No. 891,192. PATENTED JUNE 16, 1908.

C. C. SMALL.

HEEL NAILING MACHINE.

APPLICATION FILED NOV. 8, 1889.

10 SHEETS—SHEET 1.

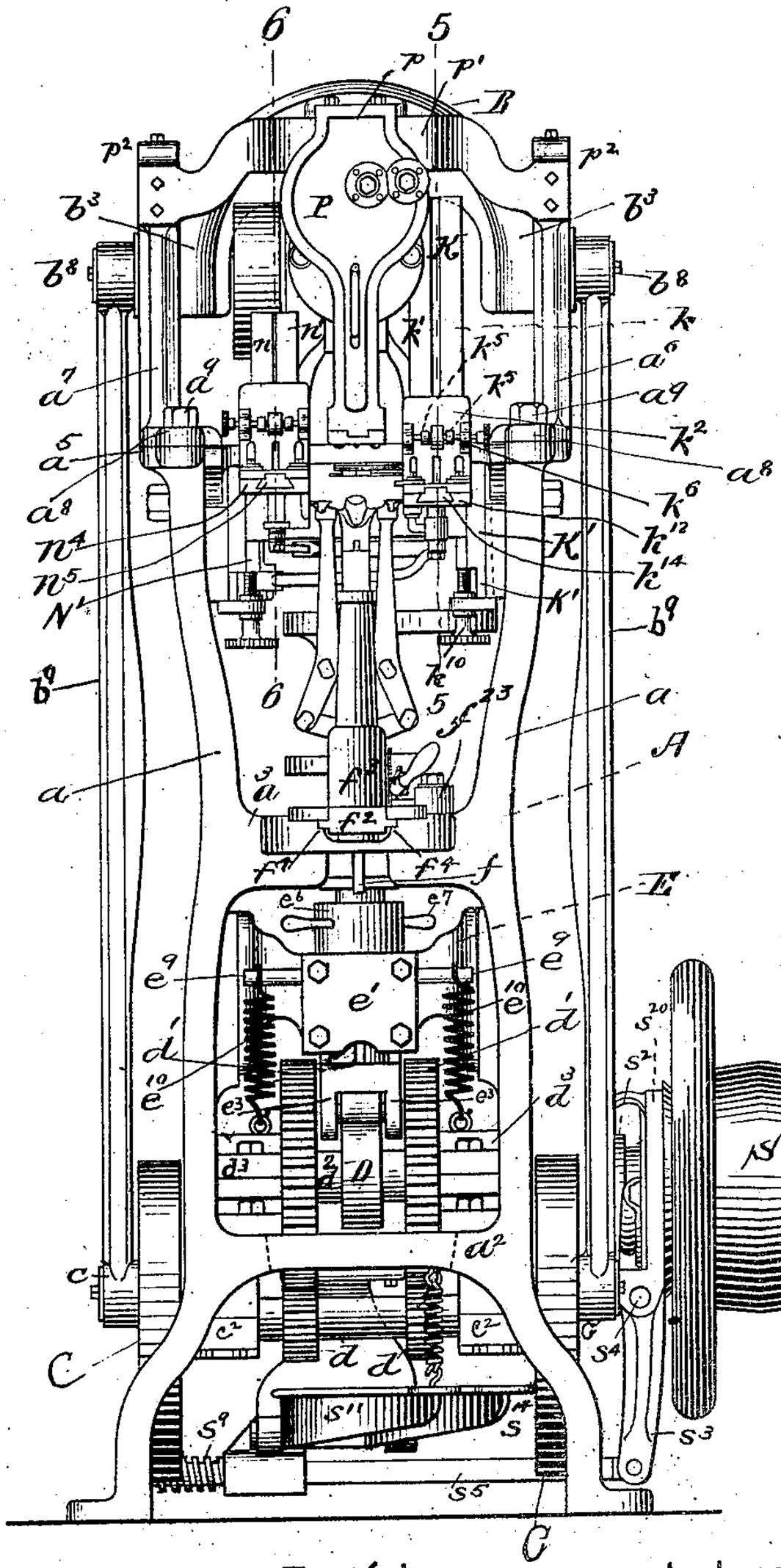

Fig. 1.

WITNESSES.

A. P. Porter.

L. McDean

INVENTOR.

Charles C. Small

by his attys

Clarke & Raymond

No. 891,192. PATENTED JUNE 16, 1908.

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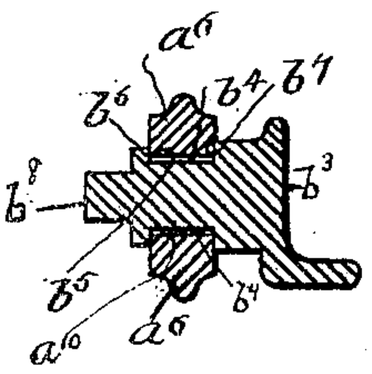

Fig. 11.

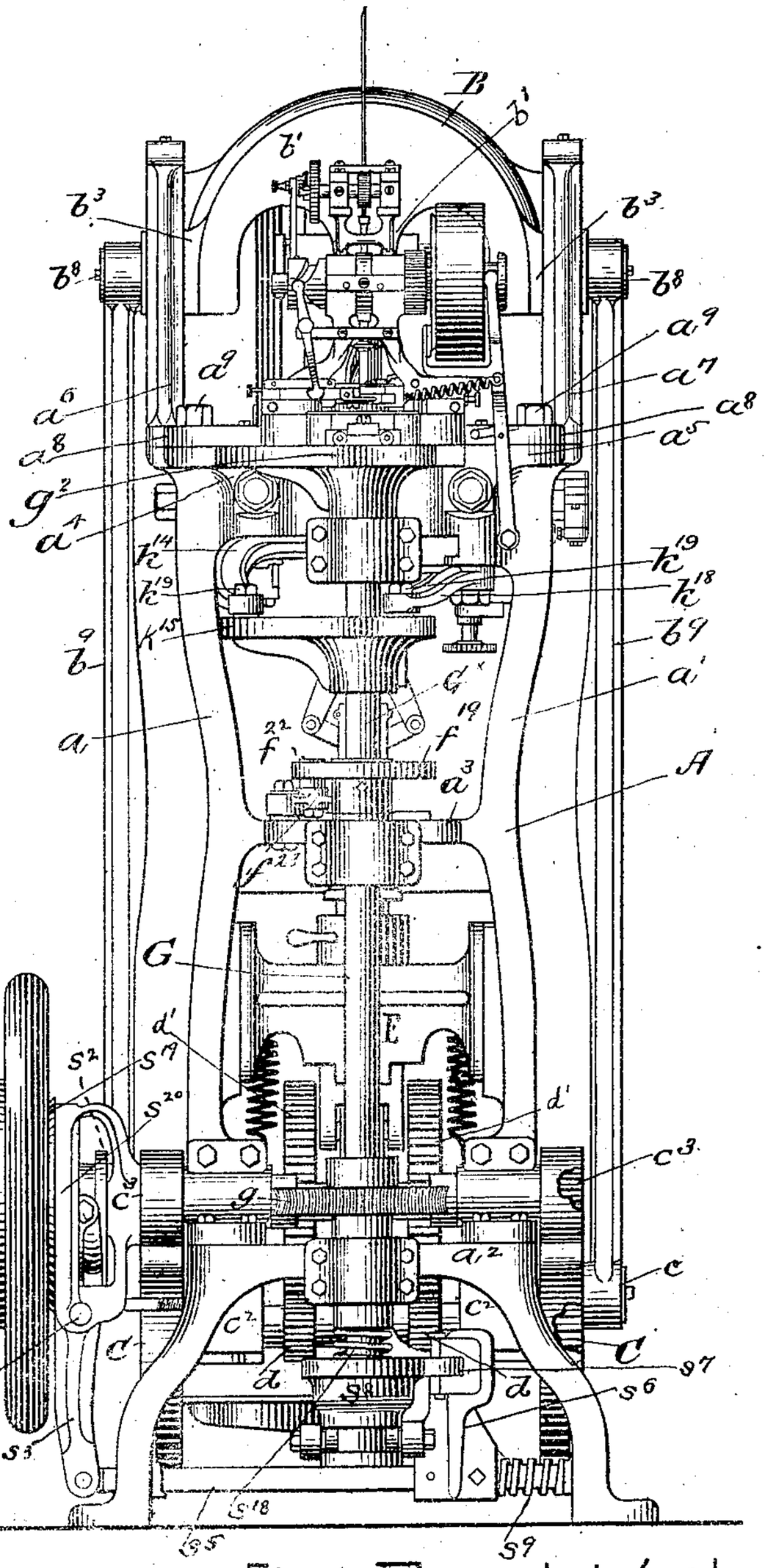

Fig. 2.

WITNESSES.

A. P. Porter.

K. McDolan

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Charles & Raymond

No. 891,192. PATENTED JUNE 16, 1908.

C. C. SMALL.

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10 SHEETS—SHEET 3.

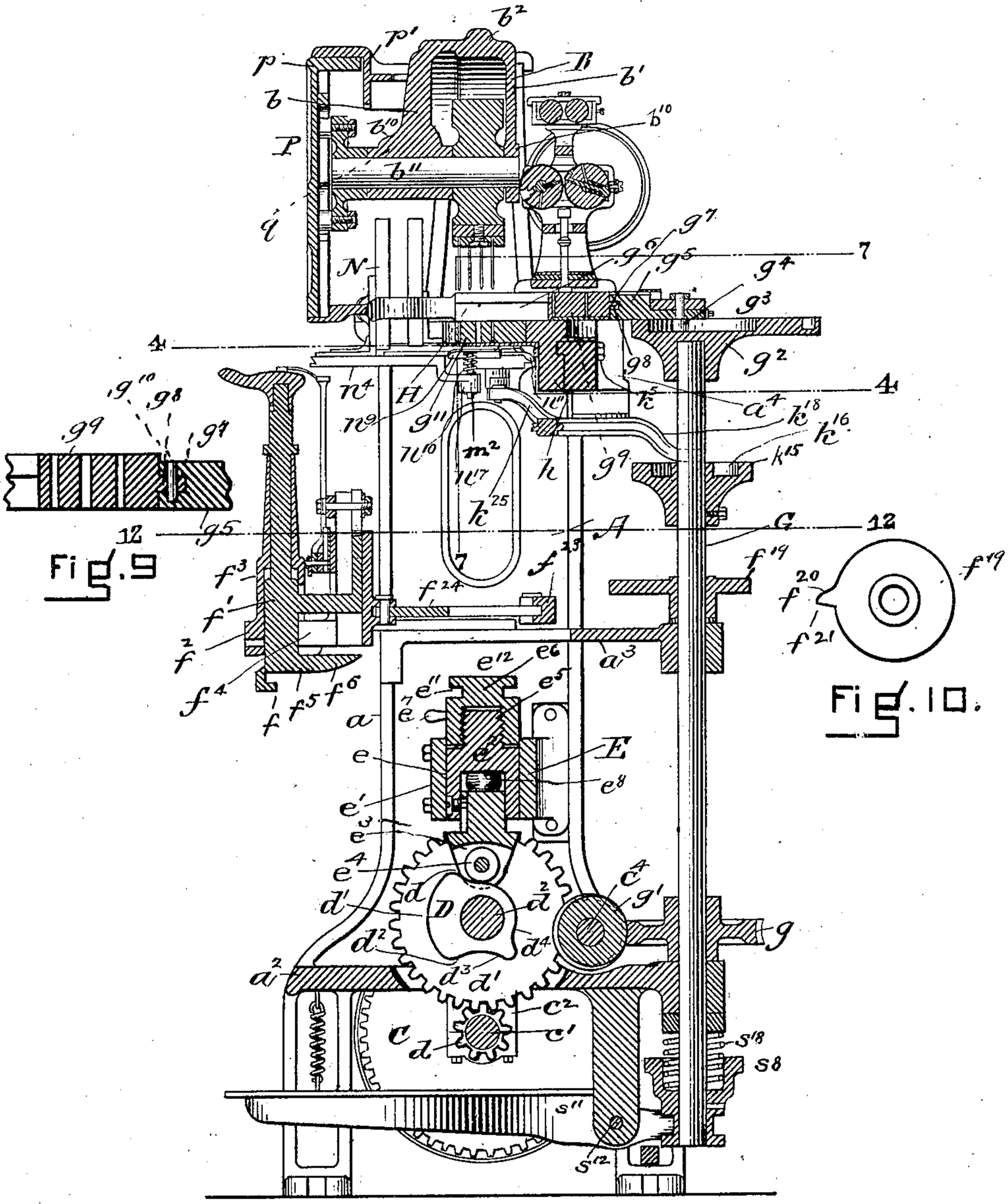

Fig. 9

Fig. 10.

Fig. 3.

WITNESSES.

A. P. Porter.

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by his attys

Charles A. Raymond & Co.

No. 891,192. PATENTED JUNE 16, 1908.

C. C. SMALL.

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10 SHEETS—SHEET 4.

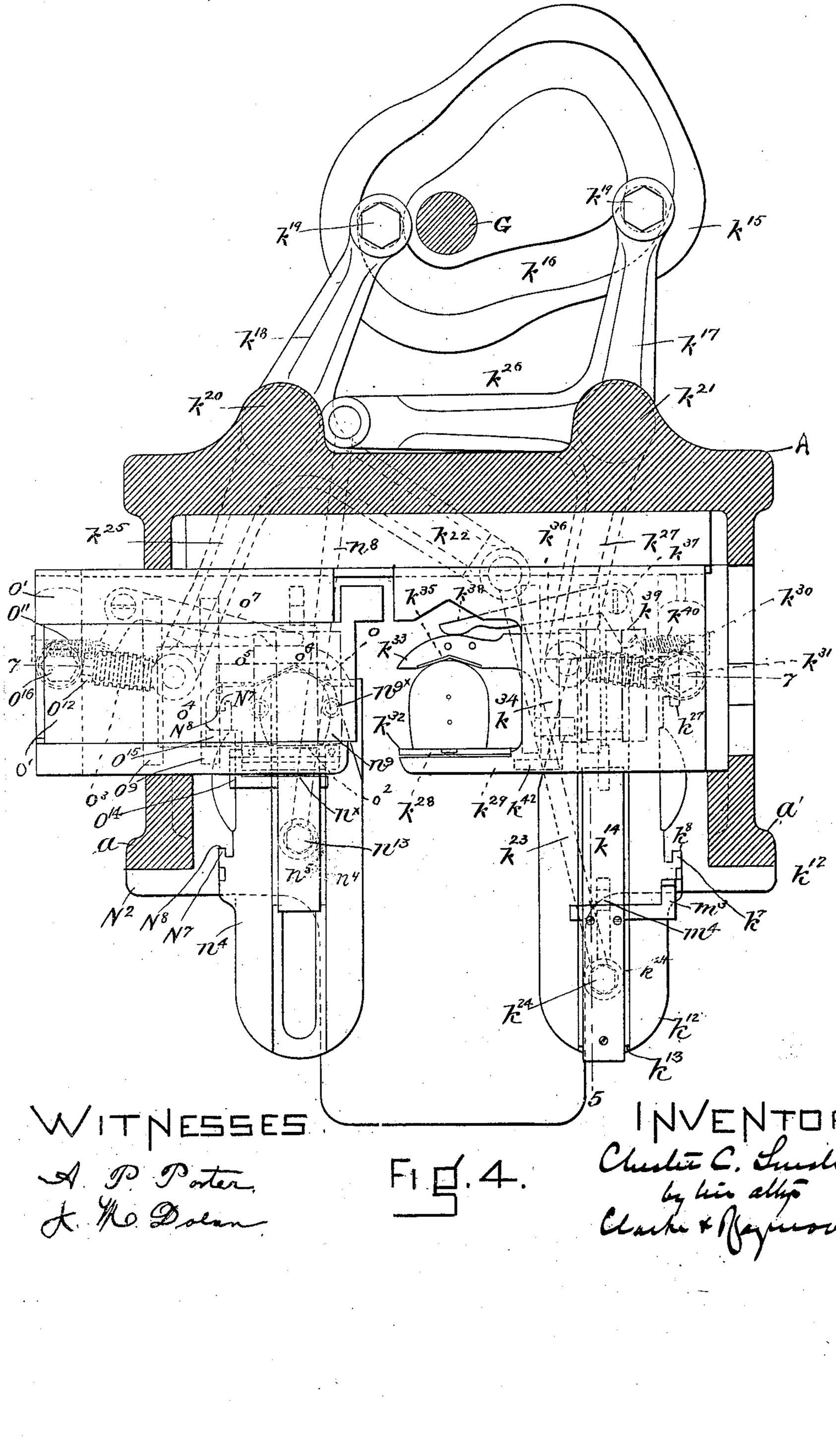

Fig. 4.

WITNESSES

A. P. Porter.

L. McDolan

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Charles C. Small

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Clarke & Raymond

No. 891,192. PATENTED JUNE 16, 1908.

C. C. SMALL.

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10 SHEETS—SHEET 5.

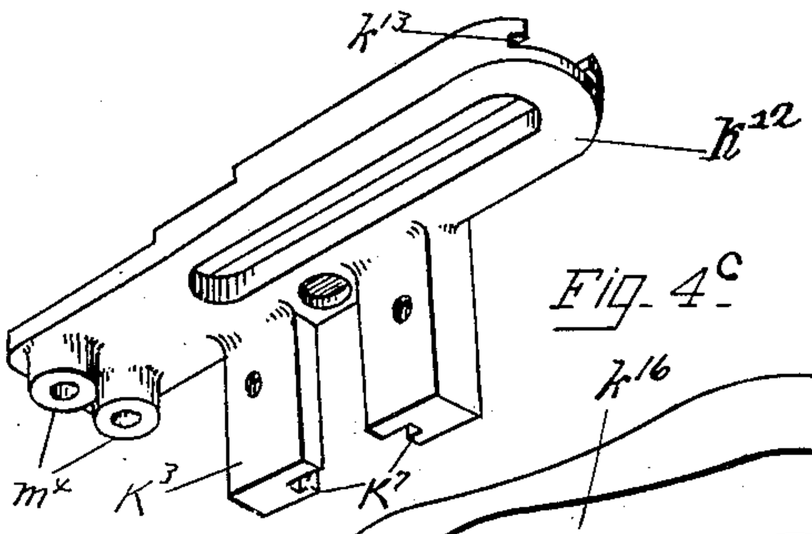

Fig. 4c

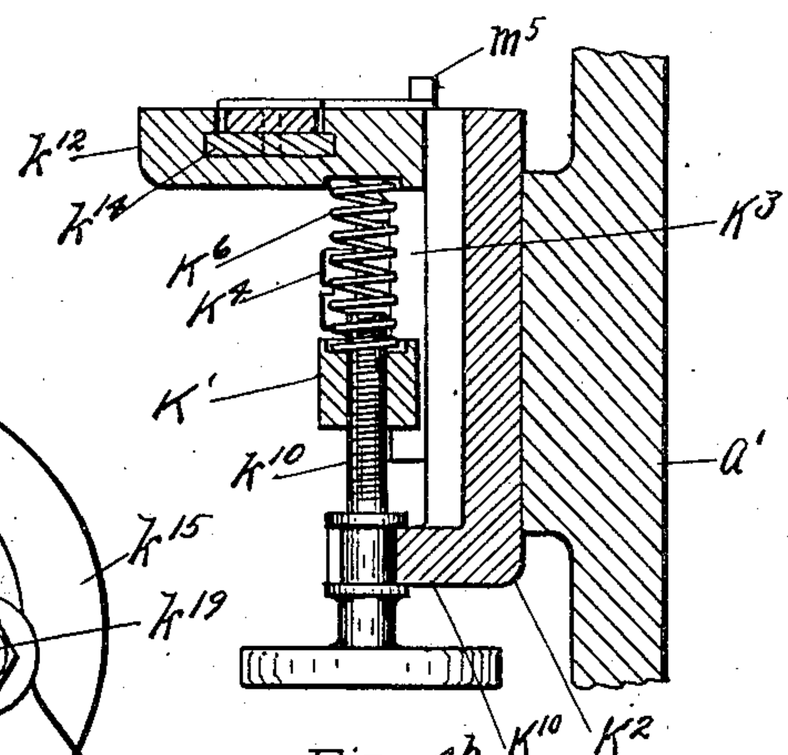

Fig. 4b

Fig. 4a

WITNESSES.

J. M. Dalon

M. V. Foley

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Charles C. Small

by Blanchard Kaymond

his Attys

No. 891,192. PATENTED JUNE 16, 1908.

C. C. SMALL.

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10 SHEETS—SHEET 6.

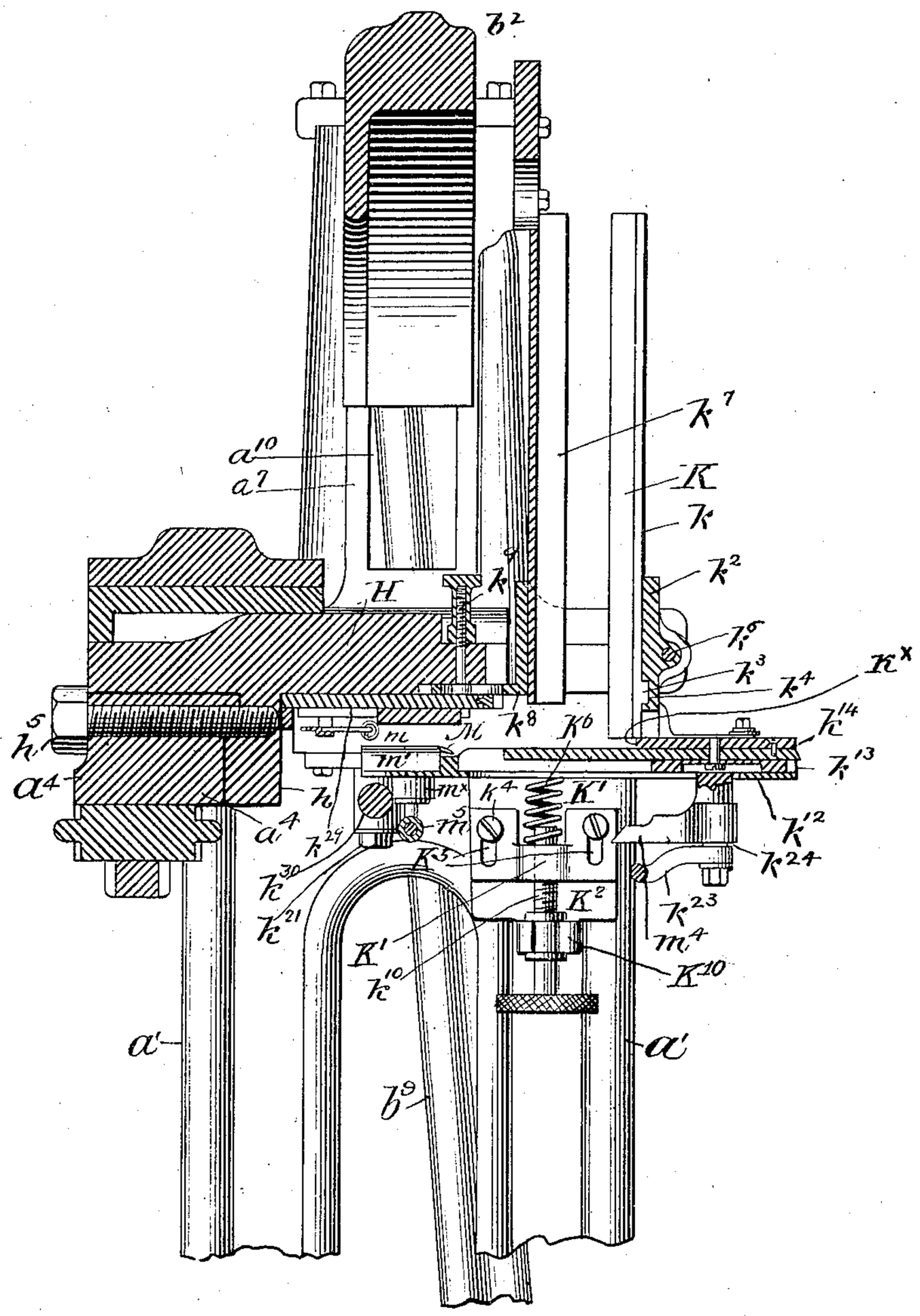

Fig. 5

WITNESSES.

A. P. Porter.

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by his attys—

Clarke & Raymond

No. 891,192. PATENTED JUNE 16, 1908.

C. C. SMALL.

HEEL NAILING MACHINE.

APPLICATION FILED NOV. 8, 1889.

10 SHEETS—SHEET 7.

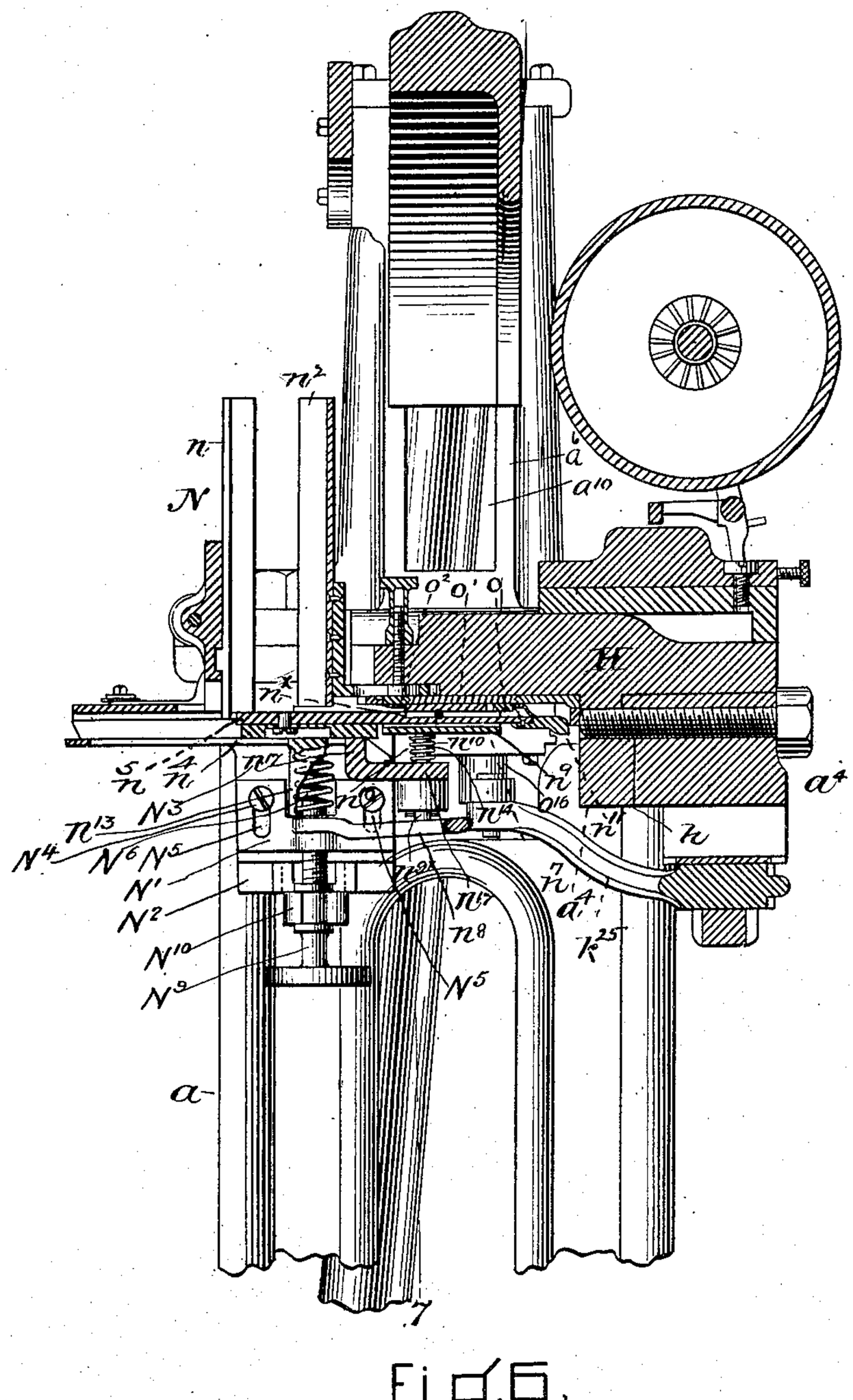

Fig. 6.

WITNESSES

A. P. Porter.

J. McDolan.

INVENTOR

Charles C. Small

by his attys

Clarke & Raymond

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C. C. SMALL.

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APPLICATION FILED NOV. 8, 1889.

10 SHEETS—SHEET 8.

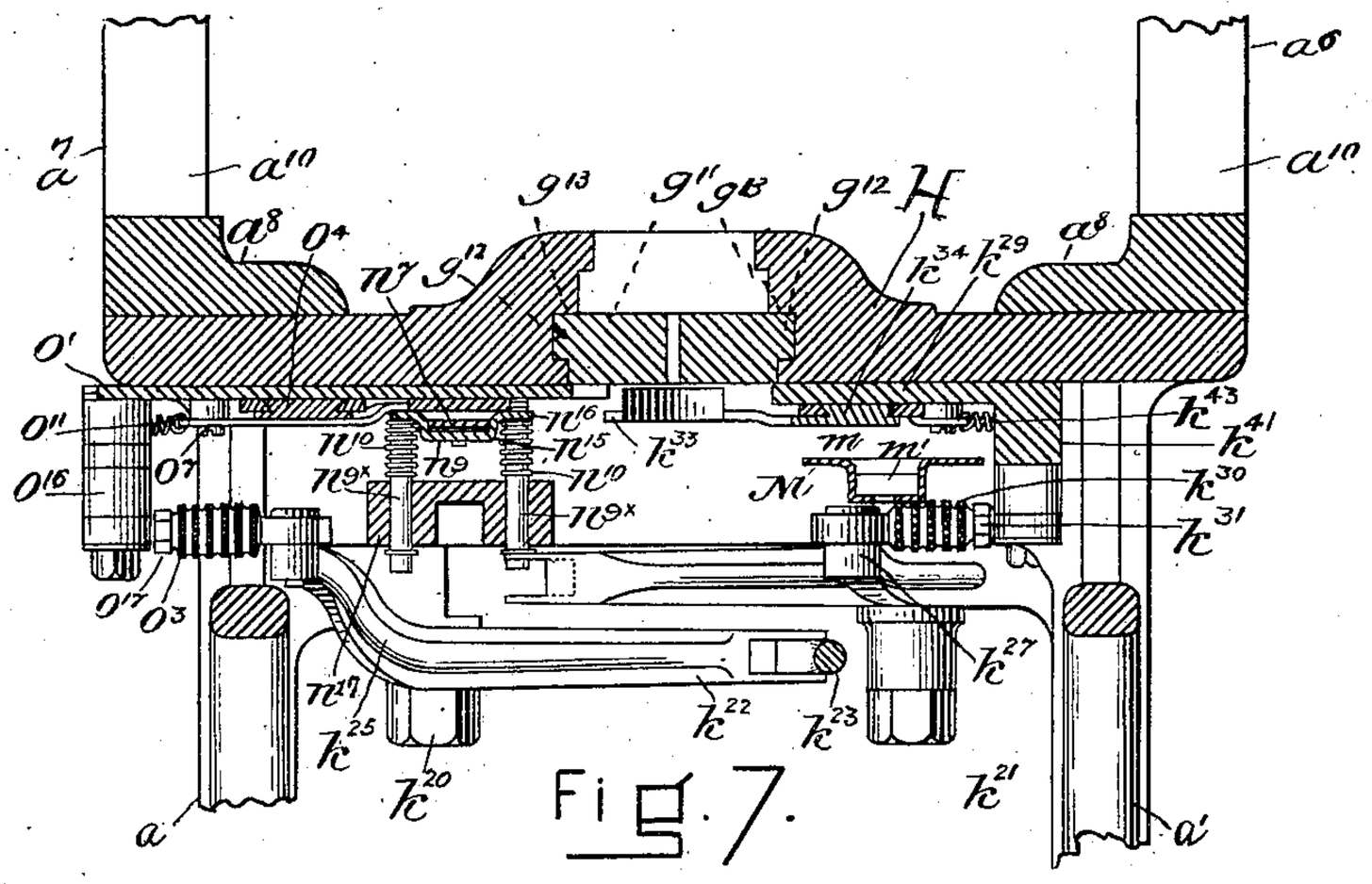

Fig. 7.

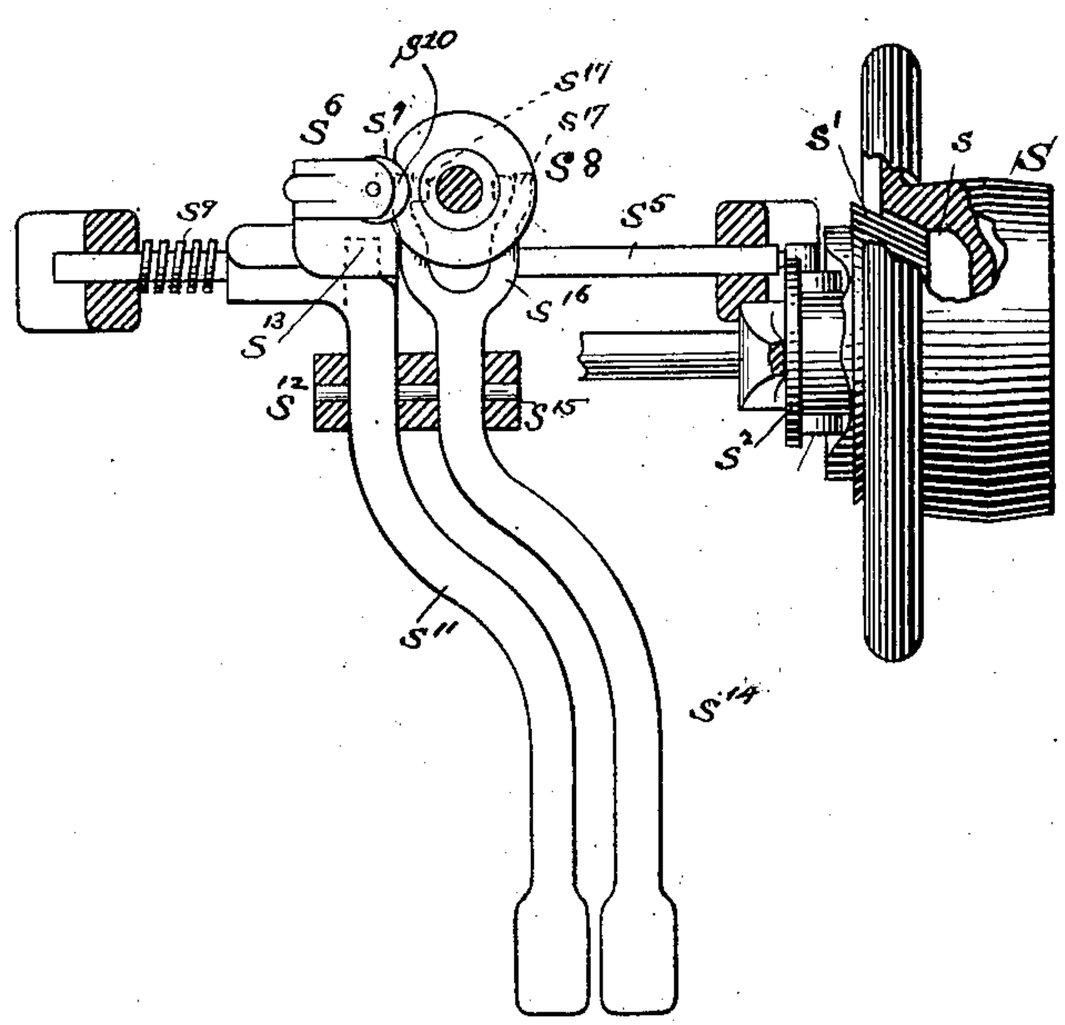

Fig. 8.

WITNESSES

A. P. Porter.

J. McD. Dolan.

INVENTOR.

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Clarke & Raymond

No. 891,192. PATENTED JUNE 16, 1908.

C. C. SMALL.

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10 SHEETS—SHEET 9.

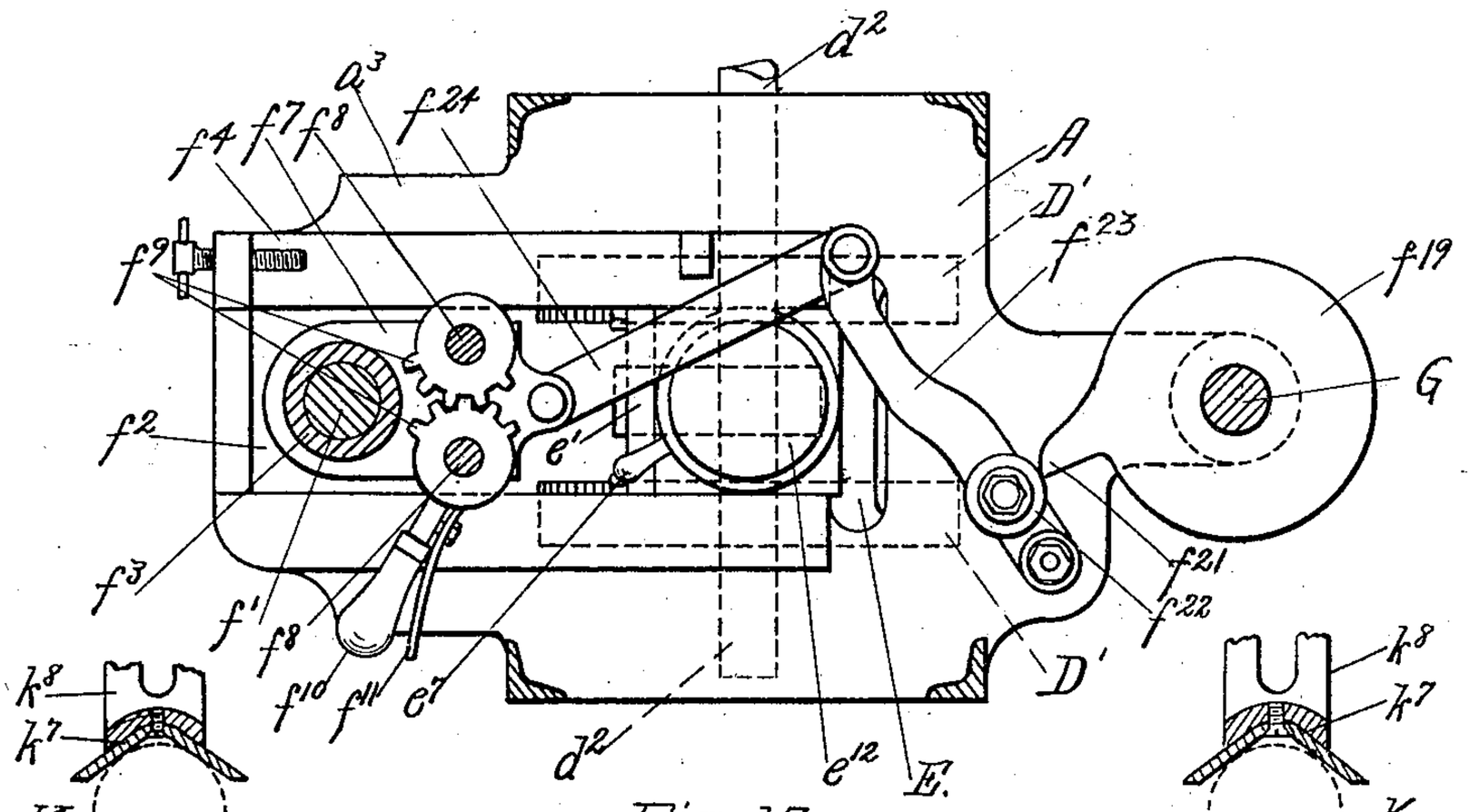

Fig. 12.

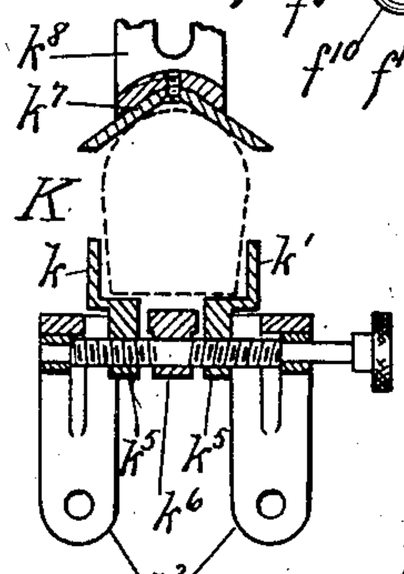

Fig. 21.

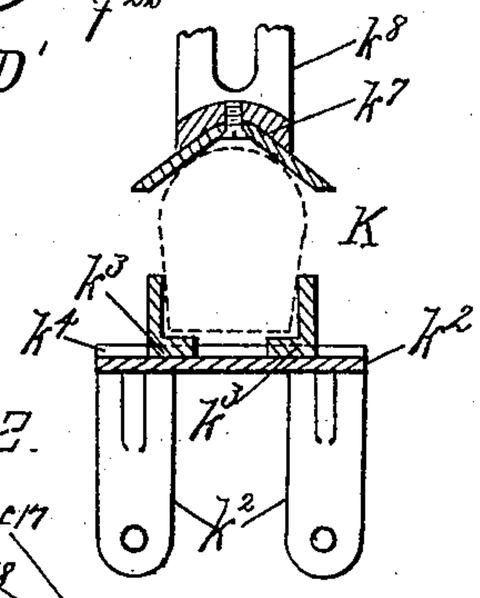

Fig. 22.

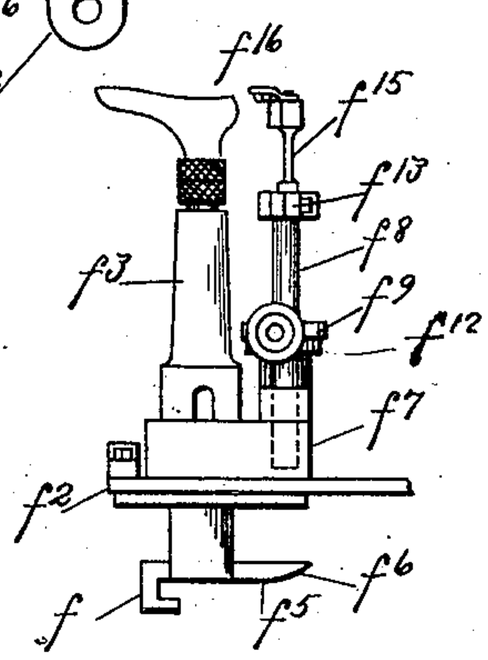

Fig. 13.

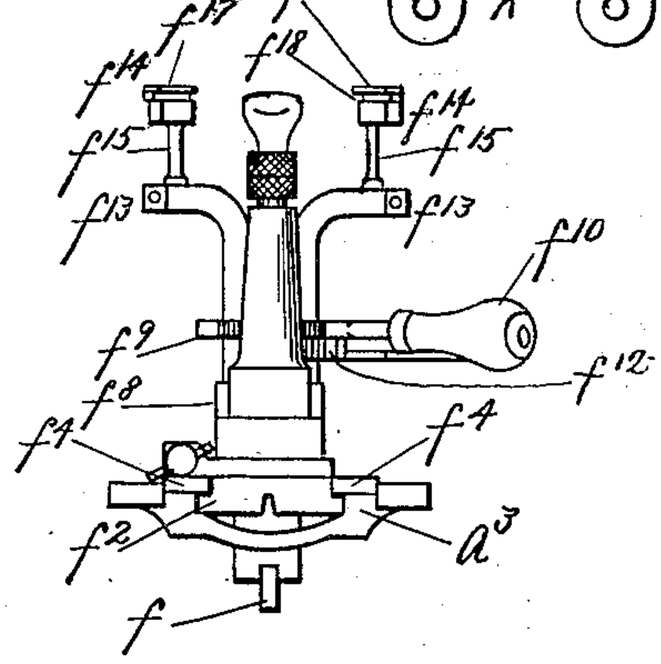

Fig. 14.

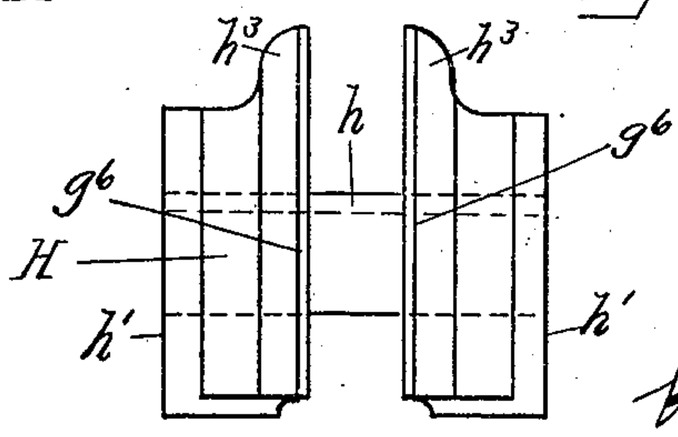

Fig. 15.

WITNESSES.

J. M. Dolan

M. V. Foley.

INVENTOR.

Charles C. Small

by Church & Church

his Attorneys.

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C. C. SMALL.

HEEL NAILING MACHINE.

APPLICATION FILED NOV. 8, 1889.

10 SHEETS—SHEET 10.

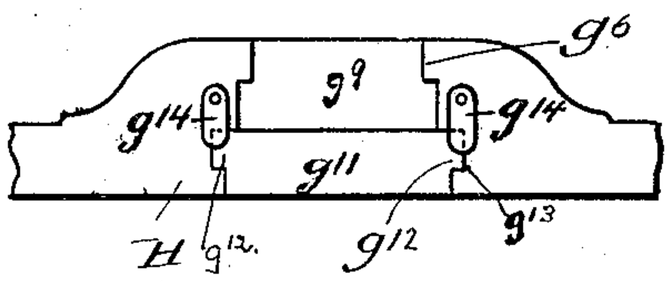

Fig. 16.

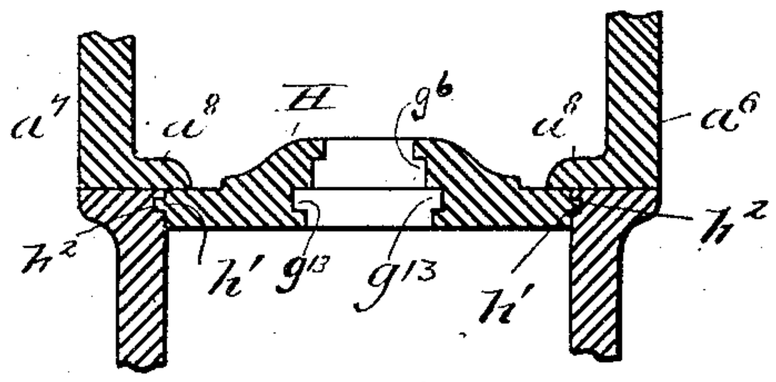

Fig. 17.

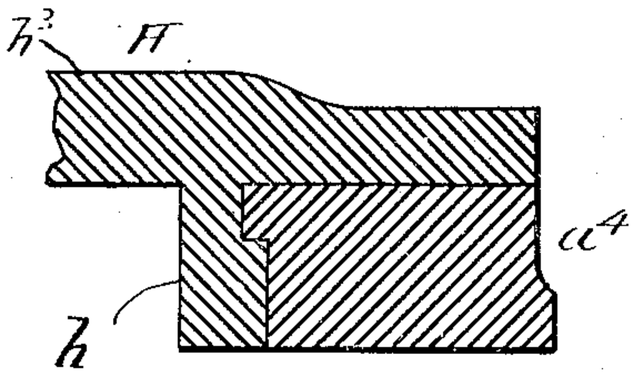

Fig. 18.

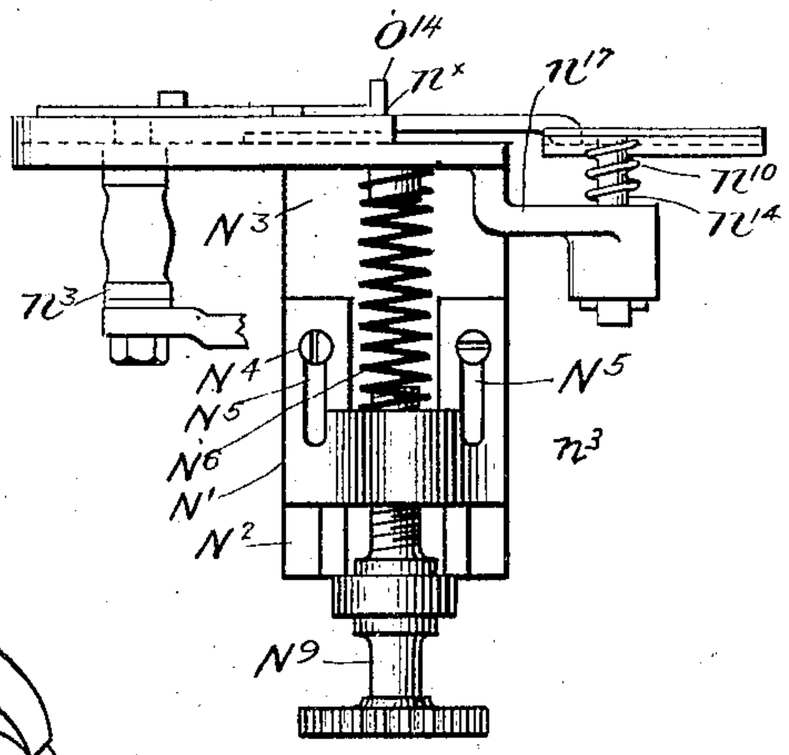

Fig. 19.

Fig. 20.

WITNESSES.

A. P. Porter.

J. M. Dolan.

INVENTOR

Charles C. Small

by his attys

Clarke & Sprague

UNITED STATES PATENT OFFICE.

CHESTER C. SMALL, OF NEWTON, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY COMPANY, A CORPORATION OF NEW JERSEY.

HEEL-NAILING MACHINE.

No. 891,192. Specification of Letters Patent. Patented June 16, 1908.

Application filed November 8, 1889. Serial No. 329,696.

To all whom it may concern:

Be it known that I, CHESTER C. SMALL, of Newton, in the county of Middlesex and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Heel-Nailing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

This invention relates to heel attaching machines.

The invention is shown embodied in a machine of the general type of that shown in Letters Patent, No. 467,242, granted to me Jan. 19, 1892. It will be obvious, however, from the following description that features of the invention may be used to advantage in heel attaching machines of other types. Certain features of the invention are particularly of advantage when used in a machine equipped with a stationary nail templet and a shoe support arranged to be moved toward said nail templet to press a heel upon the shoe and hold it securely in position while the attaching nails are being driven. In the machine shown in said prior patent, vertical movement is imparted to the shoe support by a toggle which is actuated from a cam by an intermediate lever connection. The mechanism for imparting movement to the shoe support is required to exert considerable pressure upon the support in order to hold the heel firmly in position while it is being attached. On account of the great stress to which it is subjected, said mechanism has been found too complicated to be of practical use in a heel attaching machine.

An important object of the present invention is to simplify and improve mechanism of this nature to the end that it may be durable and not liable to fracture on account of the great pressure which it is required that it shall impart to the heel. In carrying out this part of the invention, the nail templet is restrained from vertical movement as in the machine of said prior patent and a shoe support is arranged for vertical movement beneath the nail templet and is also arranged for lateral movement for convenience in applying and removing a shoe. Beneath the shoe support in its working position and in line substantially with the driver passages of the nail templet is provided a cam, by the movement of which about a horizontal axis is effected the vertical movement of the shoe support to press a heel firmly upon the shoe, said heel and shoe being clamped between the shoe support and the face of the nail templet. Between the shoe support and the cam is arranged a pressure head which is sustained by the cam and transmits movement directly from the cam to the shoe support.

By arranging the cam below the shoe support in line with the nail templet the necessity is avoided of providing other mechanical elements between the cam and the shoe support for transmitting and modifying the movement of the cam, while at the same time the function of the cam is retained. It will be understood that the use of a cam interposed between the shoe support and the primary source of power in the machine is advantageous in that it constitutes a simple and durable mechanical element for modifying, in the manner required, the motion derived from the primary source of power. For example, it readily permits the shoe support to be so actuated that it is maintained in stationary position while the nails are being forced into and through the heel and heel seat by the drivers. The arrangement herein shown is such that the pressure head has engagement with the edge of the cam, and the cam is so shaped that a portion of said edge is formed to cause vertical movement of the pressure head to subject the heel to pressure and a following portion of said edge is concentric to the axis of the cam to maintain the shoe support in stationary position while the heel is being attached. In the particular embodiment of the invention hereinafter described the cam is arranged for rotation and the attachment of a heel and a top lift is effected in a single revolution. To this end the cam is so shaped that during a single revolution it causes two vertical reciprocations of the pressure head and shoe support.

While, as will be obvious, the features above referred to are independent of mechanism for bringing heels and top lifts into position to be attached, I have shown herein novel mechanism for securing this result.

The features of novelty in the mechanism for bringing heels and for bringing top lifts into position to be attached will be pointed out in the appended claims. Other features of novelty, including details of construction

and arrangement of parts, will be hereinafter described and defined in the claims.

In the drawings, in which the same reference characters indicate like parts wherever they occur, Figure 1 is a view in front elevation of my improved nailing machine; Fig. 2 is a rear elevation thereof; Fig. 3 is a vertical central section taken from front to back of the machine; Fig. 4 is a view in horizontal section immediately below the line of the upper table, and in plan of the parts immediately below said line, the plane of section being indicated by the dotted line 4—4 in Fig. 3; Fig. 4^a is a view similar to Fig. 4, but showing the heel blank and top lift feeding mechanisms in different positions; Fig. 4^b is a vertical section on dotted line 4^b—4^b of Fig. 4^a; and Fig. 4^c is a perspective view of a plate k^{12} to be described; Fig. 5 is a detail view in vertical section and elevation on substantially line 5—5 of Figs. 1, and 4^a showing portions of the heel blank feeding devices; Fig. 6 is a detail view principally in vertical section and elevation on substantially line 6—6 of Fig. 1 to illustrate portions of the top lift feeding devices; Fig. 7 is a detail view in vertical section taken from side to side of the machine and in elevation substantially on line 7—7 of Fig. 3 to further illustrate portions of the top lift and heel blank feeding devices; Fig. 8 is a detail view showing the principal portions of the starting and stopping mechanism and an additional safety stop motion device to which reference is hereinafter made; Fig. 9 is a detail view in section illustrating the manner of attaching the nail carrier to its slide; Fig. 10 is a view in plan of the cam for moving the jack out of operative position; Fig. 11 is a detail view in horizontal section to illustrate the connection between one side of the cross-head and its guides; Fig. 12 is a sectional view in a plane indicated by the dotted line 12—12 of Fig. 3 to show the mechanism for throwing the jack out after the heel and top lift have been attached; Fig. 13 is a view in side elevation of the form of jack which I prefer to employ, it being removed from the machine; Fig. 14 is a view in front elevation thereof; Fig. 15 is a plan view of the independent upper table H removed from the machine; Fig. 16 is a detail view of the table showing the nail block and the templet in position and the buttons or latches for retaining the templet; Fig. 17 is a view illustrating the manner of uniting or connecting the upper table with the side portions of the frame; Fig. 18 is a view representing the manner of connecting the upper table with the top section or cross brace of the frame; Fig. 19 is a detail view showing the adjustable and yielding support for the top lift stack; Fig. 20 is a detail view connected with the starting and stopping mechanism and showing the ratchet wheel and locking pawl upon the pulley shaft to prevent the machine from being reversed or turned in the wrong direction; Fig. 21 is a view in horizontal section through the heel blank holding stack, representing devices for adjusting the front section thereof; Fig. 22 is a horizontal section of the same parts below the plane of Fig. 21, to show the connections between the adjustable parts of the stack and their support.

The frame A of the machine comprises the side portions a, a', which are preferably connected together by an integral base section a^2, and intermediate section a^3 and a top section a^4, see Fig. 3. The upper end a^5 of the side portions a, a' are made flat to receive the removable cross-head guides a^6, a^7. Each of these guides has a foot a^8, a^8 through which bolts a^9 pass to secure them to the main frame. The guides have vertical recesses a^{10}, see Fig. 5, for receiving the end portions b^3 of the cross-head B. The cross-head has two side portions b, b' and a top portion b^2, see Fig. 3, which is integral with the sides and curved downwardly at each end to form the end portions b^3 which extend through the recesses a^{10}. The portions b^3 are provided with grooves b^4 in either side, see Fig. 11, to fit the surfaces b^5, b^6, b^7 in the guides a^6, a^7 and insure the accurate movement of the cross-head. The sides b, b' of the cross-head are carried down at the center b^{10} to form bearings for the shaft b^{11} upon which the rotary head is mounted. This arched form of cross-head provides great strength with a comparatively small quantity of metal, so that a light yet strong cross-head is secured. The front side b' is open below the shaft b^{11} of the rotary head to permit the removal of the awl and driver blocks and other implements carried by the arms of the head. The end portions b^3 of the cross-head are extended outside of the guides a^6, a^7, where they form trunnions b^8 to receive the upper ends of connecting rods b^9, the lower ends of which are secured to the crank pins c upon the gears C. The gears C are mounted at the outer ends of the shaft c' which has bearing in the boxes c^2 secured to the under surface of the base section a^2, see Fig. 3. The gears are connected with the driving shaft by means of small pinions c^3, see Fig. 2, on the pulley shaft c^4. The shaft c' has also formed upon or attached to it the pinions d which engage gears d' on a short shaft d^2 located over the shaft c' and having bearing in pillow blocks d^3 carried upon the base section a^2, see Fig. 1. The short shaft d^2 supports a pressure cam D for lifting the jack to force the heel against the templet, as hereinafter described. A guide block E is attached to the side portions a, a' of the frame, being located directly above the pressure cam. The block has the guiding recess e, which is covered by the cap plate e'

and receives the pressure mechanism which includes a slide e^2. The slide is recessed in its lower face to receive the stem of a roll support e^3, which sustains the roll e^4 arranged to rest upon the pressure cam D above referred to. It will be understood that the roll e^4 is of advantage in preventing the wear of the cam D which would be caused if the cam D had rubbing contact with the pressure head. The upper end of the slide e^2 is reduced and screw-threaded at e^5 to receive an adjustable pressure head e^6, this head having handles e^7 by which it may be turned upon the screw-threaded portion to adjust it with relation to the pressure cam D. Preferably a spring, herein shown as a block of rubber e^8, is interposed between the upper end of the stem of the roll support e^3 and the slide e^2 for imparting a slight yielding quality to the action of the pressure head e^6. The slide e^2 has arms e^9 which are connected by springs e^{10} with the base section a^2 to assist in holding the slide normally down with the roll e^4 in contact with the pressure cam D.

The pressure cam as herein shown is formed with a lifting portion d to elevate the pressure head and jack for compressing the heel blank on the shoe, a holding portion $d'^{\times}$ for sustaining the jack while the heel blank is pricked and the attaching nails driven, a releasing portion d^2 to permit the downward movement of the jack and allow the top lift to be put into place, a second lifting portion d^3 for spanking on the top lift, and a final releasing portion d^4 to permit the downward movement of the jack to allow the shoe to be removed. It will be obvious that other means than the cam d may be arranged in substantial alinement with the pressure head for actuating the pressure head and that the invention is not limited to the particular pressure applying device herein shown.

The pressure head e^6 has a recess e^{11} extending around it near its upper end to receive and hold the fork f which extends downwardly and backwardly from the front lower corner of the jack spindle f' to connect the jack to the pressure head.

The preferred form of jack, illustrated most clearly in Figs. 12, 13, and 14, comprises a slide f^2 having a vertical sleeve f^3 and arranged to move horizontally in guides f^4 formed on or secured to the intermediate portion a^3 of the frame. The sleeve f^3 receives the spindle f' of the jack which has a foot f^5 adapted to rest upon the face e^{12} of the pressure head e^6 when the jack is in position to be elevated. The foot f^5 of the jack spindle has an inclined lower face f^6 to facilitate the positioning of the jack upon the pressure head.

The jack spindle f' has a rearward extension f^7 for supporting the shoe holding and clamping devices. These holding and clamping devices preferably comprise the shafts or rods f^8, see Figs. 12, 13, and 14, which are geared together at f^9. One of the shafts is provided with a handle f^{10} by which the shafts may be turned, and the handle has a pawl f^{11} to engage the ratchet teeth of the fixed ratchet f^{12} for locking the shafts in the position to which they may be turned. The shafts preferably do not extend to the top of the jack, but are provided below the upper surface of the jack with horizontally bent arms f^{13} to which are attached the shoe holding clamps f^{14}. The clamps preferably comprise stems f^{15} carrying blocks which are provided with plates f^{17} for entering the rand crease and faces f^{18} for bearing against the counter of the shoe. The plates f^{17} for entering the rand crease are yielding, being preferably made of spring metal, so that they may yield slightly when the shafts f^9 are turned to bring the blocks into contact with the shoe for centering it.

The jack is manually moved from position for receiving a shoe, shown in Fig. 3, to position in operative engagement with the pressure head e^6. The movement of the jack from operative position over the pressure head to position for receiving a shoe, shown in Figs. 3 and 12, is effected automatically after the heel and top lift have been attached, by the cam f^{19} mounted on the vertical shaft G, see Fig. 12. The cam has an extension or lug f^{21}, adapted to engage a pin f^{22} on a lever f^{23} which is pivoted to the intermediate frame section a^3 and connected with the jack by a link f^{24}.

The vertical shaft G is actuated from the pulley shaft c^4 by means of a worm wheel g on the vertical shaft and a worm g' on the pulley shaft. The vertical shaft carries at its upper end a cam g^2 having a groove g^3 which receives a stud g^4 on a plate g^5. The plate slides in ways g^6 in the table H of the machine, which has rearwardly extended guiding arms h^3 for this purpose, and is connected at its forward end to the nail carrier g^9. The connection between the plate g^5 and the nail carrier comprises a groove g^7 in the front end of the plate which receives a rib g^8 of the nail carrier, the parts being secured together by a removable pin g^{10}, which permits the easy removal of one nail carrier and the placing of another in position. The cam g^2 operates for sliding the nail carrier from the position shown in Fig. 3, in which it receives nails, to a position under the nail drivers, where it delivers the nails to the templet g^{11}. The templet is provided with guiding ribs g^{12} which are received in grooves g^{13} in the table H, as shown most clearly in Fig. 16. The templet may be secured in position in the table H by the latches g^{14}.

The table H is removably secured in the frame of the machine and has a downwardly extending reinforcing section h, as shown in Figs. 5, 6, 15, and 18, which serves to connect

the two side portions, thus strengthening the table. The portion h of the table has a lip which extends under a portion of the cross piece a^4. The table has also on its sides ribs h' which are received in guiding grooves h^2 in the inner faces of the frame sections a, a', as shown in Fig. 17. The sides of the table are overlapped by the feet a^8 of the cross-head guides a^6, a^7 to resist upward thrust against the table in the operation of the machine. The table is secured in position by bolts h^5 which extend through the frame into the depending portions h of the table, as shown in Figs. 5 and 6.

Heel blanks and top lift blanks are contained respectively in stacks K and N. These stacks are preferably similar in construction and therefore only one of them, namely, the heel blank stack is illustrated in detail and a description of this stack will suffice for an understanding of the construction of both stacks. The stack is preferably made in three relatively adjustable parts k, k', and k^7, arranged as shown in cross section in Figs. 21 and 22. The parts k, k' are angular in shape so as to engage the breast and the sides of the heels, and these parts are supported by a bracket k^2, see Fig. 22, which is mounted on a plate k^{12} hereinafter described. The bracket k^2 has a horizontal groove k^4 which receives a rib k^3 on the outer face of the parts k and k' of the stack, and said parts have right and left screw-threaded lugs k^5, k^5 which receive the oppositely screw-threaded portions of an adjusting screw k^6 by means of which the said parts k, k' may be moved toward and from each other to adapt the stack to hold heels varying in width. The part k^7 of the heel blank stack is shaped in cross section to embrace the rounded rear end of the heel blanks, as shown in Figs. 21 and 22. This part k^7 is attached to a bracket k^8, the foot of which is slotted to enable the bracket to be adjustably secured to the table II. The bracket is secured in adjusted position, according to the length of the heel from its breast to its rear end, by a clamping screw k^9, as shown in Fig. 5. As heretofore stated, the top lift blank stack N, which comprises the parts n, n', and n^2, is the same in construction as the heel blank stack. If desired the stacks may be constructed with a single plate to engage the breast of the heel blank or top lift instead of the two angular plates k, k', or n, n'.

The plate k^{12} is supported by a vertically adjustable block K′ which in turn is sustained by a rigid bracket K^2 attached to the frame of the machine. The plate k^{12} has a depending portion K^3 which is movably connected to the block K′ by bolts K^4 which pass loosely through slots K^5 in the block and into the depending portion of the plate k^{12} as shown most clearly in Fig. 4^b. The plate k^{12} is normally pressed upward as far as the slots K^5 permit by a spring K^6. The depending portion K^3 of the plate k^{12} has guiding ribs K^7 which coöperate with grooves K^8 in the bracket K^2 to guide the plate in its movements relative to the block K′. The block K′ is adjusted with relation to the bracket K^2 by means of the screw bolt k^{10}, the stem of which is held against longitudinal movement in the arm K^{10} of the bracket and the threaded portion of which is received in a screw-threaded aperture in the block K′. By adjusting the block K′ the plate k^{12} and the heel blank carrier k^{14}, which is supported thereon, are moved toward or from the fixed portion k^7 of the heel stack to vary the size of the opening between said carrier and the stack according to the thickness of heels which are being fed.

The plate k^{12} has a guiding groove k^{13} in which the heel blank carrier k^{14} is movable. The carrier is provided on its upper face at a distance from its forward end with an abutment $k^\times$, see Fig. 5, to engage the breast of the lowermost heel blank in the stack and push it out of the stack and toward the rear of the machine. The heel blank carrier is actuated from a cam k^{15}. The cam has a groove k^{16} for operating two levers k^{17}, k^{18} which are provided with rolls k^{19} standing in the groove at a considerable distance apart so that said levers receive substantially opposite movements from the cam. The lever k^{18} has at its forward end two arms k^{22}, and k^{25}. The arm k^{22} is connected by a link k^{23} with a stud k^{24} depending from the lower face of the carrier k^{14} and extending through a slot in the plate k^{12}. By means of this connection between the carrier and the cam k^{15} the carrier is operated to push a heel blank rearwardly from within the stack to a position over a lifting device M by which it is delivered to the heel blank holder k^{28}.

The heel blank holder k^{28} is carried by the feed slide k^{29} which is movable transversely of the direction of movement of the heel blank carrier in guideways on the under face of the table II. The feed slide and blank holder are located above the carrier k^{14}, as shown in Fig. 5, and the lifting device M is employed for lifting the heel blanks off from the carrier k^{14} and placing them in the heel blank holder. The lifting device is movably supported in the inner end portion of the plate k^{12} and comprises a depressed portion m' and laterally extending wings m. The depressed portion receives the end portion of the carrier k^{14} in its feeding stroke and the wings m receive the heel blank supported by the carrier, the front ends of the wings being inclined downward slightly, as shown in Fig. 5, to facilitate the placing of the heel blank upon them. The lifting device is provided with depending arms extending through bosses $m^\times$ on the lower side of the plate k^{12}, as shown in Fig. 5, and the arms are con-

nected by a cross-rod which supports a roll m^5, as shown in Fig. 5. The stud k^{24} depending from the carrier is provided with a wedge m^4 arranged to engage the lower face of the roll m^5 as the carrier completes its forward movement, and thereby elevate the device M for causing it to lift the heel blank and force it into the heel blank holder carried by the feed slide k^{29}. It will be understood that as the lifting device M is carried by the plate k^{12}, said lifting device will be adjusted vertically with the plate by means of the block K′ and screw bolt k^{19}, so that said lifting device will always be maintained in proper relation to the heel blank carrier k^{14}.

The feed slide k^{29} is movable transversely of the direction of movement of the carrier k^{14} for transferring heel blanks from a position at the side of the machine, where they are delivered by the carrier, to a central position between the jack and the cross-head carrying the awls and drivers for attaching the heel blank to a shoe. To this end the slide k^{29} is actuated by an arm k^{27} of the lever k^{17} above referred to, being connected to said arm by an adjustable link k^{30} secured to a boss k^{41} depending therefrom, as shown in dotted lines in Figs. 4 and 4ª and in full lines in Fig. 7. The link k^{30} is preferably made in two parts which can be relatively adjusted by a nut k^{31} for lengthening and shortening the link and thereby varying the position of the feed slide. During the feeding movement of the carrier k^{14} the feed slide is moved to the right in Fig. 4 to put the heel blank holder in position to receive the heel blank from the carrier, as shown in Fig. 4ª, and during the return movement of the carrier the feed slide is moved to the left to carry the heel blank into attaching position, as shown in Fig. 4.

The heel blank holder k^{28}, with which the feed slide is provided, comprises a breast gage k^{32} and a back gage k^{33}. The breast gage is preferably arranged for adjustment transversely of the feed slide k^{29} for determining the position of the breast of the heel, but is secured rigidly in adjusted position. The back gage k^{33} is recessed at k^{35} and is mounted to move transversely of the feed slide for opening and closing the holder. To this end the back gage has a shank k^{34} adapted to slide in ways on the under side of the feed slide, as shown in dotted lines in Figs. 4 and 4ª and in full lines in Fig. 7. The back gage is acted upon by a lever k^{36} for holding it normally pressed toward the breast gage k^{32} to clamp a heel blank. The lever k^{36} is pivoted at k^{37} and has a long arm k^{38} for engaging the back gage and a short arm k^{39} which is acted upon by a spring k^{40} secured to the slide. For the purpose of opening the holder to permit the heel blank to be lifted into it by the lifting device M the heel blank carrier k^{14} has a laterally projecting arm m^3, see Fig. 4, arranged to engage a coöperating lug k^{42} depending from the shank of the back gage. The arm m^3 moves the back gage against the influence of the spring k^{40} as the carrier approaches the end of its feeding movement. It is to be understood that the feed slide k^{29} occupies its outermost position at the right-hand end of its movement, see Fig. 4ª, at the time the carrier k^{14} comes to the end of its feeding movement bringing the heel blank which is to be lifted into the holder. The heel blank carrier k^{14} during its feeding movement therefore serves not only to convey a heel blank from the stack K, the position of which is indicated in broken lines in Fig. 4ª, toward the rear of the machine and deposit it on the lifting device M, but to open the heel blank holder and to actuate the lifting device M for forcing the heel blank from the carrier k^{14} into the holder. When the carrier is returned toward the front of the machine the spring k^{40} actuates the back gage k^{33} to clamp the heel blank against the breast gage and the wedg m^4 is withdrawn from under the roll m^5 to permit the lifting device to descend into position to receive another heel blank.

The attaching mechanism of the machine, hereinafter further described, is constructed and operated for first attaching a heel blank, leaving the nails projecting slightly from the surface of the heel, and then spanking a top lift upon the heel over the projecting ends of the nails. The heel blank feeding and top lift feeding mechanims are thereafter actuated for presenting heel blanks and top lifts alternately in attaching position.

The mechanism for transferring the top lifts from the stack N to attaching position is similar in construction and operation to the mechanism for transferring the heel blanks from the stack K to attaching position. To this end a plate n^4 is provided which supports the members n, n' of the top lift stack and said plate is grooved to form a guideway for a top lift carrier n^5. The plate n^4 is supported by a vertically adjustable block N′, which in turn is sustained by a rigid bracket N^2 attached to the frame of the machine. The plate n^4 has a depending portion N^3 which is movably connected to the block N′ by bolts N^4 which pass loosely through slots N^5 in the block and into the depending portion of the plate n^4. The plate is normally pressed upward as far as the slots N^5 permit by a spring N^6. The depending portion N^3 of the plate has the guiding ribs N^7 which coöperate with grooves N^8 in the bracket N^2 to guide the plate in its movement relatively to the block. The block is adjusted with relation to the bracket by means of the screw bolt N^9, the stem of which is held against longitudinal movement in the arm N^{10} of the bracket and the threaded portion of which is received in a screw-threaded aperture in the block N′. By adjusting the block the table

n^4 and the top lift carrier n^5, which is supported thereon, are moved toward or from the fixed portion n^2 of the top lift stack to vary the size of the opening between said carrier and the stack, see Fig. 6, according to the thickness of top lifts which are being fed.

The top lift carrier n^5 is provided on its upper face at a distance from its forward end with an abutment $n^\times$ to engage the breast of the lowermost top lift in the stack and push it out of the stack toward the rear of the machine. The carrier is actuated from the cam k^{15}, heretofore described, being connected with said cam by the lever k^{17}, one arm of which has the stud k^{19} located in the groove of said cam, and another arm k^{20} of which is connected by a link n^8 with a stud n^{13} depending from the lower face of the carrier and extending through a slot in the plate n^4. By means of this connection between the top lift carrier and the cam the carrier is operated to push a top lift rearwardly from within the stack, the position of which is indicated in broken lines in Fig. 4^a, to a position over the top lift elevating device n^9, by which it is delivered to the top lift holder.

The top lift holder is carried by the top lift feed slide o', which is movable transversely of the direction of movement of the top lift carrier in guideways in the under side of the table II. The feed slide and holder are located above the carrier, as shown in Figs. 6 and 7, and the lifting device n^9 is employed for elevating the top lifts from the carrier and placing them in the holder. The lifting device is movably sustained in an arm or bracket n^{17} formed on or secured to the plate n^4, as shown in Figs. 6, 7, and 19, and having depending stems n^{14} and being normally pressed upward by springs n^{10} surrounding the stems n^{14} between the bracket n^{17} and the device, as shown most clearly in Fig. 7. The lifting device comprises a depressed portion n^{15} and laterally extending wings n^{16}. The depressed part receives and constitutes a guide for the end portion n^7 of the carrier n^5, and the wings n^{16} receive the top lift supported by the carrier. The end portion n^7 of the carrier is provided with a block n^{11} having an inclined lower face adapted to engage the lifting device n^9 and hold it in a depressed position until the carrier, in its forward movement, has reached a point where the top lift being conveyed by it is over the lifting device, and thereafter in its continued advance movement, toward the right in Fig. 6, to pass off the lifting device whereby to release said lifting device and permit the springs n^{10} to elevate it for putting the top lift into the holder of the top lift feed slide o'.

The top lift holder comprises a breast gage o^2 and a back gage o. The breast gage is rigidly secured to the feed slide, while the back gage is movable thereon, being provided with a shank o^4 which is guided in ways o^9 on the lower side of the slide o' for movement toward and from the breast gage for clamping and releasing a top lift. The back gage has a V-shaped face o^6 for engaging the rounded rear end of the top lift and positioning it accurately. The back gage is acted upon by a lever o^7 for holding it normally pressed toward the breast gage to clamp a top lift. The lever o^7 is pivoted at o^{10} to the feed slide and has a long arm for engaging the back gage and a short arm to which is connected one end of a spring o^{11}, the other end of which is secured to the slide. For the purpose of moving the back gage against the influence of the spring o^{11} for opening the holder to permit the top lift to be placed in it by the lifting device n^9 the carrier n^5 has a laterally projecting arm o^{14}, see dotted lines in Fig. 4 and full lines in Fig. 4^a. The arm o^{14} is arranged to engage a coöperating lug o^{15} depending from the shank of the back gage as the carrier approaches the end of its feeding movement, it being understood that the feed slide o' occupies its outermost position at the left-hand end of its movement, see Fig. 4, at the time the carrier n^5 comes to the end of its feeding movement for bringing the top lift into position to be delivered to the holder. The top lift carrier n^5 therefore serves during its feeding movement not only to feed a top lift from the stack N toward the rear of the machine and deposit it upon the lifter n^9, but to open the top lift holder and to release the lifting device to permit it to force the top lift off from the carrier and into the holder. When the carrier returns toward the front of the machine the spring o^{11} actuates the lever o^7 to cause the back gage to clamp the top lift against the breast gage and the block n^{11} on the end of the carrier forces the lifting device n^9 down into position to receive the next top lift.

The top lift feed slide o' is actuated from the cam k^{15} by the lever k^{18}, the arm k^{25} of which is connected to the feed slide by link o^3 attached to the depending stud o^{16}. The link o^3 is preferably made in two parts which may be relatively adjusted by the nut o^{17} to lengthen or shorten the link for accurately positioning the top lift holder with relation to the templet and jack when the feed slide is in the position shown in Fig. 4^a for the top lift to be attached.

It will be understood from the above description of the construction and operation of the feeding mechanism that the heel blank and top lift feeding devices are moved simultaneously but in opposite directions, the heel blank carrier advancing to deliver a heel to its coöperating feed slide while the top lift carrier is making its return movement to the stack N, and the heel blank feed slide k^{30} moving to a central position to deliver the heel blank received from its carrier while

the top lift feed slide o' is returning to position to get a top lift from the top lift carrier.

The several operating mechanisms of the machine are so arranged that the heel blank holder occupies the position shown in Fig. 4 when the machine is started and the top lift holder occupies the position shown in dotted lines in Fig. 4. After the heel has been attached the top lift holder is moved to present a top lift in position to be spanked onto the heel while the heel blank holder is moved into position to receive another heel blank from the carrier k^{14}, as shown in Fig. 4^a, and thereafter, in the upward movement of the jack and shoe, the top lift is attached to the heel.

The rotary head has four arms, one of which may carry a gang of awls, the second a gang of drivers, the third, nothing, and the fourth, if desired, a breasting device. The mechanism for rotating the head is substantially like that in prior machines with the exception that the cam plate P is supported at its upper end p by a cross-brace and support p' fastened to the upper ends of the guides a^6, a^7, see Fig. 1, the ends p^2 of said cross-piece or brace acting as straps to lock the upper ends of the guides together.

It will be observed that the top lift and heel blank stacks are located nearer the place of attachment of the top lifts and heel blanks than they are in the patent above referred to, so that the feeding of the heel blanks and top lifts is more direct. In order that this may be accomplished, the rotary head shaft b^{11} is lengthened by being carried forward; its forward bearing q is also lengthened, and the cam plate P set out quite a little distance from the front of the cross-head. This permits the heel blank stack K and the top lift stack N to be located so close to the place of attachment that the heel blank and top lift may be moved directly to the holders and the holders by a single movement advance them into attaching position.

The starting and stopping mechanism comprises a driven pulley and fly wheel S having a cavity s, see Fig. 8, forming one section of a clutch and another clutch section s' adapted to enter the recess s and having a grooved sleeve s^2. This section is arranged to slide upon the pulley shaft, and it is moved into engagement with the section s' of the clutch by the lever s^3 pivoted at s^4, and having a forked end provided with pins which enter the groove of the sleeve s^2, the slide bar s^5 having a block or bracket s^6 carrying a roll s^7 which bears against the vertically movable cam s^8 upon the vertical shaft G. A spring s^9, see Fig. 2, acts against the slide bar s^5 to move the section of the clutch s' from the other section and also to force the cam roll s^7 into a groove or notch s^{10} in the cam s^8, see Fig. 8. The cam roll s^7 is moved out of the groove or notch s^{10} to start the machine by means of the treadle s^{11}, pivoted at s^{12}, and engaging by its end s^{13} a wedge surface on the block s^6, see Fig. 8, shaped so that upon the upward movement of the treadle end, the roll is moved out of engagement with the cam and the driven member of the clutch thrown into contact with the driving member. The machine beginning to operate causes the surface of the cam beyond the notch to come in contact with the roll and thus hold the driven member of the clutch in the position in which it has been moved by the treadle. It is often desirable to stop the machine before it has completed its movements. To accomplish this, there is used an auxiliary treadle s^{14} pivoted at s^{15} and connected with the slide cam s^8 by a forked end s^{16} having pins s^{17} which enter a groove in the hub of the cam s^8. The cam is moved downward upon the shaft G by a spring s^{18}. By the downward movement of the treadle the cam is moved upward on the shaft in opposition to this spring, and the cam surface which extends from the groove disengaged from the roll s^7, permitting the spring s^9 to operate to disengage the driven member of the clutch from the driving member and thus stop the machine. To again start it, the starting treadle s^{11} is operated to throw back or move away the roll s^7 from the cam hub, as in the original starting of the machine, and this permits the spring s^{18} to push the cam s^8 downward sufficiently to cause it to again act to bear against the roll s^7. The driven member of the clutch upon disengagement from the driving member has its back surface brought into contact with a friction ring s^{19} carried by the holder s^{20}. There is placed on the pulley shaft a ratchet wheel v, see Fig. 20, and on the frame a pawl to engage the ratchet. This is for the purpose of preventing the machine from being turned in the wrong direction, or the parts from being moved backward.

I do not herein claim the clutch mechanism shown and described in this application, as the same constitutes the subject-matter of a divisional application Se. No. 739,351, filed December 6, 1899.

Having explained the nature of my invention and specifically described one embodiment thereof, I claim as new and desire to secure by Letters Patent of the United States:—

1. In a heel nailing machine a rotary shaft and a cross head B supporting the rotary shaft and having the sides b, b^1 and top b^2 arched as described in combination with heel attaching devices, as and for the purposes set forth.

2. In a heel nailing machine, a cross head in combination with a shaft supported therein, a rotary head carrying heel attaching devices secured to said shaft, and devices for turning said rotary head supported in part

at the front end of said shaft, said devices being arranged to afford space for the top lift and heel blank stacks or either of them between portions thereof and the front of the cross head, and said stacks located in said spaces, as and for the purposes specified.

3. In a heel nailing machine, the cross head comprising the back plate b^1, top b^2 and front b having a long bearing with the rotary head carrying heel attaching devices and its long forward extending shaft b^{11}, substantially as described.

4. The combination of the arched cross head comprising the sides b, b^1, top b^2, and solid end sections b^3 in combination with a suitable head carrying heel attaching devices, as and for the purposes described.

5. The combination of the cross head having solid ends, heel attaching devices mounted upon said head intermediate its ends, said cross head being provided on either side with guiding recesses having guiding surfaces b^5, b^6, b^7, and the cross-head guides a^6, a^7 having guiding surfaces which fit said guiding recesses, substantially as described.

6. The combination in a heel nailing machine, of the guides a^6, a^7 with the cross stay p^1 having cap ends to tie together the tops of the guides, and suitable heel attaching devices, as and for the purposes described.

7. In a heel nailing machine, the frame A comprising the sides a, a^1, the base a^2 connecting the sides together and cast integral therewith, and the integral cross tie or section a^4, in combination with a suitable support or jack and heel attaching devices, substantially as described.

8. In a heel nailing machine the frame comprising the sides a, a^1, the integral base a^2, the integral cross tie a^4, and the integral intermediate table a^3, a suitable support or jack and heel attaching devices, substantially as described.

9. The combination, in a heel nailing machine, of the frame comprising the sides a, a^1 and the integral base a^2 and integral upper tie a^4, with the independent guides a^6, a^7 bolted to the upper surface of the sides, a suitable support or jack and heel attaching devices, substantially as described.

10. In a heel nailing machine, the combination of the sides a, a^1 and the integral connecting tie a^4, with an independent or separate table H, having a rear section lapping or extending under a portion of the tie a^4 and connected with the sides of the frame, a suitable support or jack and heel attaching devices, substantially as described.

11. In a heel nailing machine, the combination of the sides a, a^1 and the integral connecting tie a^4, with an independent or separate table II, having a rear section lapping or extending under a portion of the tie a^4 and connected with the sides of the frame, and the fastening bolts h^5 extending through the tie a^4 into the table, a suitable support or jack and heel attaching devices, substantially as described.

12. In a heel nailing machine, the combination of the sides a, a^1 and the integral connecting tie a^4, with an independent or separate table II, having a rear section lapping or extending under a portion of the tie a^4 and connected with the sides of the frame, and the guides a^6, a^7 having the feet a^8 which lap upon the upper surface of the table, a cross head mounted in said guides and heel attaching devices carried by the cross head, substantially as described.

13. In a heel nailing machine the removable table having a recess for holding the templet, and a back downward extending reinforcing section in combination with heel attaching devices, substantially as described.

14. In a heel nailing machine the independent table II, having the backwardly extending guiding arms h^3, a nail carrier, and means for moving the nail carrier in said arms, in combination with suitable supporting and heel attaching devices, substantially as described.

15. In a heel nailing machine, the table having the templet receiving recess, the downwardly extending reinforcing section, and the backwardly extending integral guiding arms in combination with a nail carrier movable in said guiding arms heel attaching devices, and means for actuating the carrier and the heel attaching devices, substantially as described.

16. In a heel nailing machine having the sides a, a^1, connected by an integral base and an integral tie rod a^4, a detachable templet supporting table held by its side and rear edges in said frame and bolted thereto in combination with suitable supporting and heel attaching devices, substantially as described.

17. In a heel nailing machine the combination with a pressure head having a lateral recess near its upper end, of a jack spindle having at its base a downwardly and rearwardly extending projection arranged to enter said recess at the front side of said head, and means for relatively moving the spindle and pressure head vertically to aline said recess and projection.

18. In a heel nailing machine the combination of the sliding jack and shoe clamping devices mounted upon vertical centers to slide therewith and formed to enter the rand crease of the shoe, and means for moving them about said centers whereby they may be caused to engage and disengage the shoe upon said jack, as described.

19. In a heel nailing machine the combination of the jack having a spindle, the work support carried by the spindle, and the boot or shoe holding device comprising the two shafts geared together, one of which has an

operating handle, and which are located behind the work support, and shoe engaging arms carried by said shafts, substantially as described.

20. The combination in a heel nailing machine, of the jack, the vertically movable spindle supported thereby, the work support carried by the spindle, and the shoe holding devices attached to said spindle to be vertically movable therewith, and comprising two vertical shafts located behind the work support, shoe holding arms carried by said shafts, and means for turning said shafts and holding said arms in contact with the sides of the shoe, substantially as described.

21. In a heel nailing machine, a work-support in combination with two vertical shafts geared together and having their ends bent at practically a right angle to their lengths and at some distance below the level of the work support, shoe holding arms attached or secured to the end of each bent section of the shaft, and devices for turning said shafts and locking them in any desired position, as and for the purposes described.

22. In a heel nailing machine, the combination in a shoe holding device of the shafts having bent ends, and a centering arm carried upon each bent end, and provided with vertically yielding devices for centering the shoe, as and for the purposes described.

23. In a heel nailing machine the combination with a sliding jack, the intermediate table a^3, a lever f^{23} pivoted at one side of said intermediate table, a link f^{24} connecting said lever with said jack, and a cam pin f^{22} carried by said lever, of a cam located above said intermediate table a^3 and provided with an extension f^{20}, as described.

24. The combination, in a heel nailing machine, of the stack comprising two front angle sections horizontally adjustable in relation to each other, and a V-shaped rear section adjustable towards and from the front sections, substantially as described.

25. The combination in a heel nailing machine, of a stack having the sections k, k^1, each of which has a cross slide k^3 to enter a guide recess in a supporting bracket, with said bracket, a right and left screw carried thereby and connected with said sections by right and left nuts respectively, substantially as described.

26. In a heel nailing machine, the combination with a stack comprising a plurality of sections, of a support for sustaining one of the sections, a blank carrier also sustained by said support, and means for adjusting said support, the carrier, and said stack section relatively to another section of the stack to permit the delivery from the stack of blanks differing in thickness.

27. In a heel nailing machine the combination of a feed slide and a blank holder supported thereby, with a blank carrier adapted to move across and below said holder, and means for adjusting the height of said blank carrier, substantially as described.

28. In a heel nailing machine the combination of a feed slide supporting a blank holder, with a blank carrier having a movement at right angles thereto and yieldingly mounted, as described.

29. In a heel nailing machine the combination of a feed slide supporting a blank holder, with a blank carrier arranged to move below said feed slide, and means for lifting a blank from the carrier into said holder, as described.

30. In a heel nailing machine the combination of the holder mounted upon a feed slide, with a blank carrier and a lifting plate and means adapted to actuate said lifting plate, as described.

31. In a heel nailing machine the combination of a blank holder and a lifting plate, with a blank carrier, means controlled by the carrier whereby said lifting plate may be moved vertically, and means also controlled by said blank carrier for opening said holder, substantially as described.

32. The combination of the heel blank feed slide k^{29} carrying a heel blank holder with the block K^1, a heel blank carrier sustained by said block, a heel lifting plate also carried by said block, and adjusting devices whereby the level of said heel blank carrier and said heel lifting plate is simultaneously varied with relation to the feed slide, substantially as described.

33. In a heel nailing machine in combination a top lift feed slide having a top lift holder mounted thereon, a top lift lifting plate and a top lift carrier, said carrier having a downward extension to operate during a portion of its movement to hold the lifting plate depressed, as and for the purposes described.

34. The combination of a cam having a groove k^{16}, a heel blank feed slide, the lever k^{17} having a cam pin to enter said cam groove and connected with said feed slide, with a heel blank carrier, a lever k^{18} having a cam pin to enter said cam groove, and a link k^{23} connecting said lever k^{18} with said heel blank carrier, substantially as described.

35. The combination of a cam having a cam groove k^{16}, the lever k^{18} having a cam pin entering said cam groove, a top lift feed slide connected to said lever and operated thereby, with the lever k^{17} having a cam pin also adapted to enter said cam groove, a top lift carrier, and the link n^8 connecting said top lift carrier with said lever k^{17}, substantially as described.

36. The combination in a heel nailing machine of a cam having the cam groove k^{16}, a heel blank feed slide provided with a holder, a top lift feed slide also provided with a holder, a heel blank carrier, a top lift carrier and levers k^{17}, k^{18}, each having at one end a

cam pin entering said cam groove k^{16}, said lever k^{17} being connected with said heel blank feed slide and said top lift carrier, and said lever k^{18} being connected with said top lift feed slide and said heel blank carrier, substantially as described.

37. A machine for attaching heels, having in combination, a templet provided with driver passages, a work supporting spindle, a vertically movable pressure head arranged to move the spindle toward the templet and a cam arranged beneath the pressure head and in line with said driver passages for raising said head.

38. A machine for attaching heels, having in combination, a templet provided with driver passages, a work supporting spindle arranged for horizontal movement into and out of alinement with said driver passages and for vertical movement, a cam arranged in substantial alinement with said driver passages and a pressure head for transmitting movement from said cam to the spindle.

39. A machine for attaching heels, having in combination, a templet provided with driver passages, and a work support arranged for vertical movement toward and from the templet, and means for raising said work support vertically to subject the work to pressure between said support and the templet comprising a cam arranged in substantial alinement with the driver passages.

40. The combination in a heel nailing machine of the templet, the work-support, a vertically movable spindle supporting the same, a vertically movable pressure head, a device in alinement with the pressure head for actuating the pressure head, and an auxiliary head and means for varying its position upon the pressure head.

41. The combination in a heel nailing machine of mechanism for driving nails, the templet, a movable top lift applying device, a work-support, a vertically movable spindle supporting the same, a pressure head and a device in line with the pressure head, the said device having a lifting section for lifting the pressure head and last towards the templet whereby the heel is compressed, a holding section for holding the heel in contact with the templet during the driving of the nails, a releasing section for permitting the downward movement of the pressure head and the work-support to permit the top-lift applying device to be moved between the templet and the heel and a second lifting section for lifting the head and the work support upward in relation to the top lift applying device, and a second releasing section for permitting downward movement of the pressure head and work-support, as and for the purpose described.

42. In a heel attaching machine, the combination with heel attaching devices, of a work-support and actuating mechanism therefor, comprising a cam in alinement with the work-support and provided with a lifting section, a releasing section, a second lifting section, and a second releasing section, arranged substantially as described.

43. The combination in a heel nailing machine, of a pressure-head, a rotary cam D directly beneath the pressure head, and in line therewith, and upon which the pressure head bears, the said cam having two lifting sections and one holding section and two releasing sections, as and for the purposes described.

44. A machine for attaching heels, having in combination, a templet provided with driver passages, a work support, means for moving relatively said templet and work support to subject the work to pressure comprising a cam arranged for turning movement in line with said driver passages, and means for preventing the application of excessive pressure to the work by said cam.

45. A machine for attaching heels, having in combination, a templet provided with driver passages, a work support, a cam arranged in alinement with the driver passages for moving the work support toward the templet, and means for transmitting movement from the cam to the work support arranged for adjustment to vary the limit of movement of the work support.

46. In a machine of the class described, shoe-holding and centering means comprising supporting members and vertical yielding devices carried by said supporting members for engaging the rand crease at the opposite sides of the heel of a shoe.

47. The combination in a heel nailing machine of the templet, the work support, a reciprocating head carrying nail driving devices, the gears C having crank pins and rods connecting said crank pins with the reciprocating head, the shaft c^1 connecting the said gear C, the pinion d thereon, the main shaft c^4 connected with the said gears C, the countershaft d^2 above the shaft c^1, the gears d^1 thereon meshing with the pinions d, the cam D upon the shaft d^2 between the gears, and the pressure-head actuated by said cam for moving the work-support toward the templet.

48. In a heel attaching machine, the combination with a blank-holding stack comprising a plurality of longitudinal sections, and means for removing blanks from said stack rear end foremost, of means for relatively adjusting said sections and said moving means to permit the delivery from the stack of blanks of different thickness.

49. A machine for attaching heels, having in combination, a templet provided with driver passages, drivers arranged for movement in said passages a movable pressure head, means for guiding said pressure head in a vertical path, a work support arranged to be moved vertically toward the templet by

the pressure head and a cam arranged to sustain said pressure head and in substantial alinement with the driver passages, and constructed to move the work support toward the templet and to hold the work under pressure during the driving of the nails.

50. The combination in a heel nailing machine of the guide block E attached to the sides of the frame of the machine and having the guiding recess e and capping plate e^1, with the pressure head contained in said guiding recess and adapted to have vertical movements therein, as and for the purposes specified.

51. The combination in a heel nailing machine of the guide block, the pressure head contained therein and having vertical movements imparted to it, the cam D arranged beneath the same and upon which it bears, and the springs e^{10} connecting the pressure head with a part of the frame.

52. In a machine of the class described, the combination with a blank carrier, of a blank lifting device arranged normally in a depressed position, means for actuating the carrier to deliver a blank into a position over the lifting device, and means for actuating the lifting device to raise the blank from the carrier.

53. The combination of a templet, a cross-head above the same, and a gang of drivers carried by said cross-head, a work-support below the templet, a movable slide upon which it is mounted, a vertically movable pressure head below said slide, a cam upon which the said pressure head is mounted adapted to move the pressure head, slide and work-support against the templet in advance of the action of the drivers, and to hold the said parts elevated during the driving operation, a crank shaft below the cam, in line therewith and connected with the cross-head by connections extending upon each side of the pressure-head and work support, and said side connections, as and for the purposes described.

54. The combination of the templet, a gang of drivers above said templet movable towards and from it, a work-support located below said templet, and a cam under and in line with said work-support for moving said work-support vertically towards said templet a slide for transmitting motion from the cam to the work support and means for actuating said drivers towards said templet to drive nails therefrom into the work when the work is pressed up by said work-support.

55. The combination of a work-support, a pressure head, arranged to move said work-support, devices for actuating the pressure-head vertically and a stopping instrumentality to stop the operation of said devices at any desired point in their movement.

56. The combination of the templet, a work-support, a vertically movable pressure head, devices for vertically moving it, means for starting said devices at a predetermined point and stopping them at a predetermined point, and an additional stopping mechanism adapted to be actuated to stop the operation of the pressure-head actuating devices at any point.

57. A heel attaching machine, having in combination, a templet provided with driver passages, drivers arranged for movement in said passages, a work support and means for moving the work support toward the templet and for advancing the drivers in the driver passages, said means including a cam arranged below the work support in substantial alinement with the driver passages and provided with a cam surface and a surface which is concentric to the axis of the cam, and means for turning said cam simultaneously with the movement of the drivers to cause the cam surface to become first operative to subject the work to pressure and thereafter the concentric surface to become effective to sustain the work under pressure during the insertion of the nails.

58. In a heeling machine, a templet, a pressure head movable toward and from said templet, a work-support on said pressure-head, and means for actuating said pressure head to move the work-support toward and from the templet, said means comprising a pressure-applying cam in line with the pressure-head and work-support having a pressure-applying surface to act against the head.

59. In a heeling machine, a templet, a pressure-head movable towards and from said templet, a work-support on said pressure-head between it and the templet, means for adjusting said pressure-head prior to the actuation of the machine, and means for actuating said pressure-head in its adjusted position comprising a pressure-applying cam in line with the pressure-head and work-support having a pressure-applying surface to act against the head.

60. In a heeling machine, a templet, a pressure-head movable toward and from said templet, a work-support on said pressure-head, means for actuating said pressure-head comprising a pressure-applying cam located in line with the pressure-head and work-support and having a pressure-applying surface to act against the head, and automatic means for moving the work-support out of operative relation to the pressure head.

61. In a heeling machine, a templet, a pressure-head movable towards and from said templet, a work-support on said pressure-head, means for actuating said pressure-head comprising a pressure-applying cam located in line with the pressure-head and work-support and having a pressure-applying surface to act against the head, and independent means between said pressure-

applying device and said templet to move the work-support out of operative relation to the pressure head.

62. A machine for attaching heels, having in combination, a templet provided with driver passages, a pressure head arranged for movement toward and from said templet, a work support between the pressure head and said templet, means for actuating the pressure head including a pressure applying cam arranged in alinement with the driver passages in position to sustain said pressure head and a heel blank holder and a top lift holder arranged for movement into and out of position between the templet and the work support.

63. A machine for attaching heels, having in combination, a templet provided with driver passages, a pressure head arranged for movement toward and from said templet, a work support between the pressure head and said templet, means for actuating the pressure head including a pressure applying cam arranged in alinement with the driver passages in position to sustain said pressure head, a heel blank holder and a top lift holder arranged for movement into and out of position between the templet and the work support, and means for varying the position to which the work support is moved with relation to the templet.

64. In a heeling machine, a templet, a pressure head movable towards and from said templet, a work support on said pressure head, a cam in alinement with the templet for moving said pressure head and a contact piece on the pressure head arranged to be engaged by said cam.

65. A machine for attaching heels, having in combination, a templet provided with driver passages, a work support, a cam arranged in substantial alinement with said driver passages for advancing the work support toward the templet, and means for transmitting movement from the cam to the work support constructed to permit movement of the work support into and out of alinement with the templet.

66. A machine for attaching heels, having in combination, a templet provided with driver passages, a work support, a cam arranged in substantial alinement with said driver passages for advancing the work support toward the templet, a pressure head for transmitting movement to the work support and a movable contact member carried by the pressure head and arranged to have engagement with the cam and to move with said cam.

CHESTER C. SMALL.

In presence of—
F. F. RAYMOND, 2d,
J. T. BALL,
A. P. PORTER.