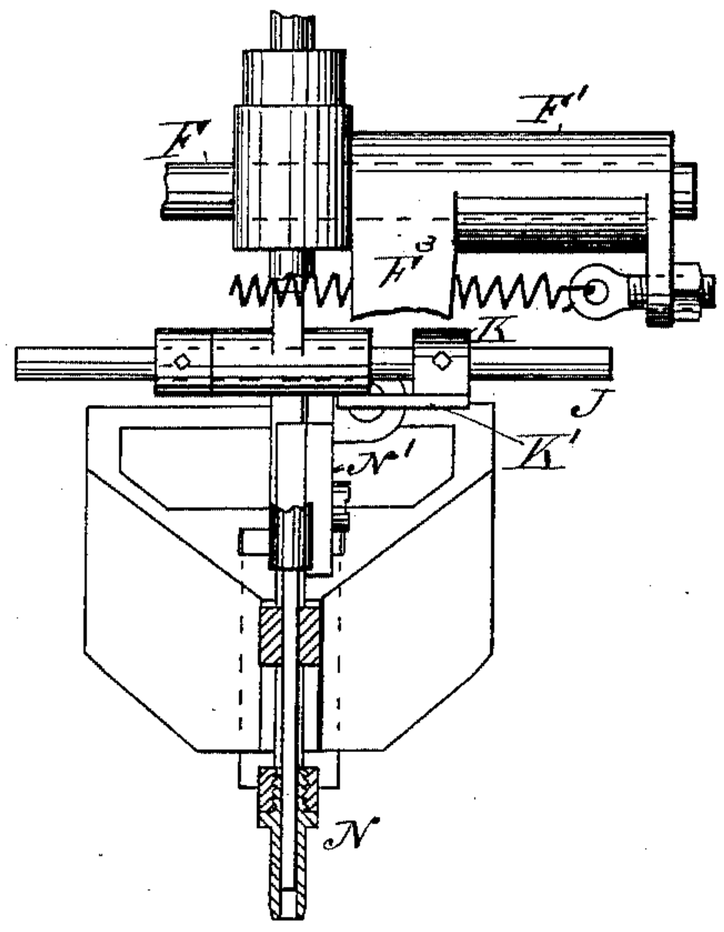

Fig. 3.

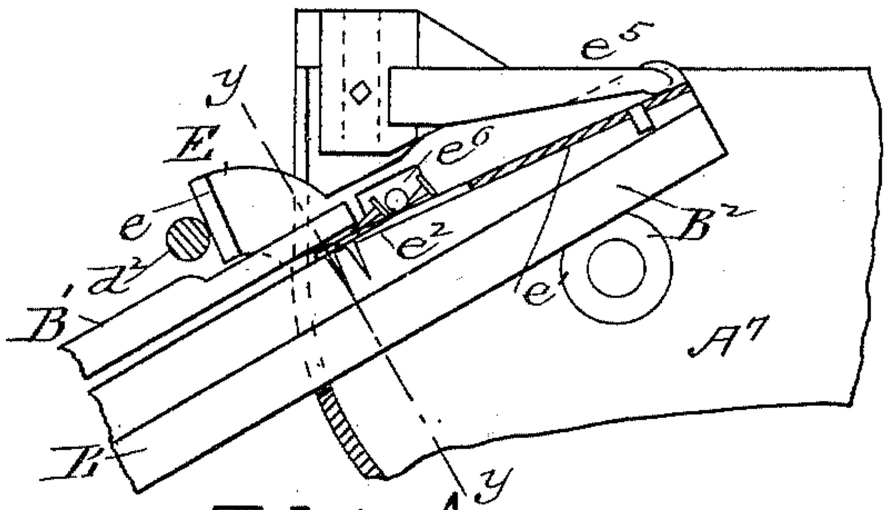

Fig. 4.

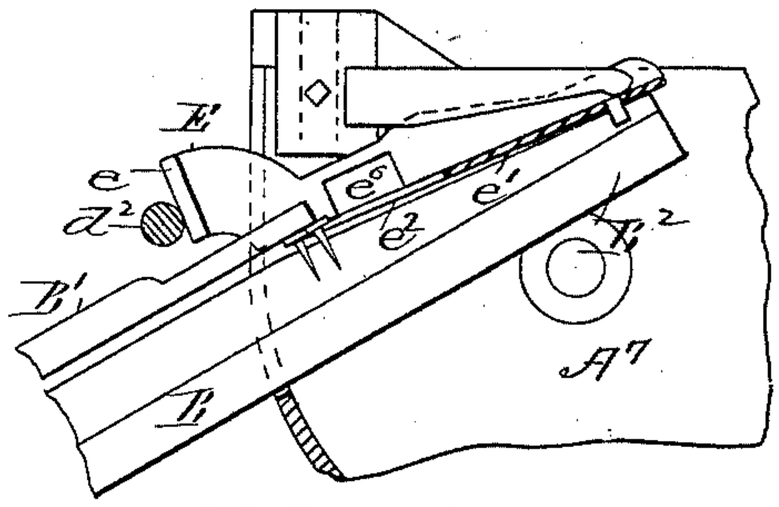

Fig. 5.

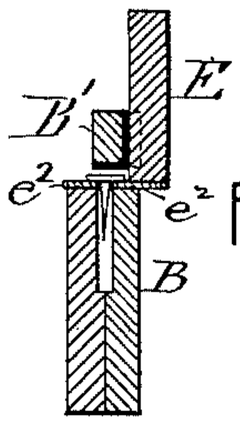

Fig. 6.

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(No Model.) 4 Sheets—Sheet 3.

E. WOODWARD.

TACKING MACHINE.

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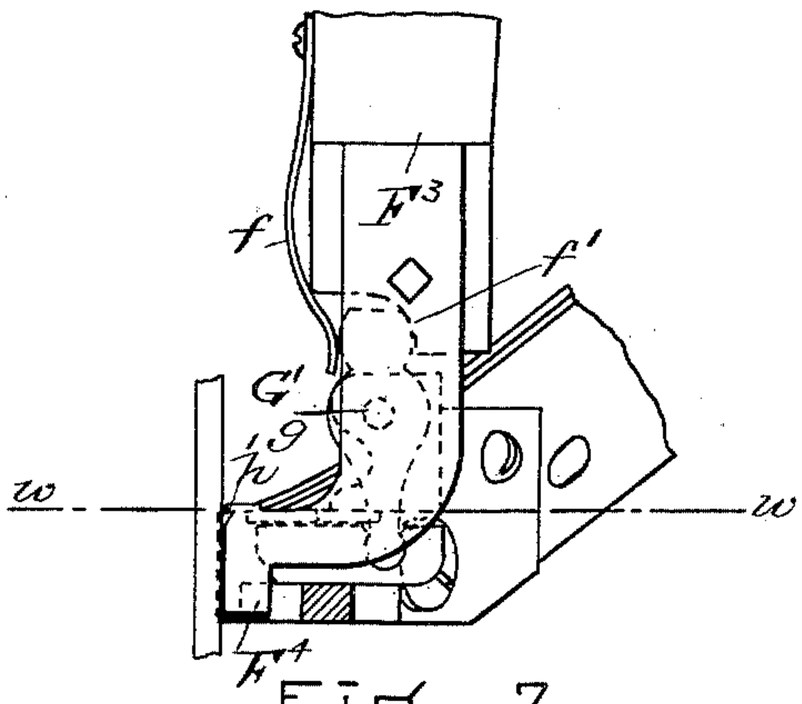

Fig. 7.

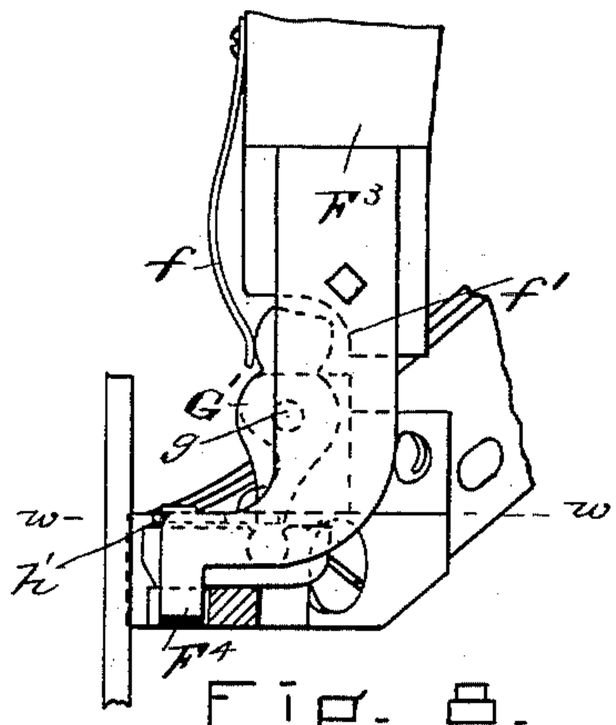

Fig. 8.

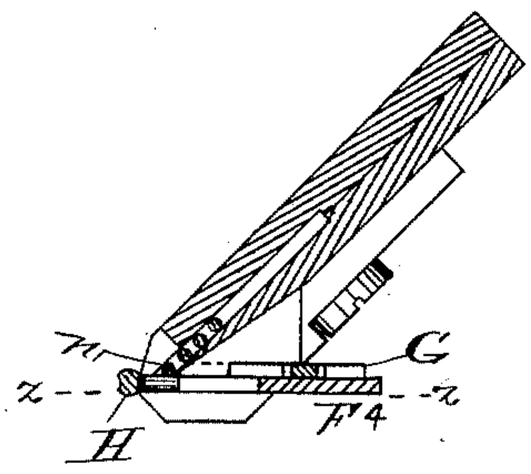

Fig. 9.

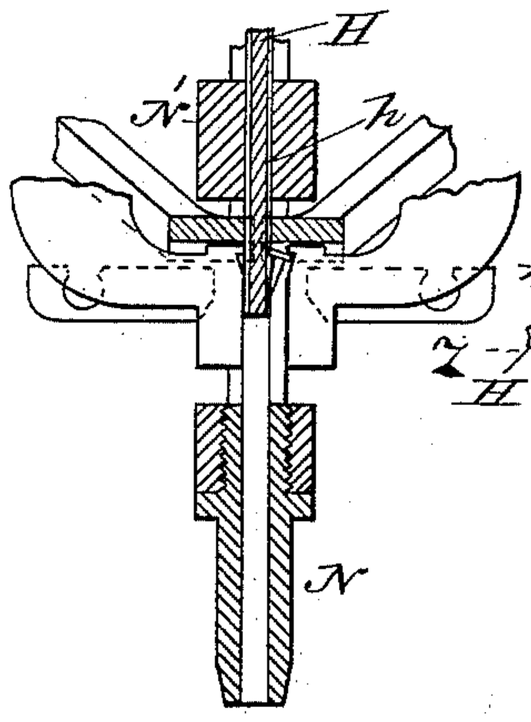

Fig. 14.

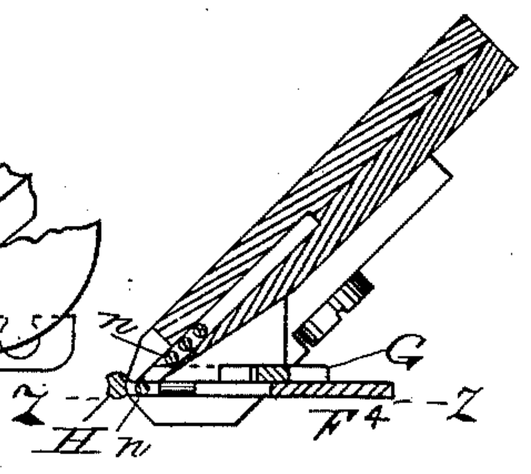

Fig. 10.

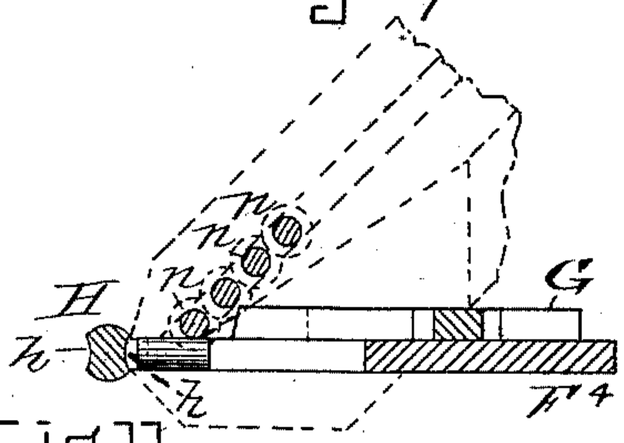

Fig. 11.

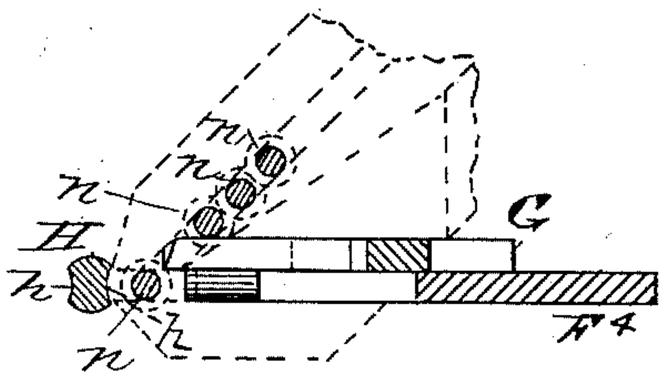

Fig. 12.

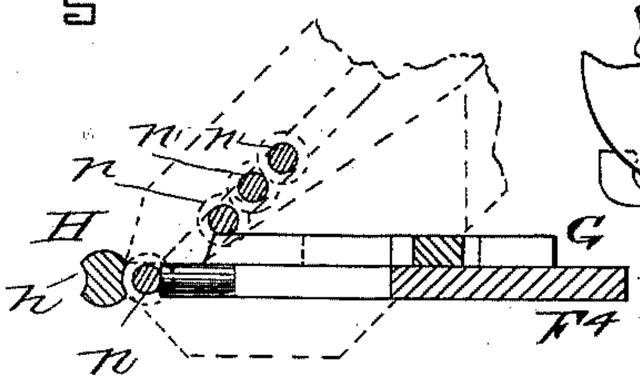

Fig. 13.

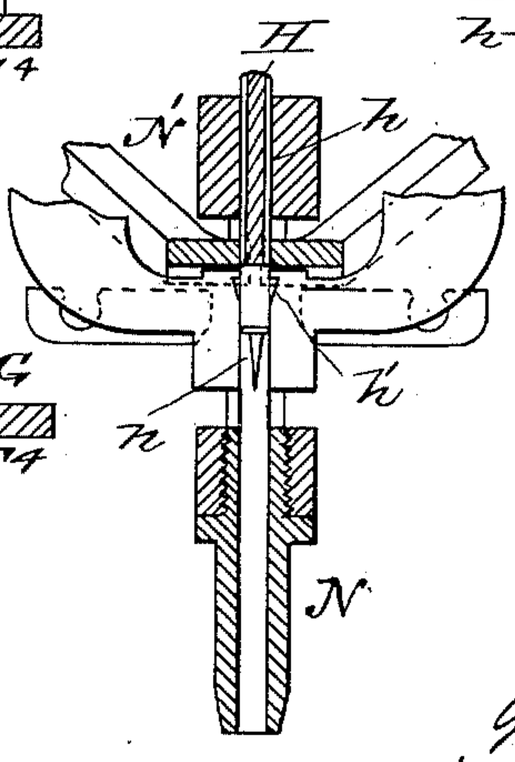

Fig. 15.

WITNESSES.

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(No Model.) 4 Sheets—Sheet 4.

E. WOODWARD.

TACKING MACHINE.

No. 468,379. Patented Feb. 9, 1892.

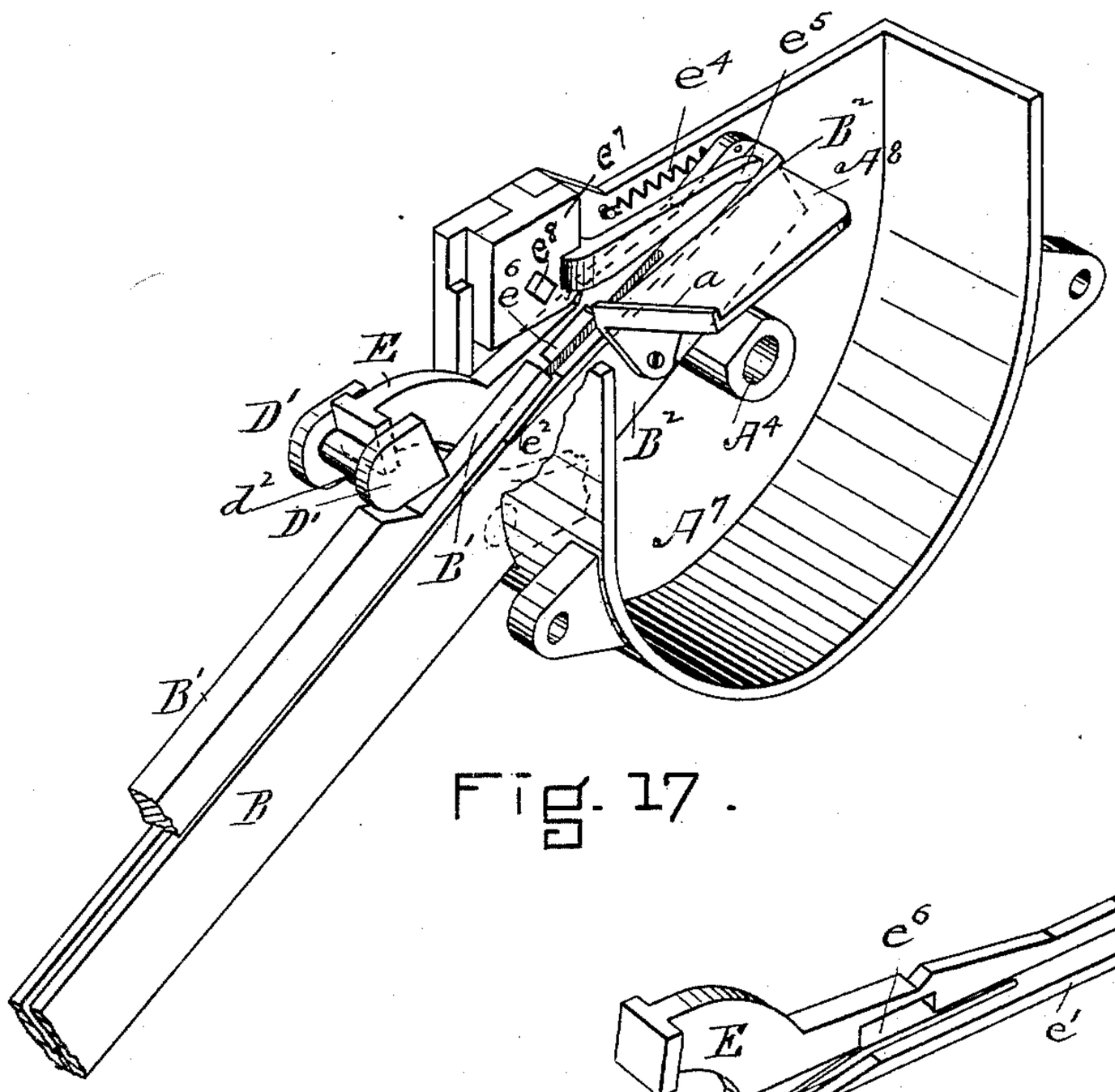

Fig. 17.

Fig. 19.

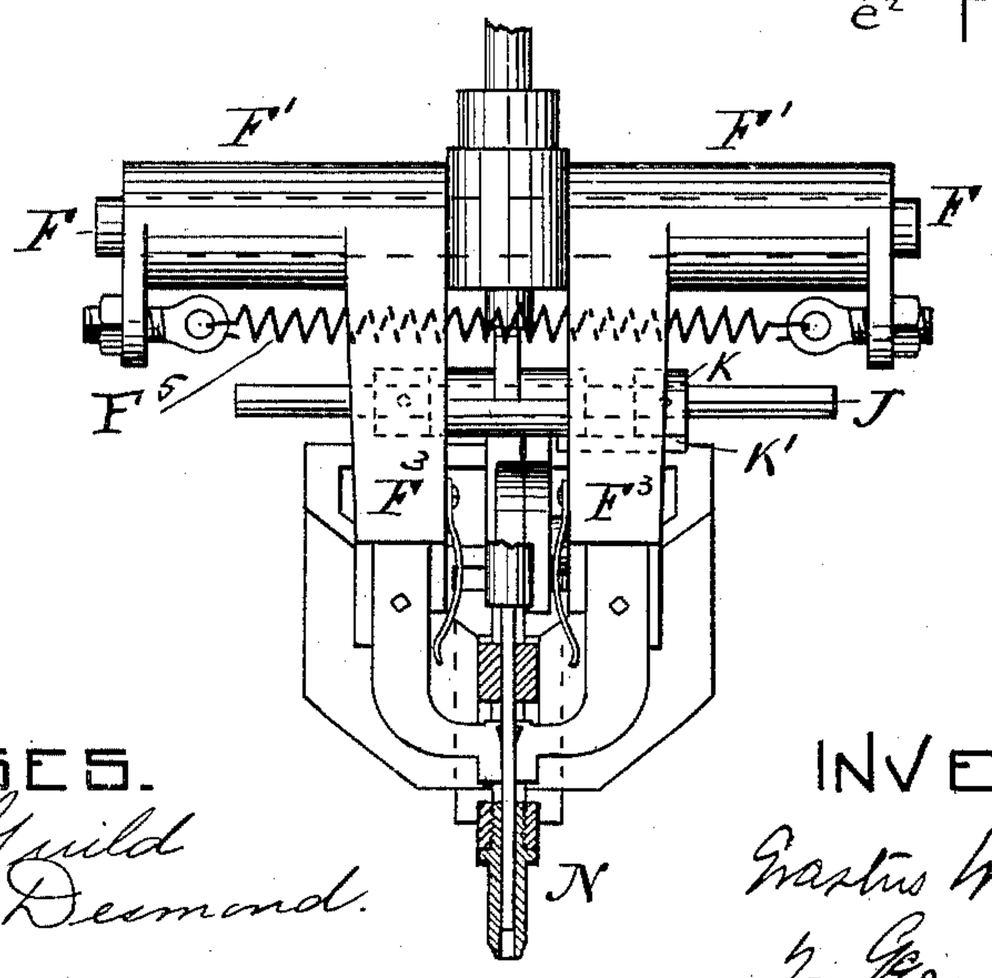

Fig. 18.

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Joseph C. Desmond.

INVENTOR.
Erastus Woodward
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his attorney

UNITED STATES PATENT OFFICE.

ERASTUS WOODWARD, OF SOMERVILLE, MASSACHUSETTS.

TACKING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 468,379, dated February 9, 1892.

Application filed June 29, 1891. Serial No. 397,929. (No model.)

To all whom it may concern:

Be it known that I, ERASTUS WOODWARD, of Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Tacking-Machines, of which the following is a specification.

My improvement relates, particularly, to the mechanism for feeding the raceways with tacks and for feeding the tacks to the driver, being an improvement upon that class of machines described in an application for Letters Patent, Serial No. 377,373, filed by me in the United States Patent Office January 10, 1891.

In the drawings is shown at Figure 1 a side elevation of mechanism embodying my invention, the portion of the raceway being broken away for convenience of illustration and the front of the tack-reservoir being removed. Fig. 2 is a plan, the main shaft and connections of this mechanism being removed. Fig. 3 is an elevation, partly in vertical section, on line *x x* of Fig. 1, the feeding mechanism being omitted. Figs. 4 and 5 are details showing the operation of the tack-clearing mechanism. Fig. 6 is a cross-section on line *y y* of Fig. 4. Figs. 7 and 8 are front views in section on line *z z* of Figs. 9 and 10, respectively, showing the operation of the mechanism for feeding the tack to the driver, Figs. 9 and 10 being sections on line *w w* of Figs. 7 and 8, respectively. Fig. 11, 12, and 13 show the operation of feeding the tack, in diagram. Figs. 14 and 15 are vertical sections showing the operation of bringing the tack in place under the driver. Fig. 16 is a detail of the shovel. Fig. 17 is a detail in perspective showing the arrangement of the tack-clearing mechanism. Fig. 18 is a more complete view of the mechanism shown in Fig. 3. Fig. 19 is a detail showing the clearer.

In the drawings I have not shown the various connections by means of which power is applied to the mechanisms embodying my invention, as that is fully described in the application above referred to.

A is a shaft supported in bearings A′ and carrying a worm A^2, meshing in the worm-gear A^3. This worm-gear A^3 is mounted on a counter-shaft A^4, which carries a radial arm, at the end of which is the shovel A^6. The construction of this shovel will be understood by reference to Fig. 16. It should be made like a scoop to scoop up the tacks and hold and deposit them upon the shelf A^8. It consists, preferably, of a cross-arm triangular in cross-section attached at right angles to said radial arm A^5, with one of its flat sides toward the shaft A^4. The body or plate of the shovel consists of the thin piece of metal attached to the edge of this cross-arm farthest from the shaft A^4. This plate is shaped like the segment of a cylinder having the axis of A^4 as its center, and I prefer to provide it with a pointed nose *a′* and bevel its edges, so that it may pass easily through the tacks. This construction is simple and enables the shovel to press through the tacks in the reservoir A^7 and scoop up a few, which it deposits upon the slanting shelf A^8, the upper surface of which is parallel and on a line with the upper surface of the raceway B. Its lower edge is provided with a rim *a*, which prevents the tacks from falling off the shelf and guides them to the raceway. The raceway is constructed with a slot a little narrower than the head of the tack, so that the tacks will rest in it, as shown in Fig. 6. The side of the raceway farthest from the feeding mechanism I prefer to make a little longer than the other side, so that one element of the feeding mechanism may seize the tack by its body, pressing it against the farther side of the raceway. As the raceway is set at an angle of, say, forty-five degrees to the line of motion of the feed, the tack will be forced down the incline in front of the second feeding element in a way to be described below. To insure the tacks falling into the raceway points down, I provide a clearing mechanism, the best form of which is now to be described.

Upon a stud C, I mount a bent lever D, one end of which is so shaped and located as to come in contact with projections *d*, arranged at equal distances about the front surface of the gear A^3, while the other end lies above the raceway B and in proximity to the clearer E. By means of the gear it is given a slight rocking motion intermittently, the weight of its upper end causing it to fall back into its normal position after its lower end has passed over each projection *d*. This lever D is pro-

vided with flanges D′ at its upper end, between which lies the pin d^2, located to strike the rear end *e* of the clearer.

The clearer E consists of a casting of peculiar construction, (see Figs. 5 and 19,) to the bottom of which is attached a thin flat piece *e′*, which projects at right angles and normally lies on the top of the raceway B and its continuation B^2. It is forked at its lower end, and its projections or toes e^2 are beveled off, so that the tacks which slide upon the clearer from the shelf A^8 may fall into the groove between the forks and from it gradually slide into the raceway proper, and also so that these toes may project under the cover B′ of the raceway, which is supported in some convenient way. The clearer slides on what may be called a "continuation" B^2 of the raceway against the force of the spring e^4. The front end of the clearer is kept against the slide B^2 by the fixed arm e^5, under which it slides, and which is attached to (see Figs. 5 and 17) one of the inner sides of the reservoir A^7 by means of the adjustable piece e^7 and set-screw e^8. The tendency of the lever D in moving the clearer is to slightly lift its toes e^2 against the under side of B′, so that there is given to the clearer a slightly-oscillating movement about a sliding axis.

The operation of this mechanism is as follows: Power being supplied from the shaft A through worm A^2 and gear A^3, the shovel A^6 throws tacks on the shelf A^8. The tacks slide down onto the floor *e′* of the clearer and toward the entrance of the raceway B, being guided by the rim *a*. Motion is given to the clearer, because as the gear A^3 rotates each projection *d* in turn strikes the lower arm of the lever D, and consequently the upper arm of the lever strikes the rear *e* of the clearer, lifting its rear end and sliding it forward a short distance—say three-eighths of an inch—at each stroke, the spring e^4 returning it. This upward and sliding motion of the clearer tends to shake down into the slot between the forks the tacks which are properly presented to the raceway. This motion of the clearer also tends to free the entrance of the raceway from those tacks which might otherwise be improperly presented to it, the toes of the clearer being for this purpose lifted against the under surface of the raceway-cover B′ and at the same time being pushed up on the raceway, so as to roll any tacks which have not fallen into the raceway out from under its cover. e^6 is a hole in the casting to allow the tacks to fall through the clearer back into the reservoir.

I will now describe the second part of my invention—namely, that relating to the separating and delivery of the tacks from the raceway to the driver.

In the drawings my machine is shown double, as I prefer to so arrange it that it will hold two sizes of tacks, either of which can be used at the pleasure of the operator. F is a cross-bar carrying two sliding quills. These quills are marked F′. They are similar in every respect and operated by similar means to the corresponding parts in my above-mentioned application, the means being a lever, for example, to force each quill outward, said lever being attached to the stud shown in Fig. 1 at the right of the quill F′, and a spring F^5 provided to retract the quills. As the mechanism operated in connection with each of these quills is exactly alike, I will only describe that operated in connection with one of them. The quill F′ carries a hanger F^3, to the lower end of which is attached a tack-feeder F^4. The purpose of this feeder is, in the first place, to hold the tacks in the raceway, and, second, to feed the tack against the driver after it has been separated from those above it in the raceway and has been pushed in front of the feeder by the separator G. This separator G and its action in connection with that of the feeder will be understood more particularly from Fig. 7 to 15, inclusive, to which reference is now more particularly made. The shape of the separator will be understood by reference more particularly to Figs. 8 and 15. It slides in proper bearings at the end of the raceway. It is operated by means of a lever G′, of peculiar shape, (see Figs. 7 and 8,) which is fulcrumed at *g*, the lower end of which lies in a slot in the separator. It is thrown by the hanger F^3, which carries a spring *f*, shaped and located so as to tilt the lever in one direction and cause the separator to separate a tack from those above it and push it in front of the feeder. (See Fig. 12.) The hanger F^3 is also provided with a shoulder *f′*, which on the return of the hanger so tilts the lever in the opposite direction as to withdraw the separator into its normal position at the same time that the feeder pushes the tack against the driver. (See Fig. 13.) H is the driver, which is operated in a way common to such machines as this, but is peculiarly constructed, in that it has on the side next the raceway a groove *h*, which is useful in combination with the feeder and separator, each in turn, to center the tack and cause it to be in proper position to fall point downward into the nozzle for delivery onto the last. The shape of this groove will be understood by reference more particularly to Figs. 11, 12, and 13. It should extend sufficiently high upon the driver to allow its upper end to be opposite the front of the feeder F^4 when the tack is to be pushed against it, the feeder at that instant being pushed forward so that its front end forms one of the walls of the nozzle. The movements of the quill and driver are so timed and the shape of the lever G′ is such that the following sequence of operations takes place. The operative parts of the machine, being in the position indicated in Figs. 9 and 11, are connected with the operating mechanism by the action of the workmen in pushing the shoe or last up against the nozzle N in a way which will be understood by reference

to my previous application. The quill F′ is now moved outward positively, thereby withdrawing the feeder F^4 from its normal position, as shown in Fig. 7, close to the driver, and allowing a tack *n* to move down the raceway in front of it. The instant after the motion of the feeder F^4 has begun and the lowest tack has begun to move in front of it the lower end of the spring *f* strikes the upper end of the lever G′, tilting it and throwing the separator by a yielding pressure into the position indicated in Fig. 12, so that it causes the separation of the said tack from those above it in the raceway and drives it down in front of the feeder, at the same time holding back those above it. Immediately thereafter when the feeder, has reached the extremity of its movement it starts back, driving the tack in front of it against the grooved driver, where it is centered by the groove and held against the upwardly-moving driver in position to drop through the nozzle when the driver has moved sufficiently, the operation being indicated in Figs. 14 and 15. This feed is also a yielding feed, so as to allow for the irregularity in the size of the tacks, being given by the spring F^5, which throws the quill. The instant after the feeder has started on its return motion, as above described, the shoulder *f′* on the hanger F^3 strikes the upper end of the lever G′, tilting it back, so as to withdraw the separator, thereby allowing the train of tacks to slide down the raceway and bringing the next tack in position against the feeder and in front of the separator to be acted upon by both in turn. When the driver has risen sufficiently high to allow the tack to fall into the nozzle, it starts down, driving the tack into the shoe or last. I have found this grooved driver to be of great advantage in a machine of this kind, as it insures the proper delivery of the tack and prevents any clogging of the nozzle, such as is quite common in some machines. The friction of the upwardly-moving driver against the tack-head tends to throw the point of the tack toward the driver, and the groove in the driver insures the centering of the point, so that it will fall point downward through the tube. To insure the holding of the side of the head which lies against the feeder, I prefer to make a small notch *h′* in the edge of the feeder into which one side of the head of a tack may slip and be held while the driver is lifting the other side. The same result may be had by roughening the front edge of the feeder.

I have not described the nozzle in which the driver moves, nor the driver-operating mechanism, as these are fully described in my previous application. It is evident that, as in that application, the nozzle must have a slot in its side through which the tack is to be fed.

In machines of this class the last is pushed against the bottom of the nozzle to receive the tack. The depth to which the tack is driven depends upon the position of the bottom of the nozzle with reference to the bottom of the driver when at its lowest position. If these two surfaces are in the same plane, the tack will be driven home; but if the driver does not reach the bottom of the nozzle in downward throw the tack will not be driven home. Its head will remain projecting into the nozzle.

In tacking the fore part of a shoe which is to be sewed, it is very desirable not to drive the tacks home, as they have to be pulled out again when the sewing is finished. When I wish to drive the tacks only part way into the shoe, I move a stop into the path of the nozzle-tube attachment N′, so as to limit its upward motion. This stop K′ is an arm—say one-eighth of an inch thick—mounted upon the sliding sleeve K, which slides on the cross-bar J. If the position of the sleeve K is sufficiently near the central line of the machine, the end of this stop will lie directly in the path of the nozzle-tube attachment N′, whereas if the slide is, for example, in the position shown in Fig. 3, the nozzle can move freely without striking the bar K′. By inserting this stop K′ so as to shorten the stroke of the nozzle it is evident that the bottom of the driver in its downward stroke will not reach the lower end of the nozzle by just one-eighth of an inch, so that the tack will not be driven home.

I have described my invention as embodied in a machine in which the driver is part of the feeding mechanism, as this is the simplest form; but it is evident that so far as the feeding of a tack to a nozzle is concerned the term "driver" for the purpose of my invention should include any other vertically-reciprocating part of similar construction which can act in conjunction with my feeder to insure the falling of the tack point downward into the nozzle. I prefer to cast my shovel double-ended, so that it may be used at either end of the shaft.

I have used the terms "feeder" and "separator" above; but I might more properly use the terms "first" and "second" feeder, for each in turn feeds the tack. The first feeder, which I have called the "separator" G, while it separates the tack which lies at the bottom of the raceway from those above it, its action is really to feed that tack into the place which what may be called the "second" feeder F^4 makes for it when the part F^4 is withdrawn. This part F^4 then feeds the tack from that position to a point where it is centered by the rising driver, and then when the driver has passed by it is allowed to drop directly from the feeder through the nozzle onto the shoe.

What I claim as my invention is—

1. In combination with the upper or receiving end of the raceway of a tacking-machine and the upper extremity of its cover, the clearing mechanism above described, consisting of a forked sliding piece located on top of the upper end of the raceway, its toes lying substantially parallel with the upper surface of the raceway and normally projecting under said cover and provided with means, substan-

tially as described, whereby it is given an oscillating movement about a sliding axis, as set forth.

2. In a tacking-machine, the tack-shoveling mechanism above described, consisting of a radial arm mounted upon a rotating shaft and carrying at its outer end an arm at right angles thereto, to which is attached a small segment of a cylinder, all as set forth.

3. In a tacking-machine, in combination, a tack-delivering nozzle, a driver reciprocating vertically therein, a raceway leading to said nozzle, and a separator and a feeder, and mechanism whereby said separator and feeder are both reciprocated horizontally side by side and in opposite directions at the same time, said separator and feeder each having its front end at substantially right angles to its sides, said end being sufficiently broad to push forward a tack, all substantially as described.

4. In a tacking-machine, mechanism adapted to center the tack and drop it upon the work in position to be driven, said mechanism consisting of a vertical nozzle of the kind described, a feeder adapted to be reciprocated horizontally toward and from said nozzle, and a grooved driver adapted to be reciprocated vertically in said nozzle and in its upward movement passing above the end of said feeder, all arranged together and adapted to operate as described.

5. In a tacking-machine, a raceway and a vertically-reciprocating driver, in combination with mechanism for feeding tacks irregular in size, consisting of a tack-feeder and a tack-separator, each of the kind described, adapted to reciprocate horizontally side by side in parallel planes and in a general direction toward and from the driver, and mechanism, substantially as described, whereby said feeder and separator are both moved by yielding pressure in a direction toward the driver and withdrawn therefrom positively, said feeder and separator operating in opposite directions at the same time, all as set forth.

6. In a tacking-machine, in combination with a sliding nozzle, the tube attachment N′ and the adjustable stop K′, located as described and adapted for the purposes set forth.

7. In a tacking-machine, in combination, a laterally-moving feeder carrying a spring *f*, and a laterally-moving separator and its lever G, the lower end of said lever being connected with said separator and its upper end being located in close proximity to said spring, as set forth.

8. In a tacking-machine, in combination with the laterally-moving feeder carrying a spring *f* and having a shoulder *f′*, a laterally-moving separator and its lever F, the lower end of said lever being connected with said separator and its upper end lying between said spring and said shoulder and adapted to be moved by each in turn, as set forth.

In testimony whereof I have hereunto subscribed my name this 25th day of June, A. D. 1891.

ERASTUS WOODWARD.

Witnesses:
GEORGE O. G. COALE,
EVA A. GUILD.