(No Model.)

3 Sheets—Sheet 1.

E. B. ALLEN.

HEEL LOADING MACHINE.

No. 375,913. Patented Jan. 3, 1888.

Fig: 1.

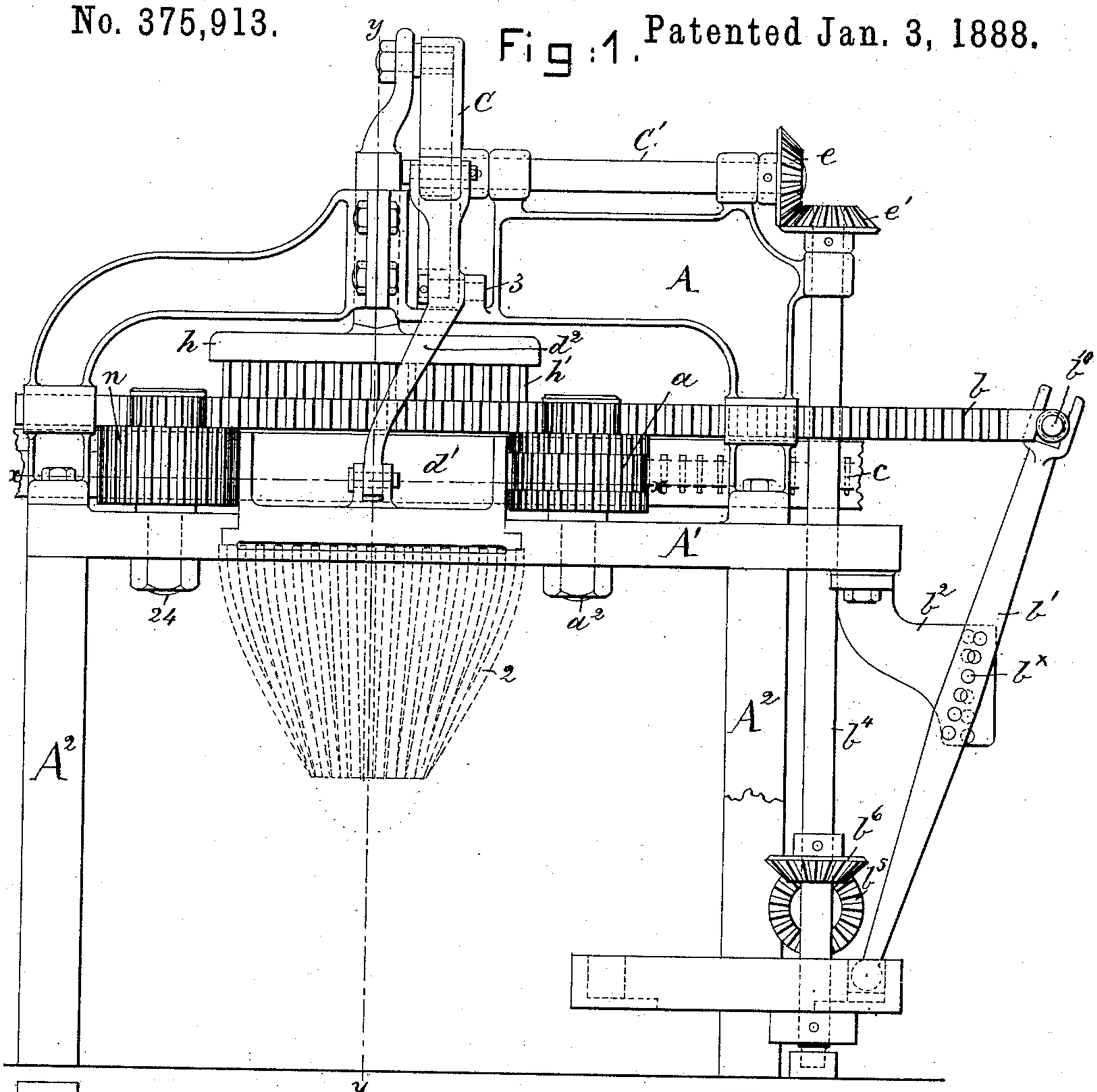
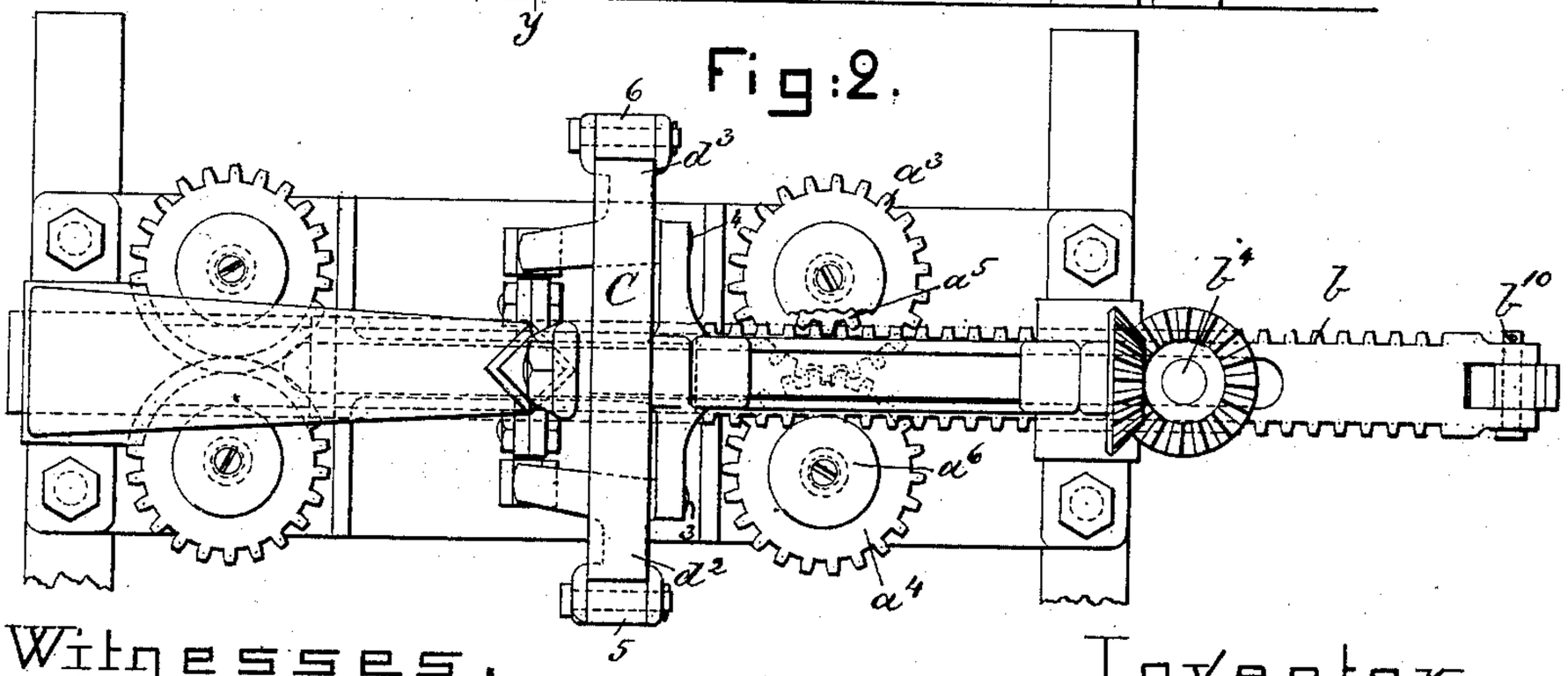


Fig: 2.



Witnesses.

Fred L. Emery

John F. C. Brinkerh

Inventor.

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(No Model.) 3 Sheets—Sheet 2.

E. B. ALLEN.

HEEL LOADING MACHINE.

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Fig: 3.

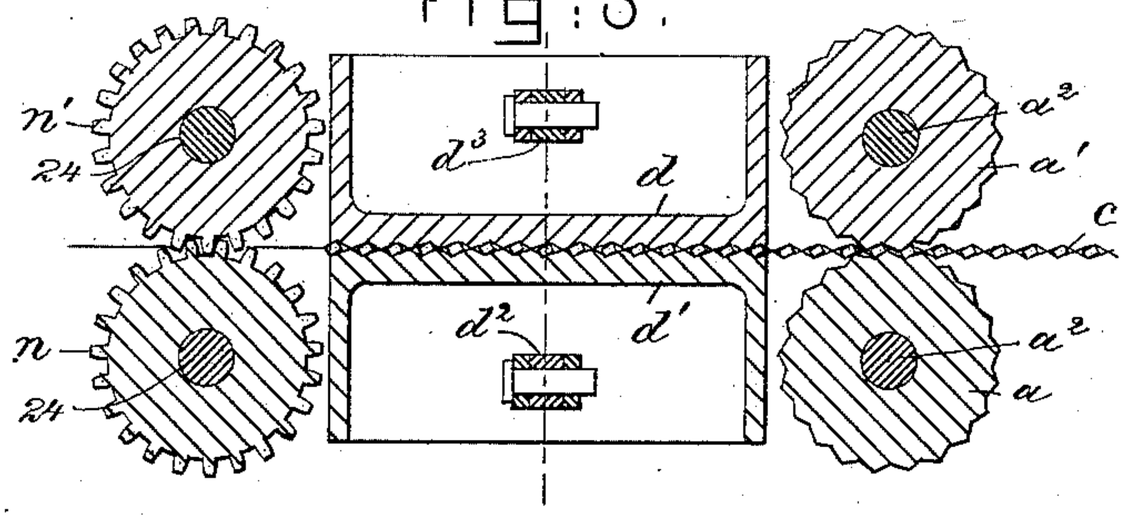


Fig: 4.

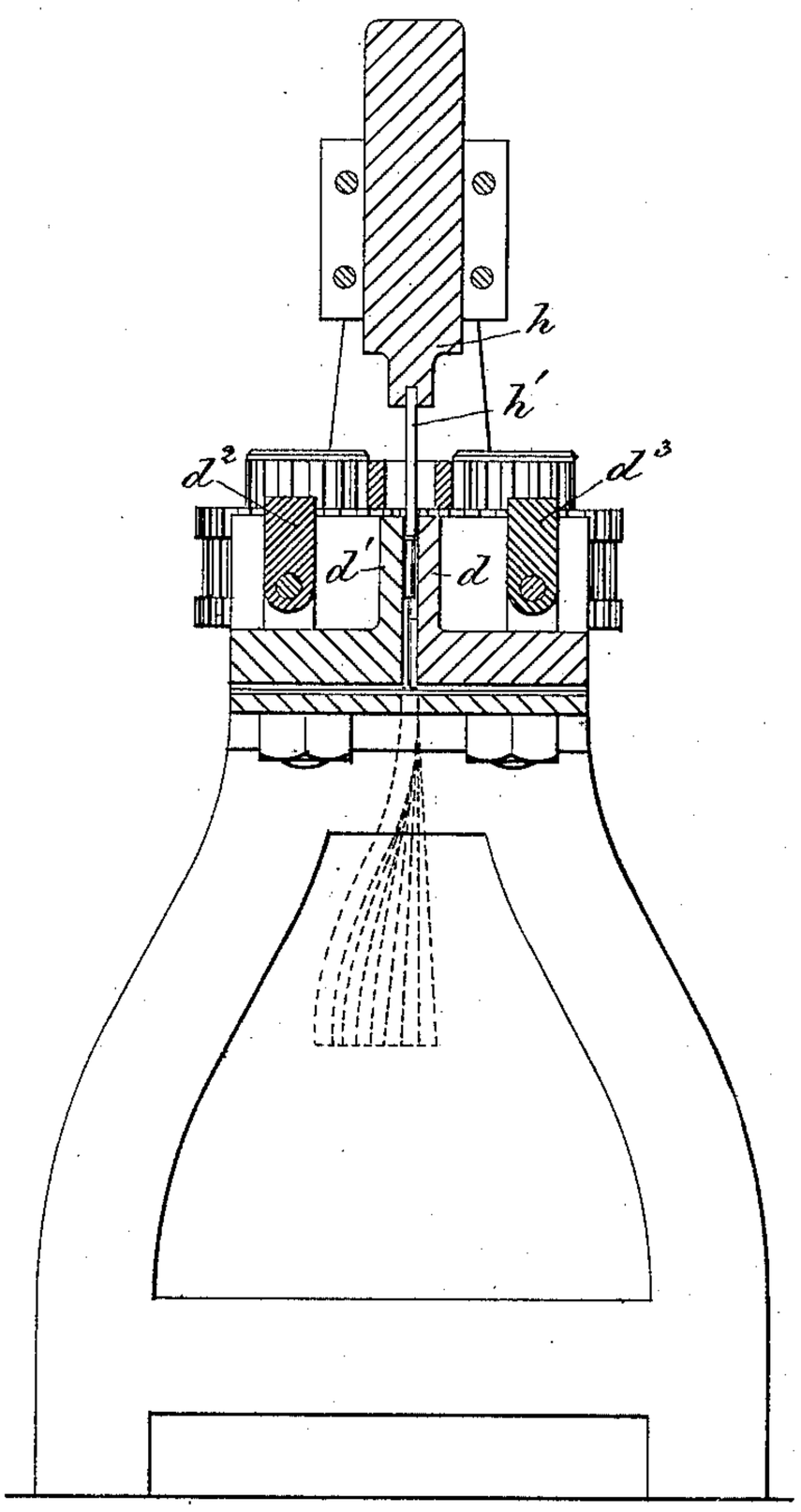


Fig: 5.

Fig: 6.

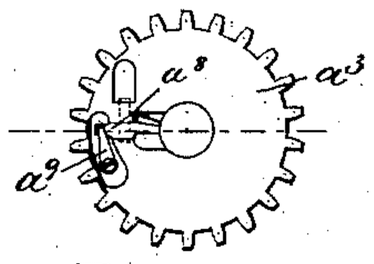


Fig: 7.

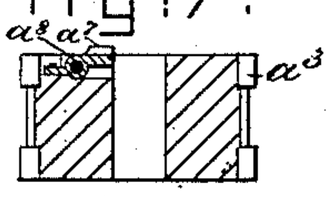


Fig: 8.

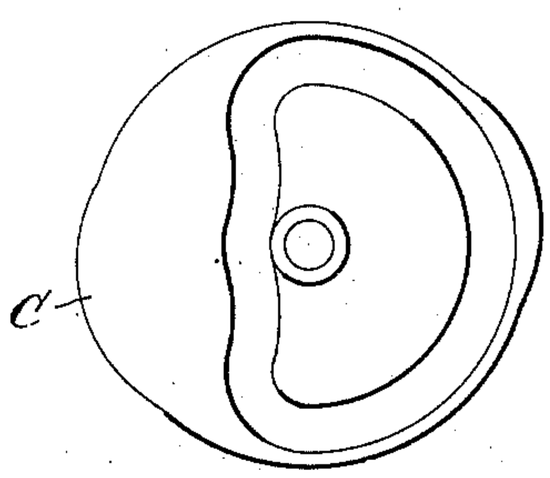
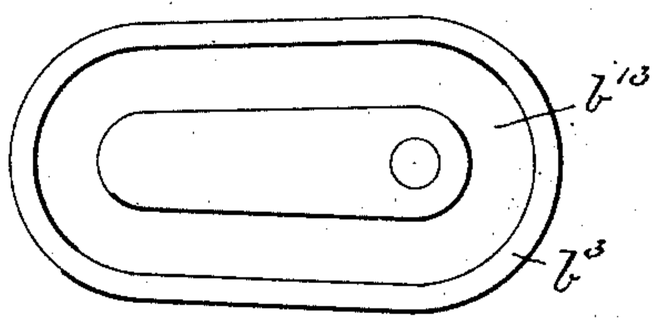


Fig: 9.



Witnesses.

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(No Model.) 3 Sheets—Sheet 3.

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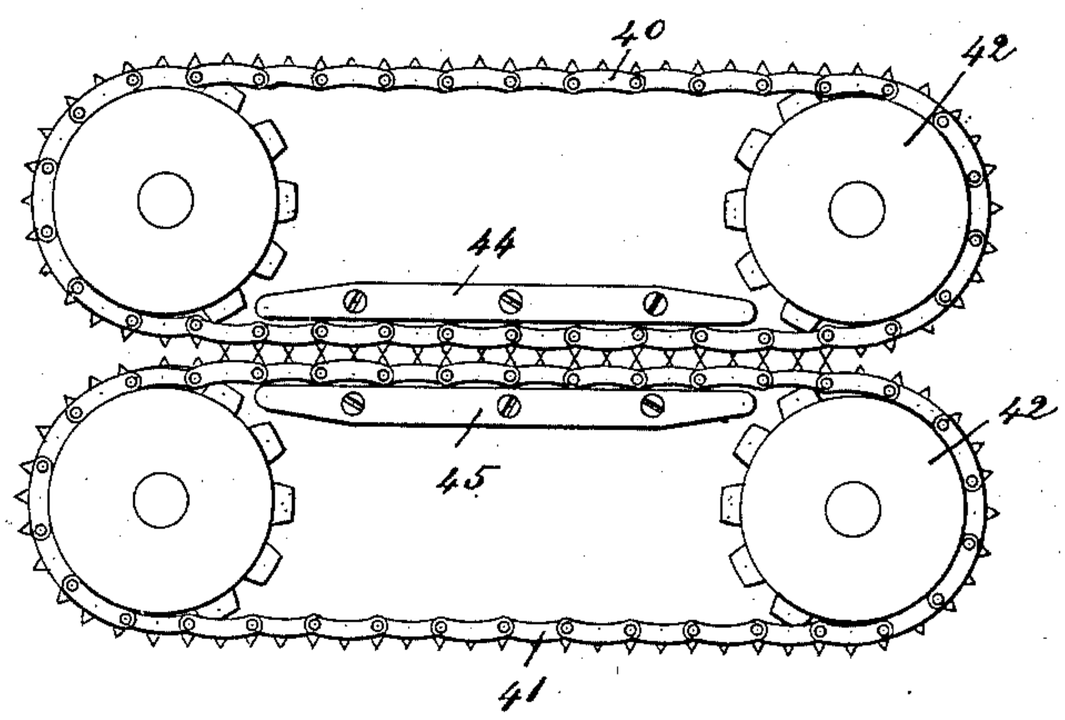
Fig: 10.



Witnesses.
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John F. C. Printerbon

Inventor.
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attys.

UNITED STATES PATENT OFFICE.

EDWARD B. ALLEN, OF PORTLAND, MAINE, ASSIGNOR TO JAMES W. BROOKS, TRUSTEE, OF SAME PLACE.

HEEL-LOADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 375,913, dated January 3, 1888.

Application filed March 10, 1887. Serial No. 230,370. (No model.)

To all whom it may concern:

Be it known that I, EDWARD B. ALLEN, of Portland, county of Cumberland, and State of Maine, have invented an Improvement in Heel-Loading Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to provide a heel-loading machine of the class shown in Letters Patent of the United States, No. 348,092, dated August 24, 1886, with feeding devices adapted to feed several nails into position above a series or set of nail-receiving tubes, and with means for moving the nails into the tubes.

The invention consists of a pair of feeding-rolls between which passes a nail strip or carrier consisting, essentially, of a piece of flexible material carrying nails, substantially as shown and described in application, Serial No. 230,369, filed by me March 10, 1887. Suitable means are provided for moving the feeding-rolls to feed the strip forward intermittingly. I also employ a nail-supporting device consisting, as herein shown, of a pair of clamps which engage and hold the nail-strip in position above the set or series of nail-receiving tubes of the heel-loading machine while the nails are separated or driven from the strip into the nail-receiving tubes below them. A second pair of feeding-rolls is provided for conveying the strip from the nail-supporting device.

Figure 1 shows in side elevation a sufficient portion of a heel-loading machine of the class referred to with my improvements added to enable my invention to be understood; Fig. 2, a top view of the machine shown in Fig. 1; Fig. 3, a section taken through the feeding-rolls and nail-supporting device on the dotted line *x x*, Fig. 1; Fig. 4, a vertical section of the machine shown in Fig. 1, taken on the dotted line *y y*. Figs. 5, 6, and 7 show details of the ratchet-clutch mechanism, to be referred to; Figs. 8 and 9, details of the operating-bars, to be described; and Fig. 10, a modification to be referred to.

The frame-work or head A and the bed A′, supported by the uprights A^2, are all of suitable shape and construction to sustain the operating parts of the machine. The bed A′ has erected on it studs a^2, on which are placed the feeding-rolls *a a′*. Each feeding-roll *a a′* is provided with a transversely grooved or fluted surface, and at each end each of the said rolls has a toothed surface, a^3 a^4, which mesh one with the other.

The feeding-rolls *a a′* are rotated by a ratchet-clutch mechanism, herein shown as consisting of two toothed wheels, a^5 a^6, one of which is mounted loosely upon each stud a^2, the said toothed wheels a^5 a^6 each having upon its under side a series of ratchet-teeth, as shown in Fig. 5, which, when moved in one direction, engage a tooth or projection, a^7, (see Fig. 7,) upon the upper side of a latch, a^8, pivoted upon the upper side of the roll *a′*, and provided with a tooth normally held protruding by a flat spring, a^9, the said latch being thereby free to yield against the tension of the spring as the wheel a^5 is moved in the opposite direction. The toothed wheels a^5 a^6 are rotated to thus in turn rotate the feeding-rolls *a a′* by a reciprocating double rack-bar, *b*, located between them, the teeth of the rack-bar engaging the teeth of the said toothed wheels.

The nail strip or carrier *c*, as herein shown, is composed of a strip or band of flexible material carrying nails and constructed as shown in the application referred to, and is fed between the feeding-rolls *a a′* by the projections of the said rollers entering the indentations or notches between the said nails.

The rack-bar *b* is moved to and fro by a lever, *b′*, having its fulcrum at $b^\times$ on a bracket or stand, b^2, the upper end of the said lever being loosely connected to a stud or roll, b^{10}, of the said rack, the lower end of the lever *b′* entering the cam-groove b^{13} of the cam-grooved disk b^3, (shown in plan view, Fig. 9,) secured to the rotating shaft b^4, engaged by a driven bevel-gear, b^5, meshing with a beveled gear, b^6, secured to the said shaft, the gear b^5 being driven in any suitable manner by a drive wheel and shaft. (Not shown.)

As the rack-bar *b* is moved in one direction it engages and rotates the toothed wheels a^5 a^6

in one direction, while the ratchet teeth of the said toothed wheels engage and rotate the feeding-rolls, and as the rack-bar is moved in the opposite direction the toothed wheels a^5 a^6 are also rotated in the opposite direction, during which time the feeding-rolls remain idle.

The rack-bar *b* is arranged to move the toothed wheels, to thereby feed the nail-strip a sufficient distance to bring into position above a set or series of nail-receiving tubes, 2, (see dotted line, Fig. 1,) a nail for each tube.

The nail-strip is supported above the nail-receiving tubes by a nail-supporting device, herein shown as two rectangular-shaped clamps, *d d'*, placed side by side, and suspended and made movable toward and from each other by two levers, d^2 d^3, pivoted to the head A on studs or pins 3 4, the opposite ends of the said lever carrying friction-rolls 5 6, which bear against the opposite sides of the periphery of a cam-disk, C. (Shown in plan view, Fig. 8.) The cam-disk C is secured to a shaft, C', carrying a bevel-gear, *e*, which is engaged and rotated by a bevel-gear, *e'*, secured to the shaft b^4, so that as the shaft C' is rotated the cam-disk C moves the levers d^2 d^3 toward and from each other, thereby moving the clamps *d d'* to grasp and release the nail strip or carrier. The faces of the clamps *d d'* are corrugated vertically, the nails in the strip resting loosely in the recesses, the projections catching and holding the nail-strip between the independent and detached nails therein, in order that the nails may be readily removed by the drivers. While the clamps *d d'* are brought together, holding the nails above the tubes 2, a plunger-head, *h*, having a series of plungers or drivers, as *h'*, one for each tube, is caused to descend upon the nails of the strip, each of the several plungers removing a nail from the strip or carrier into tubes 2.

The plunger-head *h* moves in a guideway made in the head A of the machine, and a suitable projection or stud carrying a friction-roll is arranged to follow in a cam-groove cut in one face of the disk C, (see Fig. 8,) so that the plunger-head may derive its movement from the rotating disk. The cam-disk C is thus made to move the nail-supporting device and the plunger longitudinally to support the nails and move the same into the tubes 2.

A second pair of feeding-rolls, *n n'*, constructed substantially the same as the feeding-rolls *a a'*, above described, are placed at the exit of the nail-supporting device *d d'*, upon which the strip is fed, to thereby convey the flexible strip from the machine. This second pair of feeding-rolls, provided with toothed-surfaced end portions and toothed wheels like the toothed wheels a^5 a^6, are placed and made to rotate upon studs 24, like the studs a^2, the said toothed wheels being arranged to engage and disengage the feeding-rolls by a ratchet-clutch mechanism substantially the same as the clutch mechanism employed to actuate the wheels a^5. The rack-bar *b* is made of sufficient length to enter between the ratchet-toothed wheels and reciprocate them.

The operating-lever *b'* is provided with a series of holes and the stand or bracket b^2 with a similar series, to thereby vary the fulcrum, and hence the throw, of the lever; but I do not desire to limit myself to any particular construction or means of varying the fulcrum of the said lever.

In Fig. 10 I have shown a modified form of feeding mechanism composed of two sprocket-chains, 40 41, driven by the sprocket-wheels, as 42, the said chains moving adjacent to each other and having their links so formed as to serve as a feeding-chain to convey the nail-strip forward beneath the driver or plunger. The chains pass between two guide-blocks, 44 45, which keep the said chains so close together as to hold the nail strip firmly between the chains. The sprocket-wheels will be driven intermittingly to move the nail-strip forward some distance at each movement, so that a series of nails will be brought beneath the plunger at a time.

I claim—

1. In a heel-loading machine, a series of nail-receiving tubes and a series of drivers, combined with an intermittingly-actuated pair of feed-rolls to feed forward under the drivers and above the tubes a nail-strip having an independent series of detached nails, and with other feeding devices, substantially as described, to take the said strip away from the drivers after the latter have ejected the nails into the said tubes, substantially as set forth.

2. In a heel-loading machine, the nail-receiving tubes and a pair of corrugated nail-supports, combined with means for moving forward intermittingly a nail-strip having independent detached nails, and with plungers for ejecting the said nails into the said tubes, substantially as described.

3. In a heel-loading machine, the supporting devices for the nail-strip and an intermittent feeding device, combined with a second feeding device for feeding or carrying the flexible strip from the machine after the nails have been removed therefrom, and with plungers for removing the nails, substantially as described.

4. In a heel-loading machine, the nail-supporting mechanism and feeding-rolls for feeding the nail-strip, combined with toothed wheels and ratchet-clutch mechanism for moving the feeding-rolls intermittingly, and means, substantially as described, for reciprocating the toothed wheels, substantially as described.

5. In a heel-loading machine, a separable nail-supporting device for supporting several independent nails above a set of nail-receiving tubes, the faces of the said supporting device being corrugated to grasp and hold the nail-strip between the detached and independent nails therein while the said nails are ejected

therefrom, and means for supplying the nail-supporting devices with nails, combined with plungers for removing the nails from the nail-supporting devices, and with means for moving the plungers and separating the nail-supporting devices alternately, substantially as described.

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

EDWARD B. ALLEN.

Witnesses:
BERNICE J. NOYES,
F. L. EMERY.