

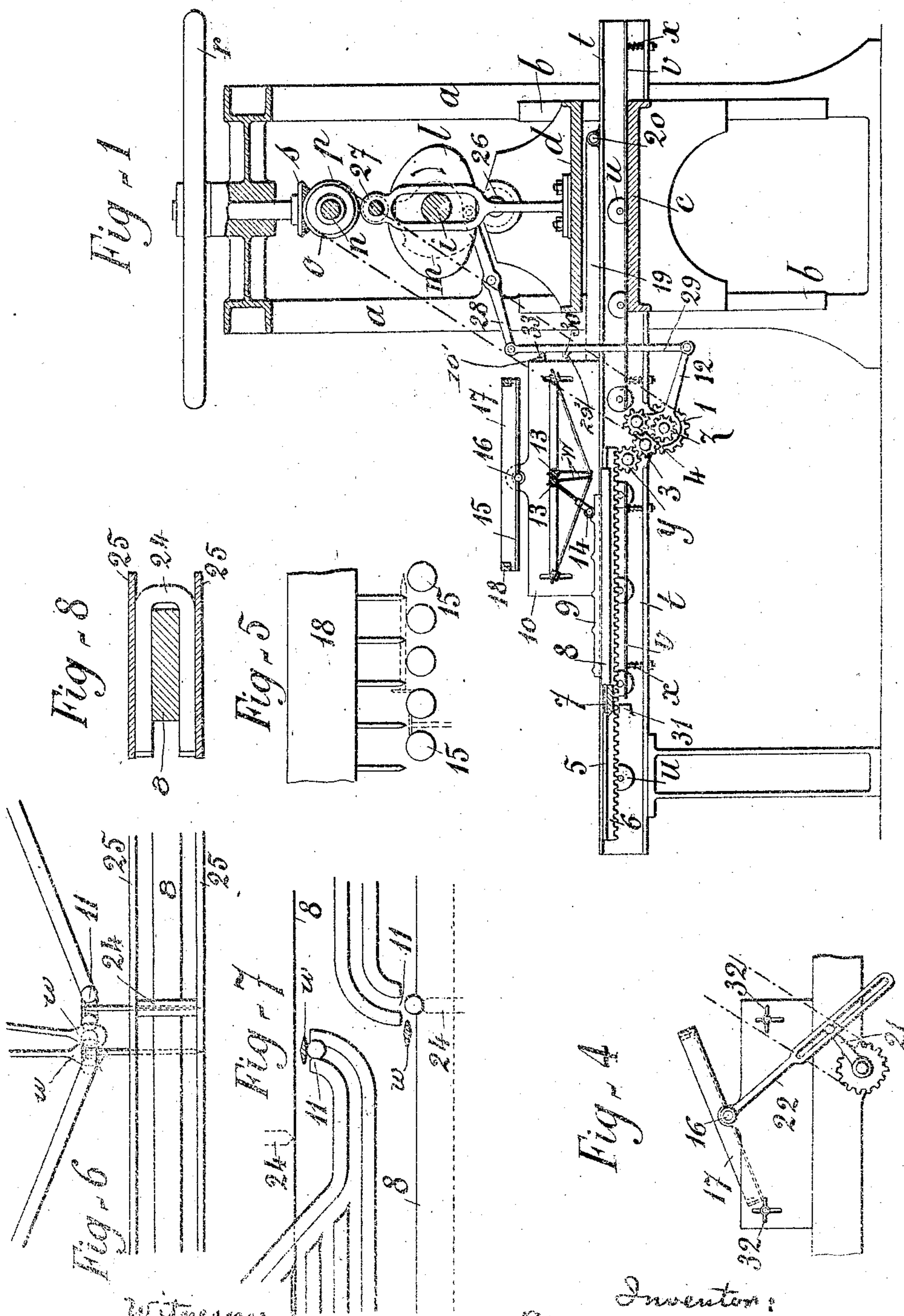
No. 819,471.

PATENTED MAY 1, 1906.

T. J. M. THEURET.
NAILING MACHINE.

APPLICATION FILED AUG. 29, 1902.

4 SHEETS—SHEET 1.



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4 SHEETS—SHEET 2

Fig. 2

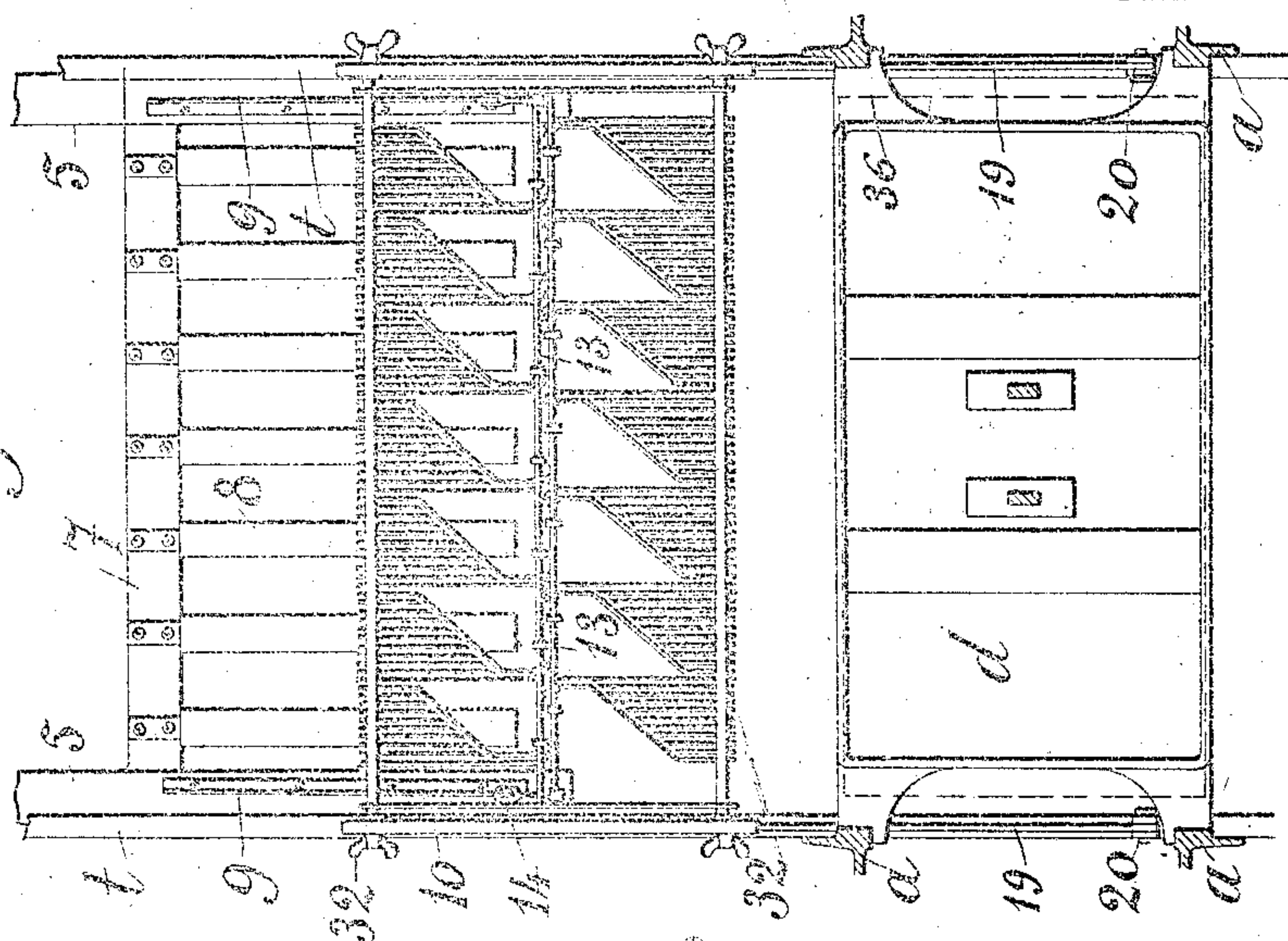
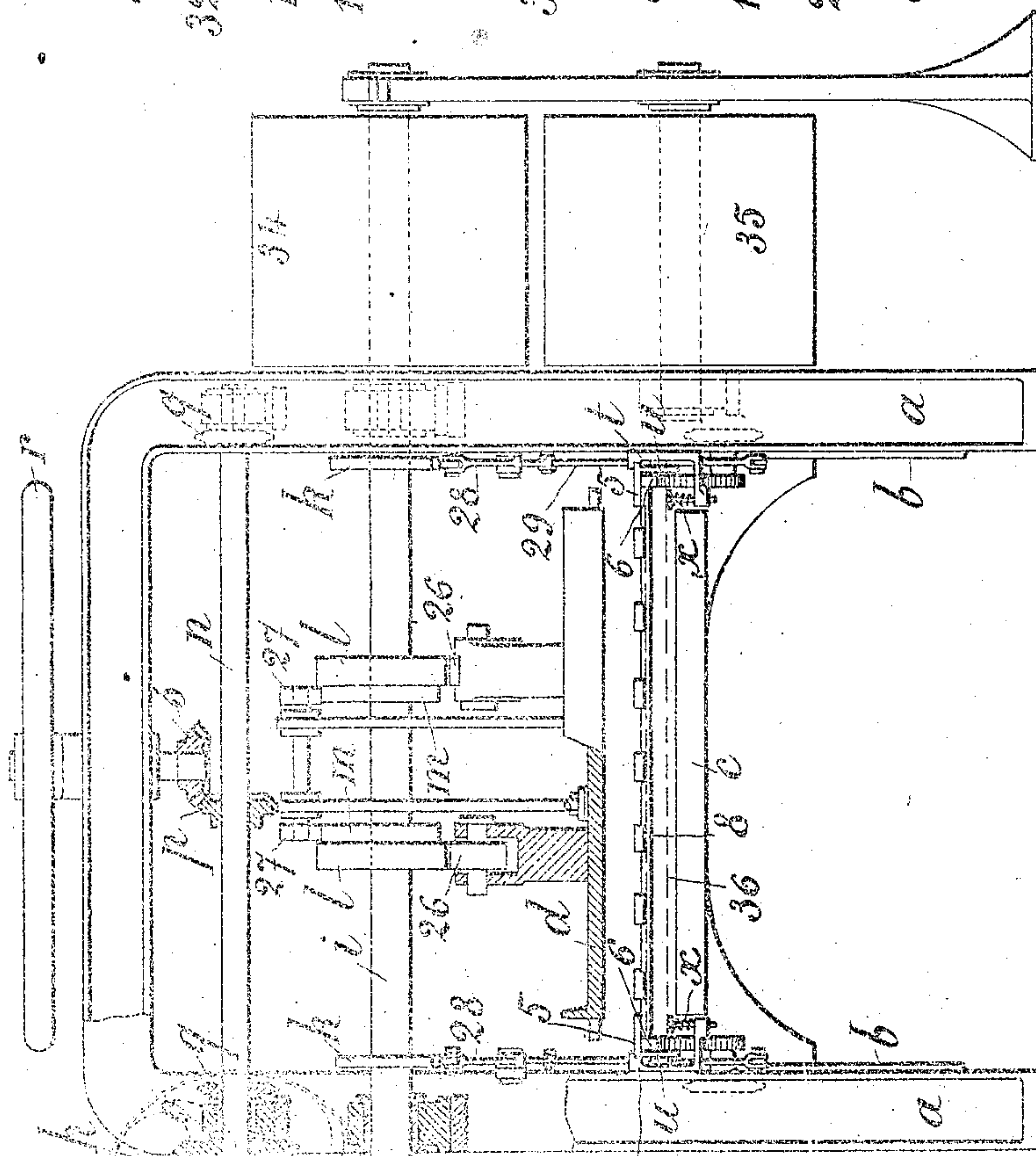


Fig. 3



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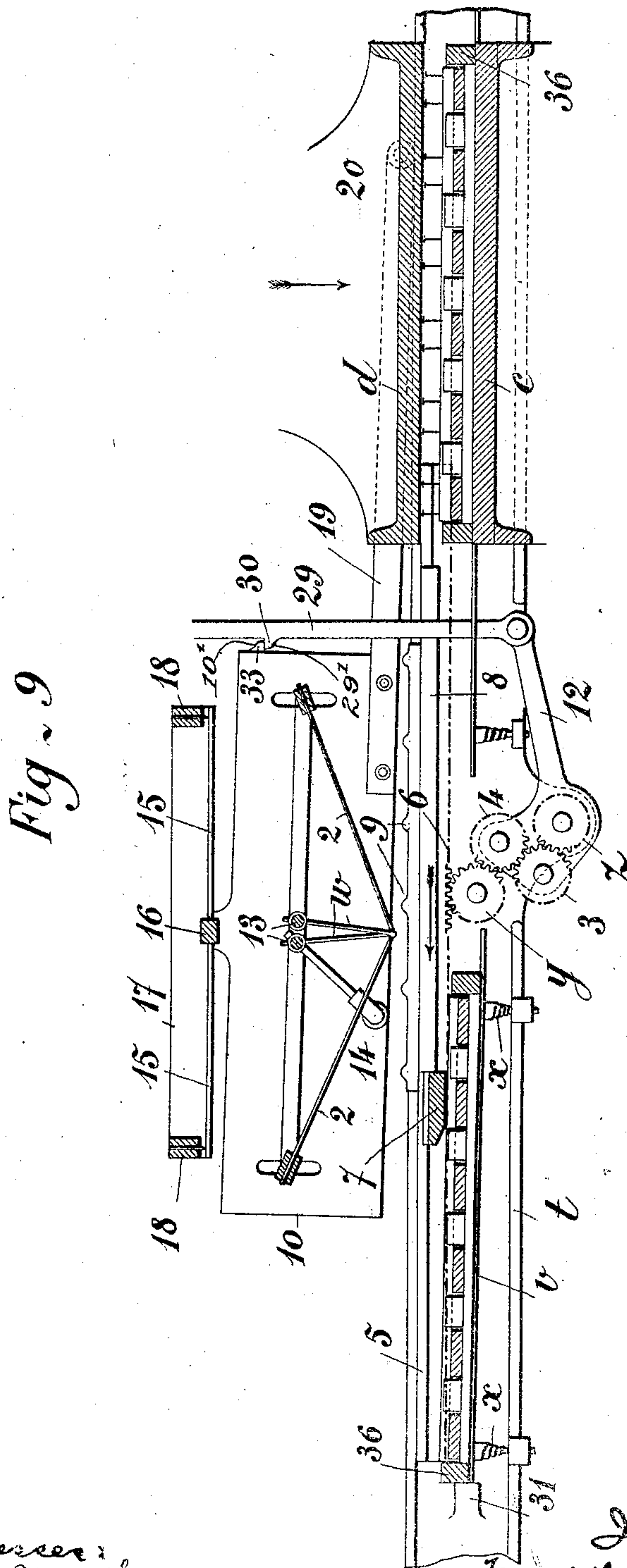
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4 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

THEOPHILE JEAN MARIE THEURET, OF GAILLON, FRANCE.

NAILING-MACHINE.

No. 819,471.

Specification of Letters Patent.

Patented May 1, 1906.

Application filed August 29, 1902. Serial No. 121,529.

To all whom it may concern:

Be it known that I, THEOPHILE JEAN MARIE THEURET, a citizen of the Republic of France, residing at Gaillon, France, have invented certain new and useful Improvements in Nailing-Machines, of which the following is a specification.

My improvements refer more particularly to machines employed in simultaneously driving a number of nails after first automatically placing such nails in their proper relative positions, and my improvements render such machines particularly useful in the manufacture of articles such as packing-cases, crates, &c., which are generally produced in large quantities and of equal sizes and configurations and wherein board and panels are to be attached to their frames or main bodies.

The objects of my invention are to provide a nailing-machine of simple construction and rapid and reliable in operation, whereby the nails may be arranged automatically in their proper relative positions, whether in straight lines or otherwise, and the parts which are to be joined together are automatically brought into positions in which a hammer acts upon and drives said nails simultaneously, thus doing away as far as practicable with manual labor.

In the machine, as hereinafter described, the articles to be joined together by nailing are placed in their proper relative positions and are carried upon a horizontally-reciprocating platform to a position underneath a vertically-reciprocating hammer, and while the platform is traveling toward the hammer the nails required in the nailing operation are automatically delivered from a sorter to a distributor, which places the same with their points downward into their proper positions with reference to the articles to be nailed. Magnets attached to the carriage hold the nails in such positions until they have been brought underneath the hammer and the latter has been lowered sufficiently to partly drive the same. After that the carriage, and with it the magnets, are withdrawn and the hammer completes the nailing operation. The clenching of the nails takes place by passing the articles which have been nailed between suitable rollers.

In the accompanying drawings, wherein corresponding letters and figures of reference refer to corresponding parts, Figure 1 is a central longitudinal section of a nailing-machine constructed according to my invention;

Fig. 2, a horizontal section thereof; and Fig. 3 an end view, its upper left-hand portion being shown in a section along the axis of the hammer. Fig. 4 is an elevation of the mechanism for actuating the sorter, and Fig. 5 an end view of part of the sorter. Fig. 6 is an elevation, and Fig. 7 a plan view of a device embodying a magnet for distributing the nails and placing the same in their proper positions, while Fig. 8 is a transverse section of the magnet-holder. Fig. 9 is a longitudinal section of part of the machine, illustrating the relative positions of the carriage and connecting parts during the return travel of the carriage, while Fig. 10 is a corresponding section showing said carriage and connecting parts during the forward travel of the former. Fig. 11 is a longitudinal section of part of the machine, showing the carriage on the point of starting upon its return movement.

In the drawings, *a* indicates an upright frame carrying vertical guides *b*, along which a platform *c* and a hammer *d* are adapted to travel.

e is a main shaft mounted upon the frame *a*, which carries a pulley *f*, receiving its motion through a belt driven by any suitable motor. Shaft *e* also carries a conical pinion *g* and the endless screw *h*. The transverse shaft *i* is mounted over the central portion of said frame and carries a toothed wheel *j*, which engages with endless screw *h* and cams *k l m*. Another shaft *n*, placed in the same vertical plane with shaft *i* and above the same, carries a conical pinion *o*, engaging with pinion *g*, another conical pinion *p*, and toothed pinions *q q*. Above the frame a fly-wheel *r* is placed, the shaft of which carries a conical pinion *s*, which engages with pinion *p*.

Two parallel horizontal main girders *t t* are fixedly mounted upon the frame and carry rollers *u u* and guides *v*, mounted upon springs *x*. Each of such girders carries the axis of pinions *y* and *z*, and the axis of the latter carries also a pinion *1*, which communicates by a sprocket-chain with one of the pinions *q q*. Upon the axis of the pinion *z* is articulated a lever *12*, the head of which carries two pinions *3* and *4*, which are always coacting, pinion *3* also engaging constantly with pinion *z*. These pinions *3* and *4* can alternately be thrown into and out of engagement with pinion *y*. A carriage *5*, which travels between girders *t t* and rolls upon rollers *u u*, is provided underneath its lower surface with racks *6 6* and a cross-piece *7*, upon which magnet-

holders 8 8 are fixedly secured, and upon its upper lateral edges there are provided cams 9 9, arranged symmetrically.

A nail-distributor is provided comprising two lateral brackets 10 10, between which are arranged two series of planes inclined inversely. Each of said planes 2 is constructed of copper wires so spaced as to permit the passage between them of the shanks of the nails, but not of their heads, the shanks thereby becoming suspended vertically in the spaces and all the spaces being made to communicate with a channel of the same width, which leads to a socket 11, that is normally closed by a plate *w*. All the plates *w* in the same series of planes 2 are mounted upon the same shank 13, the two shanks 13 being arranged side by side and parallel with the lines of intersection of the two series of planes 2 2, and the two shanks are provided, one at the left-hand extremity and the other at the right-hand extremity, with an arm carrying a roller 14, which is adapted to travel upon cams 9 9. A nail-sorter surmounts the distributor and consists of a sieve constructed of metallic wires or threads spaced in the same manner and for the same purpose as those forming the inclined planes 2 2. These threads are arranged parallel and in the same plane in the longitudinal direction of the machine and on each side of a transverse shaft 16, supported by the brackets 10 10 of the distributor. The threads 15 are inclosed in a rectangular space, the longitudinal sides 17 of which are mounted upon shaft 16 and the transverse sides 18 18 of which are placed at right angles to the threads 15 and on their under sides are provided with teeth placed above the spaces between threads 15 in such manner as not to permit the falling of nails into the distributor unless the same are suspended vertically between the threads 15 15 and to arrest the others, as shown in Fig. 5.

The brackets 10 10 are fixedly attached, respectively, to the ends of the two arms 19, articulated upon the axes 20 20, around which they are adapted to oscillate, together with the distributor.

To one of the ends of the shaft 16 there is keyed a lever 22, having a rectilineal slot with which engages a stud on the crank 21, which crank is keyed to the shaft of pinions 1 and 2, Fig. 4.

The magnet-holders consist of flat iron bars 8 8, having one of their ends fixedly attached to cross-piece 7 and at right angles thereto. The iron horseshoe-magnets 24 are arranged at suitable distances upon the holders 8 8, which they straddle, and are confined there by brass bands 25 25, screwed to bars 8 8. The space between bands 25 25 and between the magnets is filled out with putty. Said magnets have their poles made tapering vertically, so as to shape their ends in the form of vertical wedges.

The hammer *d* carries two sets of rollers 26 26 and 27 27, which may be actuated by cams *l* and *m*. Cams *k k* actuate levers 28 28, connected, by means of rods 29 29, to levers 12 12, and each connecting-rod 29 is provided with a tooth 30, which is adapted to engage with a corresponding tooth 33 on bracket 10.

The longitudinal girders *t t* are provided with abutments 31 31, and the threads 2 2 of the distributor are supported by rods 32 32, which may be adjusted along the grooves of brackets 10 10 and confined in their proper positions by means of screw-nuts at their ends.

The operation of the machine is as follows: The motor imparts revolving motion to shaft *e*, which the latter communicates to shaft *n* by means of pinions *g* and *o* and to the shaft *i* by endless screw *h* and toothed wheel *j*. Shaft *n* transmits its rotative movements to fly-wheel *r* by means of pinions *p* and *s*, and through the chains pinions *q q* impart rotative movement to pinions 1 1, and consequently to pinions 2 2. When pinions 2, 3, and *y* coact, the movement imparted to racks 6 6 is a movement forward toward hammer *d*, when pinion 4 engages with pinion *y* this produces movement in the opposite direction, and when neither pinion 3 nor pinion 4 engages with pinion *y* there is no movement imparted to rack 6 6. In accordance with the length of the nails employed the height of the sockets of the distributor above the magnets 24 is regulated by raising or lowering rods 32 in the grooves of brackets 10 10. The boards or panels which are to be attached by means of nails are placed in a rectangular wooden frame 36, which confines the same in their respective positions. This frame is placed upon guides *v v* in contact with the abutments 31. The thickness of said frame 36 equals the distance between the magnet-holders 8 8 and the guides *v* underneath the same, and the cross-piece 7 of carriage 5 on its under side is lower than the lower surfaces of the magnet-holders, its rear end being made tapering, so that during the retrograde movement of the carriage, Fig. 9, said slope will cause the lowering of frame 36, held in contact with abutments 31 31, and will pass above the same, whereby springs *x* supporting guides *v* will be compressed, and when cross piece 7 has passed the rear edge of frame 36 the latter, actuated by springs *x x*, will again take its place underneath magnet-carriers 8 8. During the forward movement of carriage 5 toward the hammer *d* cross-piece 7 carries along frame 36 and each line of magnets 24 passes sockets 11 11 of the distributor. At this movement one of the undulations of each cam 9 acts upon a roller 14 so as to cause shafts 13, with the covers *w*, to oscillate and to liberate the nails which are suspended in sockets 11 11. These nails are attracted by the magnets 24, while the covers *w w* keep closed

the sockets containing the nails which are to be seized afterward by another line of magnets. The nails are thus moved along and are placed with frame 36 underneath hammer *d*. Thereupon cams *k k* act upon levers 28 28 and through connecting-rods 30 30 upon oscillating levers 12 12, so as to cause pinions 3 to be thrown out of engagement with pinions *y* without pinions 4 being brought into gear with the latter. The movement of the frame is therefore arrested. The cams 1 1 act then upon rollers 26 26, cause the hammer to descend, Fig. 11, and the nails are driven to a certain extent into the boards or panels which are to be attached, Fig. 9. The hammer stops in its movement when it reaches a position about two or three millimeters above the magnet-holders, and the nails are by that time driven in sufficiently so as to be rendered independent of the influence of the magnets. Cams *k k* then again act upon levers 28 28 so as to cause pinions 4 to be brought into mesh with pinions *y*. The carriage 5 then starts upon its return movement and another frame carrying boards or panels which are to be nailed is placed against abutments 31. Cross connection 7 is withdrawn from the frame, which is held upon the platform *c* by hammer *d*, which rests upon the nails, and the same as the magnet-holders are withdrawn from the opposite hammer is again lowered and completes the driving in of the nails. Hammer *d* is in its lowest position when the carriage 5 is farthest removed therefrom and is being elevated while the carriage is again advancing toward the hammer. The same movements as described above again take place and the frame 36, which is advancing, pushes the frame which has just been nailed beyond slides *v* and takes its place upon platform *c* of the machine. During the backward movement of the carriage no nails must be permitted to be released by the distributor, and it therefore is necessary to then keep rollers 14 out of operative engagement with cams 9. For this purpose cams *k k* while employed in bringing parts 4 and *y* into engagement raise connecting-rods 29, the teeth 30 of which actuate the teeth 33 of the distributor and elevate the latter while turning it around the axes 20, so that cams 9 cannot any further affect rollers 14. The nails are thrown into sorter haphazard, the oscillating movement of which shaking the same up and spreads them out until they take vertical positions, as indicated in Fig. 5, which permits the same to be introduced into the distributor, while the other nails are retained by the teeth of rakes 18 until they assume the positions which are required. The oscillating movement of the sorter is obtained by the rotation of crank 21, the projection of which communicates to lever 22 and shaft 16 the rocking movement required. The downward movement of the

nails from the sorter to the distributor is produced by the trembling movement of the machine, or if necessary, by suitable mechanical means.

Platform *c* is capable of sliding vertically along guides 6; which permits of adjusting the same at varying distances from hammer *d*, according to the dimensions of the articles which are to be nailed.

34 and 35 are two cylinders attached laterally to the machine and arranged similarly to the cylinders in a rolling-mill and between which the panels which have been nailed are conducted for the purpose of completing the nailing operation and clenching the points of the nails.

I do not wish to confine myself to the details and detail combinations herein set forth, as it will readily be seen that the same may be varied materially without departing from the spirit of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a nailing-machine, the combination of the following elements: a movable carriage, magnet-holders mounted upon the carriage, magnets mounted upon the magnet-holders and arranged in lines in accordance with the nails which are to be applied to the panels, a distributor of nails formed with sockets therein and comprising lateral brackets and inclined sieves made of metallic wires arranged in series each leading to a socket, plates closing the sockets, means carried by the carriage for actuating said plates, a hammer, vertical guides for said hammer, means for actuating the hammer, a frame with horizontal guides for the movable carriage, rollers mounted upon the frame for supporting the carriage, means for propelling the carriage, guides mounted upon the aforesaid frame for supporting a wooden frame receiving the panels which are to be nailed, springs upon the first frame for supporting the said guides, an abutment upon the first frame for arresting the said wooden frame, and the cross-piece at the end of the movable carriage to which the magnet-holders are fixedly attached and which is cut on an inclined plane, the parts being arranged substantially as described above and for the purposes specified.

2. In a nailing-machine, the combination of the following elements: a movable carriage carrying magnets with beveled poles and placed in lines in accordance with the nails upon the panel which is to be secured thereby, a frame, a distributor of the nails formed of lateral walls articulated upon the frame and formed with sockets therein, the transverse bars, inclined sieves secured on said bars and made of metallic wires placed parallel and arranged in series each leading to a socket, covers normally closing said sockets, axles for said covers, a movable carriage,

cams arranged upon the sides of the movable carriage, arms mounted upon the axles of the covers and carrying rollers which engage with said cams, teeth arranged upon the ex-
5 tremities of the above-named lateral walls of the distributor, connecting-rods having a tooth underneath each of said teeth of the distributor, and means for actuating said connecting-rods, a nail-sorter, a shaft dis-
10 posed transversely upon the walls of the dis-

tributer, and means for causing said shaft to move, substantially as described and for the purposes specified.

Signed at Paris, France, this 16th day of August, 1902.

THEOPHILE JEAN MARIE THEURET.

Witnesses:

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PAUL BACARD.