

No. 706,805.

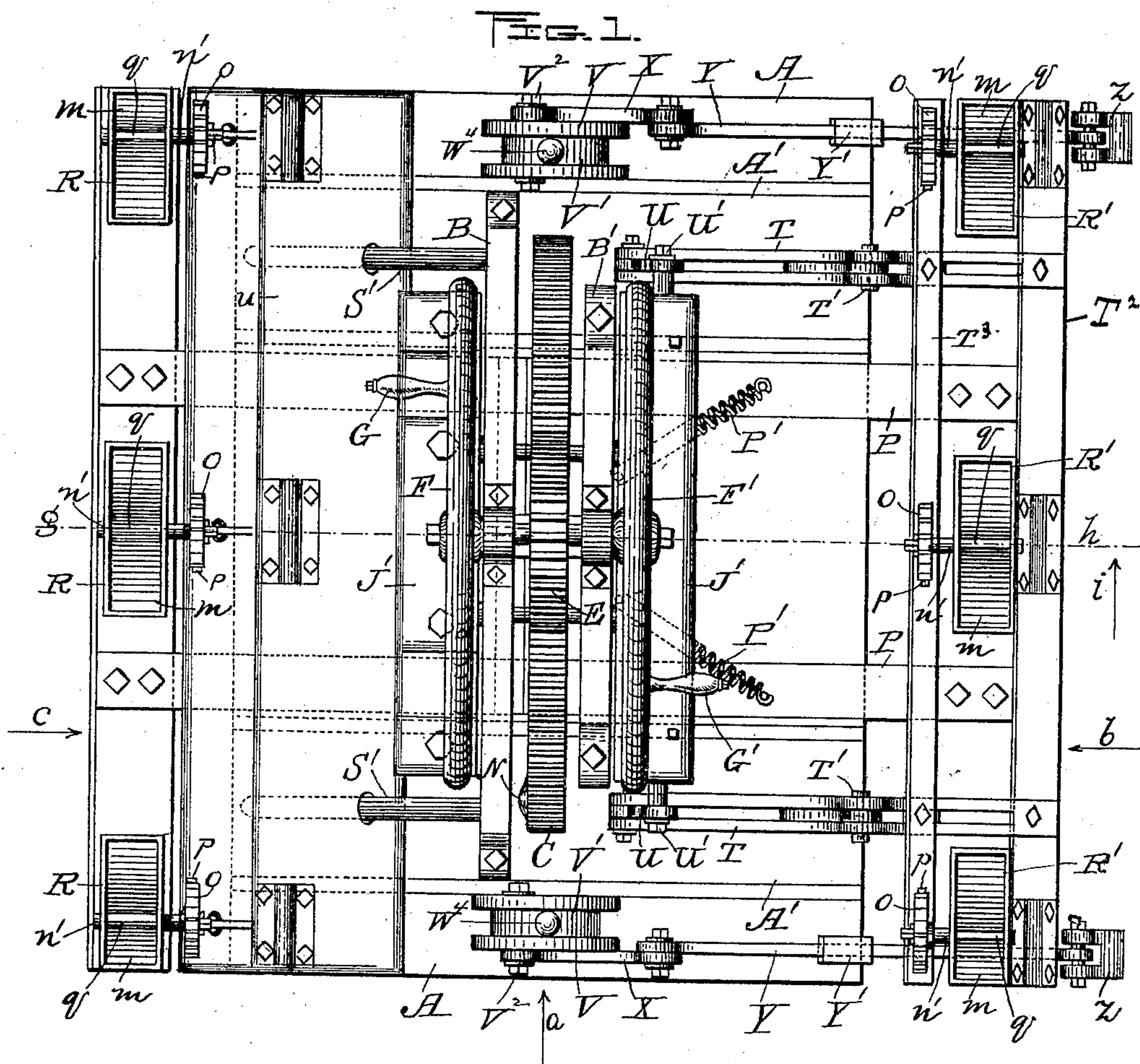
Patented Aug. 12, 1902.

J. C. DAIGNEAULT.
FLOOR LAYING AND NAILING MACHINE.

(Application filed Nov. 20, 1899.)

(No Model.)

6 Sheets—Sheet 1.



Witnesses;
W. B. Nourse.
A. A. Gilbert.

Inventor;
Joseph C. Daigneault.
By A. A. Barker, Atty.

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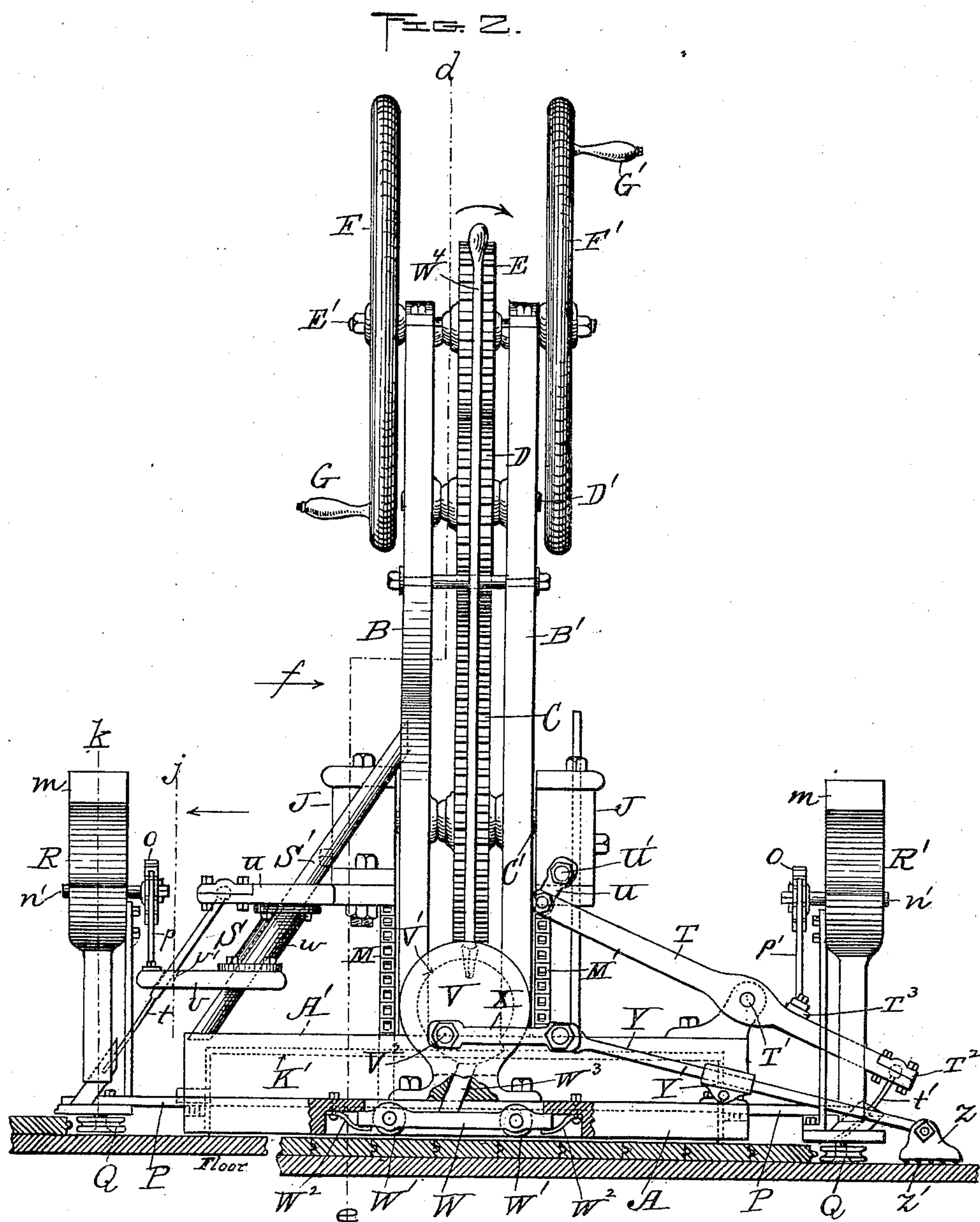
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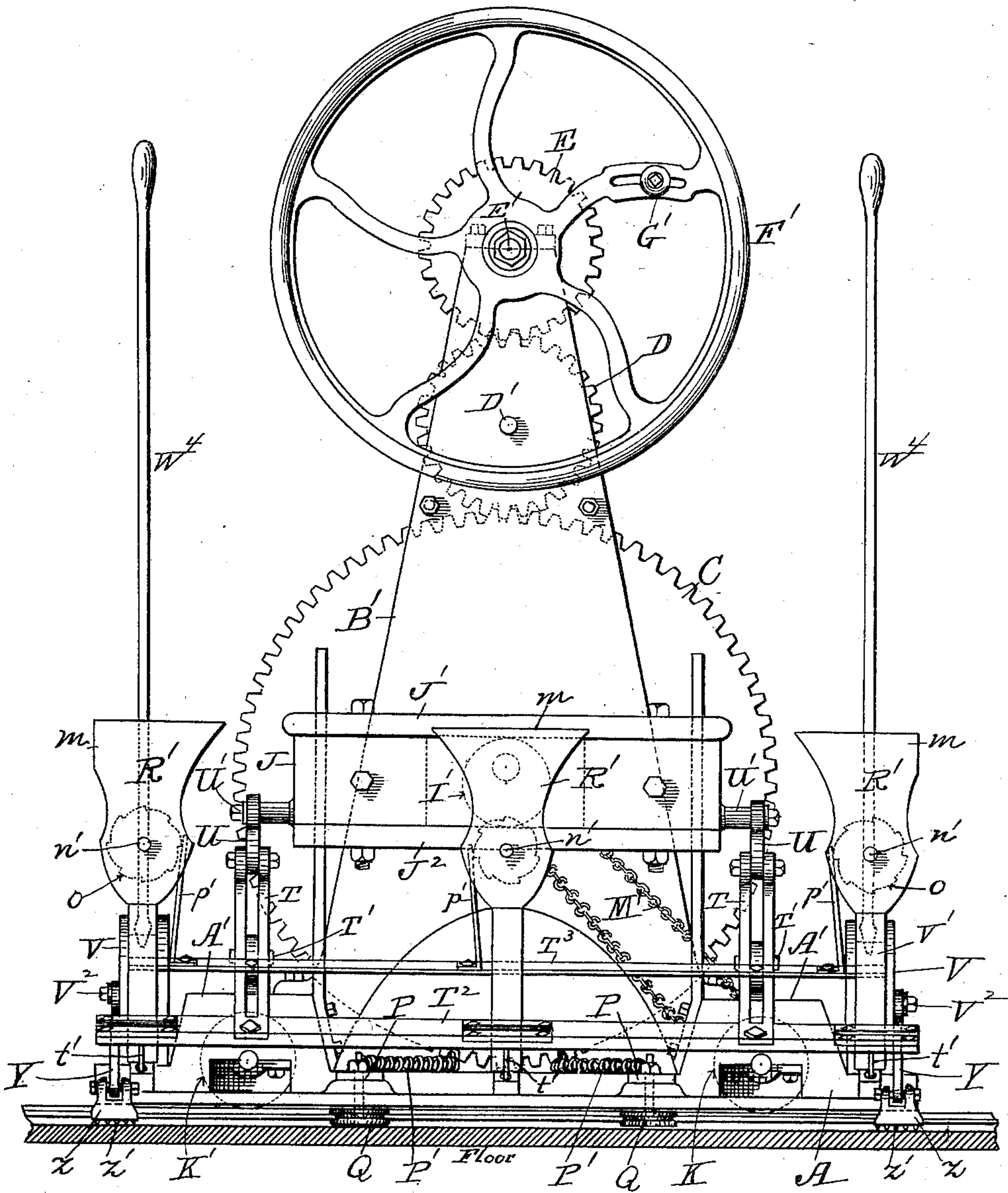
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FIG. 3.



WITNESSES;
W. B. Nourse.
A. A. Gilbert.

INVENTOR;
Joseph C. Daigneault.
By A. A. Barker. Att'y.

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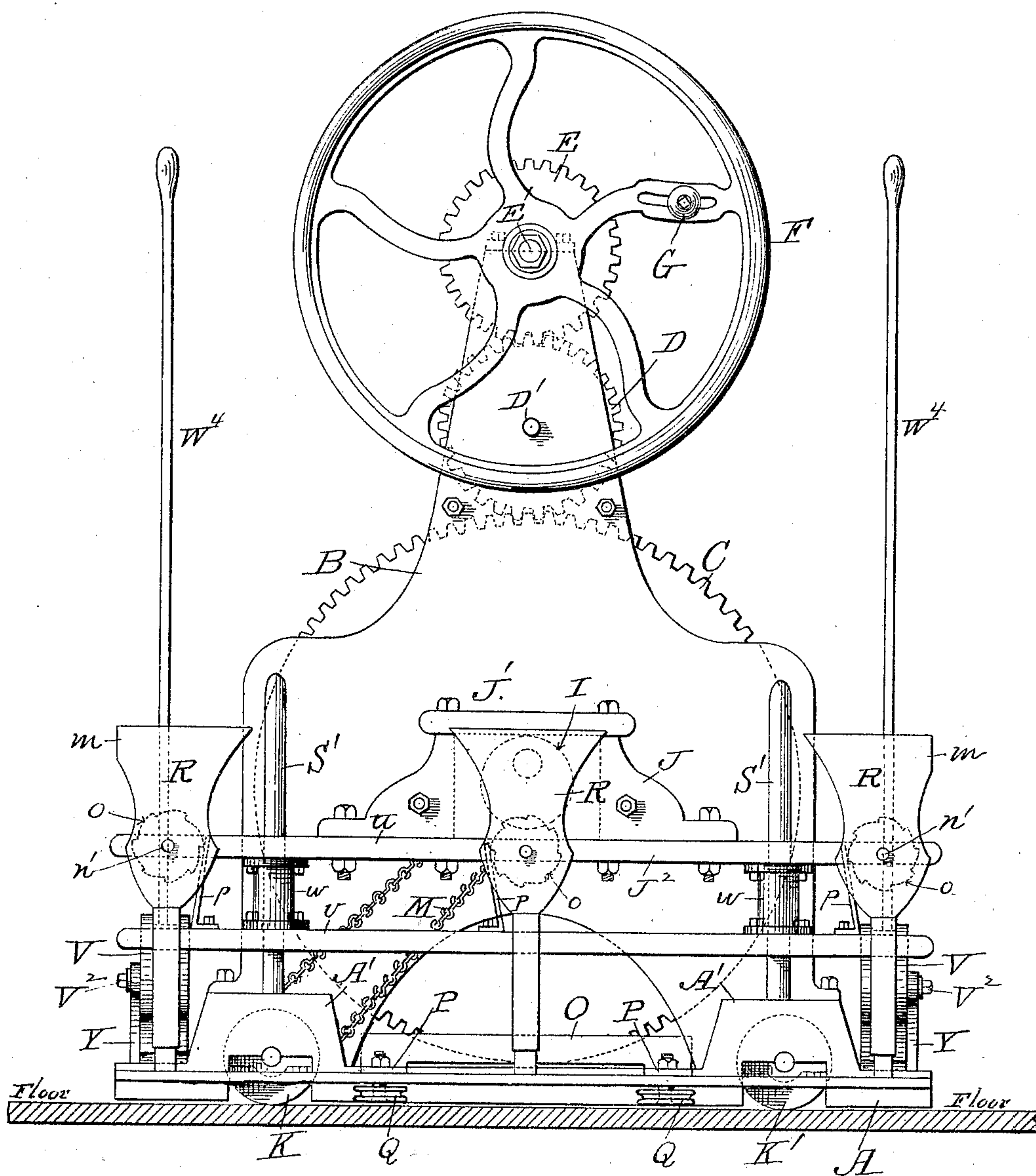
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FIG. 4.



Witnesses;
W. B. Nourse,
A. A. Gilbert.

Inventor;
Joseph C. Daigneault.
By A. A. Barker. Atty.

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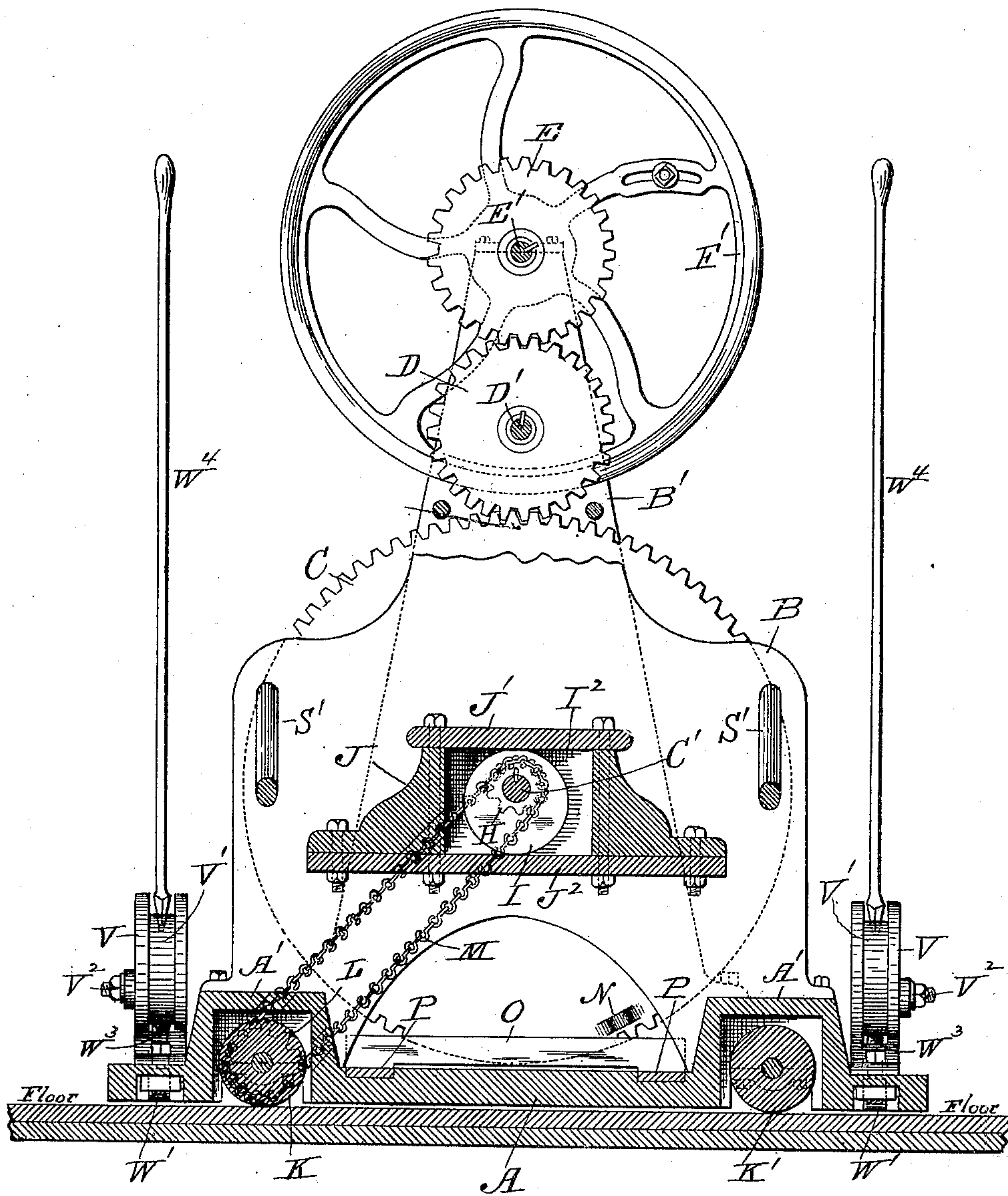
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FIG. 5.



Witnesses;
W. B. Nourse.
A. A. Gilbert.

Inventor;
Joseph C. Daigneault.
By A. A. Parker. Att'y.

No. 706,805.

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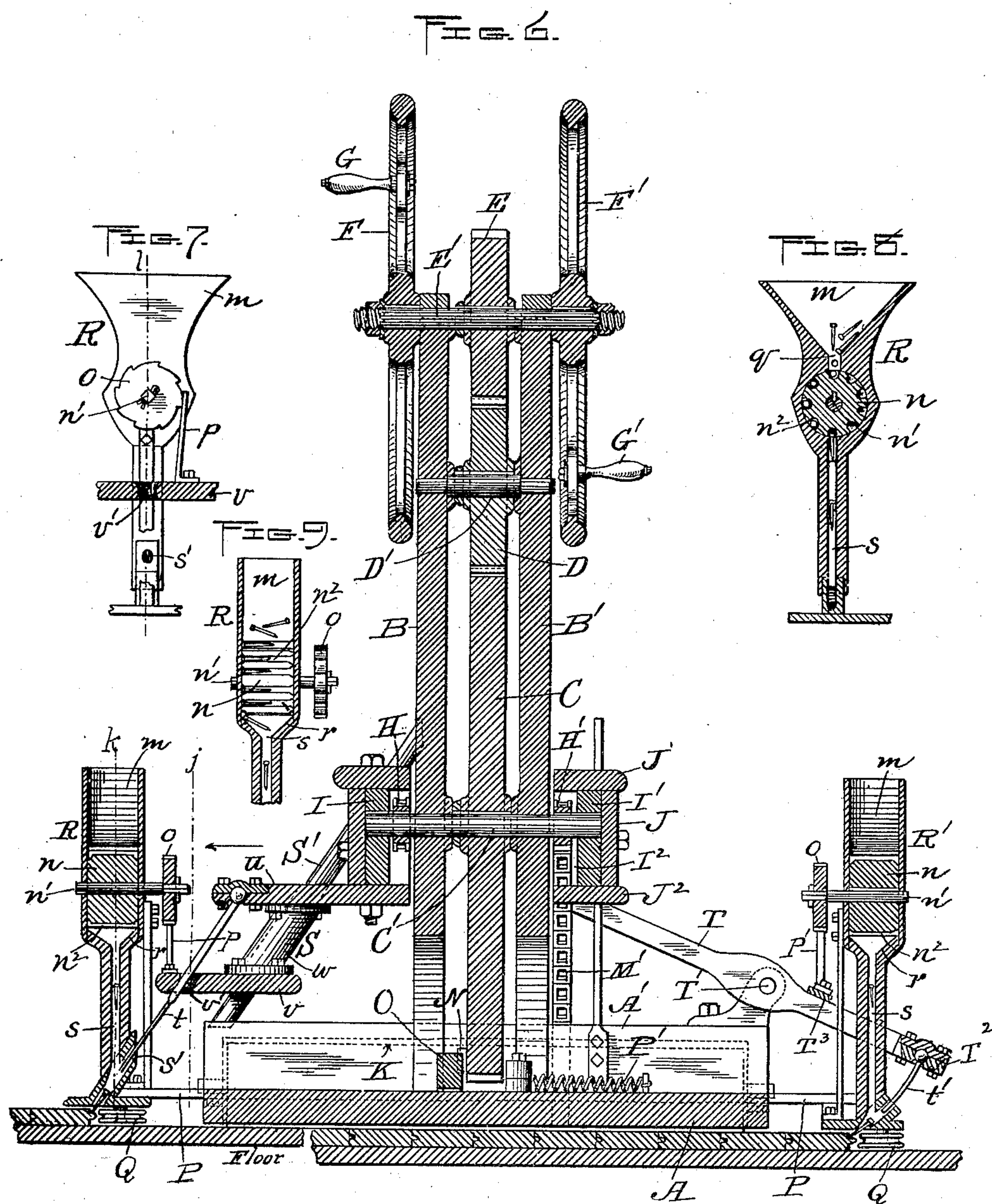
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6 Sheets—Sheet 6.



WITNESSES;
W. B. Nourse.
A. A. Gilbert.

Inventor,
Joseph C. Daigneault.
By A. A. Barker. Atty.

UNITED STATES PATENT OFFICE.

JOSEPH C. DAIGNEAULT, OF WORCESTER, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO WILFRED A. BEAUDETTE, OF WORCESTER, MASSACHUSETTS.

FLOOR LAYING AND NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 706,805, dated August 12, 1902.

Application filed November 20, 1899. Serial No. 737,589. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH C. DAIGNEAULT, of the city and county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Floor-Laying Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a top or plan view of my said improved floor-laying machine. Fig. 2 is an end view of the machine looking in the direction of arrow *a*, Fig. 1, a part of said figure being broken away to more fully illustrate some of the operating parts hereinafter described. Fig. 3 is a side view looking in the direction of arrow *b*, Fig. 1. Fig. 4 is a side view looking in the direction of arrow *c*, Fig. 1. Fig. 5 is a vertical section taken on line *d e*, Fig. 2, looking in the direction of arrow *f*, same figure, and showing a side view of the parts coming beyond said section-line. Fig. 6 is a central vertical section taken on line *g h*, Fig. 1, looking in the direction of arrow *i*, same figure. Fig. 7 is a vertical section taken at the point indicated by lines *j j*, Figs. 2 and 6, showing a side view of one of the feed devices of the machine beyond said section-lines. Fig. 8 is a vertical section taken at the point indicated by lines *k k*, Figs. 2 and 6; and Fig. 9 is a vertical section, partly in elevation, taken on line *l*, Fig. 7.

My invention is designed principally for laying the top or finish flooring over large surfaces, such as in churches, public halls, factories, and similar large floors.

Said invention consists of a machine operated by hand-power and by means of which the nails may be driven automatically at certain distances apart as said machine is moved continuously in a lateral direction lengthwise of and parallel to the edges of the boards by turning the hand-wheel of said machine, as will be hereinafter more fully set forth.

To enable others to better understand the nature and purpose of my said invention, I will now proceed to describe it more in detail with reference to the accompanying drawings.

In said drawings, A represents the bed of

the machine, upon which are mounted the two vertical supporting-stands B B'. Between said vertical stands are arranged the large bottom gear C and the smaller gears D E above said large gear, each being respectively mounted upon a horizontal transverse shaft C', D', and E', fitted to turn in suitable bearings in stands B B'. To the outer ends of the upper shaft E' are secured hand-wheels F F', each respectively provided with a handle G G' for turning the same. The object of having a wheel upon each side will be described later. Upon the bottom shaft C' are mounted the sprocket-wheels H H', which are secured to the shaft next to the stands B B', and outside of said sprocket-wheels are also secured to said shaft C' the eccentrics I I', one upon each end, and which are fitted to turn in an opening I² between the top and bottom plates J' J² of frame J for the purpose hereinafter described.

Just inside of each end of the machine-bed are formed boxes A' A', open at the bottom, in which are arranged transverse rolls K K', fitted to turn in suitable bearings at the ends of said boxes. Said rolls are adapted to travel over the surface of the flooring lengthwise of the floor-boards. Upon each roll K K' is respectively mounted a toothed wheel L (see dotted lines, Fig. 5) in alinement with the sprocket-wheels H H' on shaft C', and over said toothed wheels and sprocket-wheels are respectively arranged the endless chains M M'.

By the foregoing construction and arrangement it will be seen that by turning one of the hand-wheels F or F' the rolls K K' will also be turned through the various connections described, and the whole machine is thereby moved laterally over the floor. Said operation at the same time causes certain devices on said machine to be automatically operated for clamping each floor-board up tight against the edge of the flooring already laid and also for driving the nails therein at equal distances apart to fasten them after having been thus clamped in position.

In laying the floor-boards they are first placed in position by hand in advance of the machine, with their grooved and tongued

edges fitted together and their ends abutting. The machine then follows and clamps said boards up tight in position and drives the nails therein automatically, as aforesaid.

5 They are thus automatically clamped in the following manner: Upon the side of the large gear C, near its periphery, is formed a cam projection N, which as the gear turns impinges against a cross-bar O and forces it longitudinally to one side. The ends of said

10 cross-bar are secured to longitudinally-operating slide-bars P P, fitted to slide in bed A, and the outer ends of said slide-bars carry horizontal friction-rolls Q, adapted to bear

15 against the edges of the floor-boards. Therefore it is obvious that when the cross-bar O is forced longitudinally to one side by the cam projection N, as aforesaid, said friction-rolls are likewise moved in the same direc-

20 tion and force the board being laid up tight against the one previously laid and nailed in position ready to be also nailed in place. The slide-bars P P and parts connected therewith are drawn back after each movement impart-

25 ed by the cam projection N by means of suitable springs P' P', attached at one end to said bars P P and at their other ends to some fixed point on the machine. The last board laid

30 having been clamped in position, as aforesaid, it is nailed down while it is still clamped by means of devices which automatically feed and drive the nails as the machine is continuously moved laterally forward on its

35 carrying-rollers K K', as previously described. Said nail feeding and driving devices are constructed and arranged to operate in the following manner: The feed devices R, of which

40 there are three shown in this instance upon each side of the machine, each comprise a hopper *m* for holding a quantity of nails, a longitudinally-corrugated cylinder *n*, arranged in a suitable chamber under said hopper and mounted on a shaft *n'*, fitted to turn in suitable bearings, and a ratchet-wheel *o* and

45 pawl *p* for operating said cylinder *n*. An oblong opening *q* is formed at the bottom of hopper *m*, through which the nails one at a time discharge from said hopper onto the corrugated surface of cylinder *n*, one nail

50 dropping into each longitudinal groove or corrugation *n*² as said cylinder is intermittently rotated. It is thus kept filled around one-half of its periphery, and as each groove or corrugation arrives at the bottom the nail

55 lying therein drops down therefrom onto the downwardly-inclined interior surface *r* with the drive-point of the nail pointing downward, and in this position slides down through the guideway *s* to the edge of the board, as

60 is indicated in Fig. 6 of the drawings, ready to be driven by the driver *t* or *t'*.

The cylinder *n* is turned, as aforesaid, to carry around the nails and intermittently deposit them one after another into the guideway or chute *s* by the operation of one or the other of the eccentrics I I', which cause the vertical pawls *p p'* to be elevated and low-

ered, through suitable connections hereinafter described, and thereby turns its respective ratchet-wheel *o* or *o'*, which is mounted 70 on the same shaft *n'* as cylinder *n*. The eccentrics I I' not only impart the power to turn cylinders *n*, but also to operate the nail-drivers *t t'*. The means for supporting said nail-drivers and the pawls for operating the 75 cylinders *n* are different upon one side of the machine from those upon the opposite side of said machine, for the reason that in laying and nailing down the first few boards of the flooring it is necessary to place the machine 80 upon the under or lining floor, close to the wall or partition, and drive the nails into the flooring being laid between said machine and said wall or partition in a direction inclined outward from the machine, as is best shown 85 in Fig. 6. The floor-boards are fitted and the nails driven therein with the machine in said position until sufficient flooring has been laid for the machine to rest upon it. Said machine is then moved onto the top flooring 90 already laid, with the feed devices and nail-drivers just over and forward of the outside edge of the last line of boards laid. The nails are then driven at an incline, pointing inward toward the machine, as is also shown 95 in said Fig. 6. In order to thus drive the nails outward from the machine upon one side thereof and inward upon its other side, it is obvious that the supports for the nail-drivers *t* must be different upon one side 100 from those upon the other side, as aforesaid. The driver *t*, which points outward for driving the nails into the boards next to the wall or partition, is mounted upon a carriage S, fitted to slide up and down on stationary inclined guide-rods S' S'. Said carriage consists 105 of the top and bottom horizontal plates *u v* and sleeves *w w*, attached to said plates *u v* and fitted to slide on the guide-rods S'. The drivers *t* are each pivoted at their upper ends 110 to the outer edge of the top plate *u*, and each passes through a guide-opening *v'* in the plate *v*. The bottom end of each driver works up and down in an inclined guide-opening *s'*, which is made at the proper incline to drive 115 the nail into the edge of the floor-board just above its tongue, as is shown in Fig. 6. The top plate *u* constitutes a part of the bottom plate J' of frame J. Therefore when said frame is elevated and lowered by its eccentric I the drivers *t* are moved up and down 120 endwise with quick intermittent movements to drive each nail passed down under the end thereof. Each pawl *p* is attached at its lower end to the plate *v*, and consequently when 125 the carriage S is moved up the upper end of each pawl engages with its respective notch in the ratchet-wheels *o* and turns the same one notch forward, which is just sufficient to move each cylinder *n* the distance between 130 one nail-groove and the next.

In practice it will be understood that the various parts are constructed and adjusted so as to feed each nail into position to be

driven just after the floor-board has been clamped in place and just prior to the driver descending to drive said nail.

All the pawls p and drivers t upon one side of the machine being attached to the same carriage S they of course operate together in feeding and driving the nails. In this instance three of said feed devices and drivers are shown upon each side of said machine, as previously stated; but, if desired, a greater or less number may be employed in practice. The feed devices R' upon the opposite side of the machine from feed devices R are made and operate to feed the nails substantially in the same way as said devices R ; but the supports for the nail-drivers t' are different from those of the nail-drivers t . In this instance levers $T T$, pivoted at $T' T'$ to a fixed bearing and carrying the cross-bar T^2 on their outer ends, are employed instead of the carriage S , as in the other instance. The drivers t' are pivoted to said cross-bars T^2 , and the upright pawls p' are secured to another cross-bar T^3 on said levers $T T$. The inner ends of said levers $T T$ are each pivoted to the ends of short links $U U$, which are in turn pivoted to studs $U' U'$, secured to the ends of vertically-reciprocating frame J . By the above construction it is obvious that when said frame J is elevated by its eccentric I' the outer ends of the levers $T T$ are depressed, and thereby cause the drivers t' to be moved down to drive the nails, and when lowered said drivers are drawn up again into the position shown in Fig. 6.

As previously described, the whole machine is moved bodily along the floor upon the long rollers $K K'$ when moving in the direction lengthwise of the floor-boards to nail the edges of each succeeding line of boards laid; but at times it is necessary to move said machine in the opposite direction or crosswise of the boarding to adjust the same into the proper position to bring the feed devices and nail-drivers where they should come to properly perform their offices as the machine is fed along by the operation of the hand-wheels $F F'$. It is also convenient to be able to move the machine in different directions in transferring it from one position to another in using the same. I have therefore provided an independent device, one upon each side of the machine, operated by hand for thus moving the machine in directions at right angles to the movements imparted by turning the hand-wheels $F F'$. As both devices are alike, it will be unnecessary to describe but one, which is constructed and arranged to operate as follows: To the bed of the machine is secured a bearing V , in which is fitted an eccentric V' , pivoted to a transverse bolt V^2 . Under said eccentric and vertically in alignment therewith is arranged a carriage W , having small wheels W' mounted thereon. Said carriage is arranged loosely in a recess in the under side of bed A , being held in place simply by two springs $W^2 W^2$, so as to keep the

wheels W' elevated a little above the floor. From the top of said carriage a bearing-hub W^3 extends up to the periphery of eccentric V' . Therefore when said eccentric is turned in one direction the carriage is forced down to bring its wheels W' onto the floor, and when turned in the opposite direction, the pressure being released, said carriage and its wheels are forced up again by the springs W^2 into their normal positions off of said floor. The eccentric may be thus turned by means of a suitable bar W^4 , one of whose ends is adapted to be inserted into a radial opening in the periphery of the eccentric. By thus turning the eccentric and forcing the carriage-wheels W' onto the floor the weight of the machine is by additional power on the bar W^4 raised and transferred from the rollers $K K'$ to said wheels W' , so that it may be moved thereon. The operation of swinging the bar W^4 over to depress the carriage and its wheels, as aforesaid, also causes the machine to be moved over the floor through the crank-arm X , connecting-rod Y , and barbed shoe Z . The crank-arm X is secured at its inner end to one end of eccentric bolt V^2 , and to its outer end is pivoted the connecting-rod Y , which is fitted to slide in a fixed guide-bearing Y' . The shoe Z is pivoted to the outer end of said connecting-rod and is adapted to bear upon the floor and hold thereon by means of its spurs Z' when pressure is applied against the same to move the machine in the opposite direction. In practice it will be understood that when the handle of bar W^4 is moved in the direction indicated by the arrow in Fig. 2 the eccentric first forces the wheels W' down and transfers the weight from the rollers $K K'$ to said wheels W' , and immediately following said transfer the power is transmitted through the connections described to the shoe Z , and the machine is thereby moved. Only short movements in this direction are necessary in the operation of the machine, said machine being arranged to travel principally on the rollers $K K'$, as hereinbefore described. In moving the machine by the bar W^4 it is done by short hitches—that is, by swinging said bar forward and back, so as to alternately engage the shoe Z with the floor and move it back again into position for each intermittent forward movement of the machine.

In operating the machine in practice, after the first few boards have been laid across the room or hall next to the wall or partition, the feed devices, nail-drivers, and their connections with the driving power may be removed from the machine before adjusting said machine onto the top flooring preparatory to proceeding with the floor-laying over the balance or main part of the floor-surface, and thereby considerably lighten the weight of the machine, or said parts may be left on, as preferred.

The right is reserved to make such modifications in the construction of the machine as

circumstances may require and coming within the scope of my invention.

Having now described said invention, what I claim therein as new, and desire to secure by Letters Patent, is—

1. A floor-laying machine comprising in combination a bed having supporting-standards carrying horizontal shafts; a series of vertically-arranged, intermeshing gears, mounted on said shafts and having means for turning them; sprocket-wheels, mounted on one of the shafts of said gearing; horizontal rollers fitted to turn in suitable bearings in the bed, and each having a gear mounted thereon; endless chains engaging said sprocket-wheels and the last-named gears; an eccentric mounted on one of the gear-shafts; a frame fitted over and operated by said eccentric; a nail-driver pivoted to a suitable support connected with the eccentric-frame; horizontal bars, fitted to slide longitudinally in the bed; means for imparting longitudinal movements thereto from one of the gears and for drawing them back when the pressure is removed; combined nail receptacle and feed devices mounted on said slide-bars and operated by connection with the eccentric-frame to intermittently feed the nails into position for the drivers to act thereon, and said drivers also mounted on supports connected with the eccentric-frame, substantially as and for the purpose set forth.

2. In a floor-laying machine, the combination of the bed and vertical stands mounted thereon, with a series of vertically-arranged, intermeshing gears mounted on horizontal shafts, in turn mounted in said stands, one of said gears being provided with a cam projection; means for turning said gears; a pair of rollers, one at each side of the machine fitted to turn in suitable bearings and adapted to travel upon the floor; means for connecting said rollers with one of the gear-shafts to impart the driving power thereof to said rollers; horizontal bars fitted to slide in the bed, and adapted to be moved longitudinally by engagement with the aforesaid cam projection on the gear; means for imparting opposite longitudinal movements thereto, and horizontal friction-rolls mounted on the outer ends of said bars and adapted when moved forward to bear against the edge of the board being laid, substantially as and for the purpose set forth.

3. In a floor-laying machine, the combination of the bed and vertical stands mounted thereon, with a series of vertically-arranged intermeshing gears mounted on horizontal shafts, in turn mounted in said stands, one of said gears being provided with a cam projection; means for turning said gears; a pair of rollers, one at each side of the machine, fitted to turn in suitable bearings and adapted to travel upon the floor; means for connecting said rollers with one of the gear-shafts to impart the driving power thereof to said rollers; horizontal bars fitted to slide in

the bed and adapted to be moved longitudinally by engagement with the aforesaid cam projection on the gear; means for imparting opposite longitudinal movements thereto; horizontal friction-rolls mounted on the outer ends of said bars and adapted when moved as aforesaid, to bear against the edge of the board being laid; combined nail receptacles and feed devices mounted on said longitudinally-operating bars, each device consisting of an outer case having a hopper at its upper end for the nails and a chute for guiding the nails to the edge of the floor-board, a transversely-arranged, longitudinally-grooved cylinder fitted to turn in said case, and a ratchet-wheel attached to the shaft of said grooved cylinder, and adapted to be turned by a reciprocating pawl on the machine, substantially as and for the purpose set forth.

4. In a floor-laying machine, the combination of the bed and vertical stands mounted thereon with a series of vertically-arranged intermeshing gears mounted on horizontal shafts, in turn mounted in said stands; means for turning said gears; an eccentric mounted on one of the gear-shafts; the frame in which said eccentric is fitted to turn, having means for supporting a vertically-arranged pawl; said pawl, adapted to engage with the ratchet-wheel of the feed device, and said ratchet-wheel, substantially as and for the purpose set forth.

5. In a floor-laying machine, the combination of the bed and vertical stands mounted thereon, with a series of vertically-arranged, intermeshing gears mounted on horizontal shafts, in turn mounted in said stands; means for turning said gears; an eccentric mounted on one of the gear-shafts; the frame in which said eccentric is fitted to turn, having means for supporting a vertically-arranged pawl; said pawl adapted to engage with the ratchet-wheel of the feed device, said ratchet-wheel; the shaft upon which it is mounted; the longitudinally-grooved cylinder of the feed device also mounted on said shaft; the feed-device case, having a hopper at its upper end to receive the nails and a suitable chute for guiding said nails to the edges of the floor-boards, and means for supporting said feed device, substantially as and for the purpose set forth.

6. In a floor-laying machine, the combination of the bed and vertical stands mounted thereon, with a series of vertically-arranged intermeshing gears mounted on horizontal shafts, in turn mounted in said stands; means for turning said gears; an eccentric mounted on one of the gear-shafts; the frame in which said eccentric is fitted to turn, the nail-drivers mounted on a support on said frame and the feed device, substantially as and for the purpose set forth.

7. In a floor-laying machine, the combination of the vertically-reciprocating pawl for operating the ratchet-wheel of the feed device, with said ratchet-wheel; the shaft upon which

it is mounted; the longitudinally-grooved cylinder, also mounted on said shaft for carrying around the nails to the chute of the device; the case of the device having a hopper
5 at its upper end to receive the nails and a chute for guiding said nails to the edges of the floor-boards, and means for supporting said feed device, substantially as and for the purpose set forth.

10 8. In a floor-laying machine, the combination of the bed and vertical stands mounted thereon, with a series of vertically-arranged intermeshing gears mounted on horizontal shafts, in turn mounted in said stands; means
15 for turning said gears; an eccentric mounted on one of the gear-shafts; the frame in which said eccentric is fitted to turn; a link, pivoted to each end of said frame; two levers, each pivoted to said links and to a fixed bearing,
20 and the nail-drivers mounted on the outer ends of said levers, substantially as and for the purpose set forth.

9. In a floor-laying machine, the combination of the bed and a vertical fixed bearing
25 mounted thereon, with an eccentric pivoted

on a transverse bolt in said bearing and having means for turning it; said bolt; a carriage arranged in the bed under said eccentric; wheels mounted thereon and normally
out of contact with the floor, and means for
30 connecting said carriage with the eccentric, and for elevating and depressing the carriage, substantially as and for the purpose set forth.

10. In a floor-laying machine, the combination of the bed and a vertical, fixed bearing,
35 mounted thereon, with an eccentric pivoted on a transverse bolt in said bearing and having means for turning it; said bolt; a crank-arm attached to said bolt; a connecting rod or lever pivoted to said crank-arm and fitted
40 to slide in a fixed bearing, and a shoe pivoted to the outer end of said rod or lever and provided with spurs adapted to engage with the floor, substantially as and for the purpose set forth.

JOSEPH C. DAIGNEAULT.

Witnesses:

A. A. BARKER,
W. B. NOURSE.