G. W. CAMPBELL.

MORTISING MACHINE.

APPLICATION FILED APR. 6, 1908.

921,795.

Patented May 18, 1909.

3 SHEETS—SHEET 1.

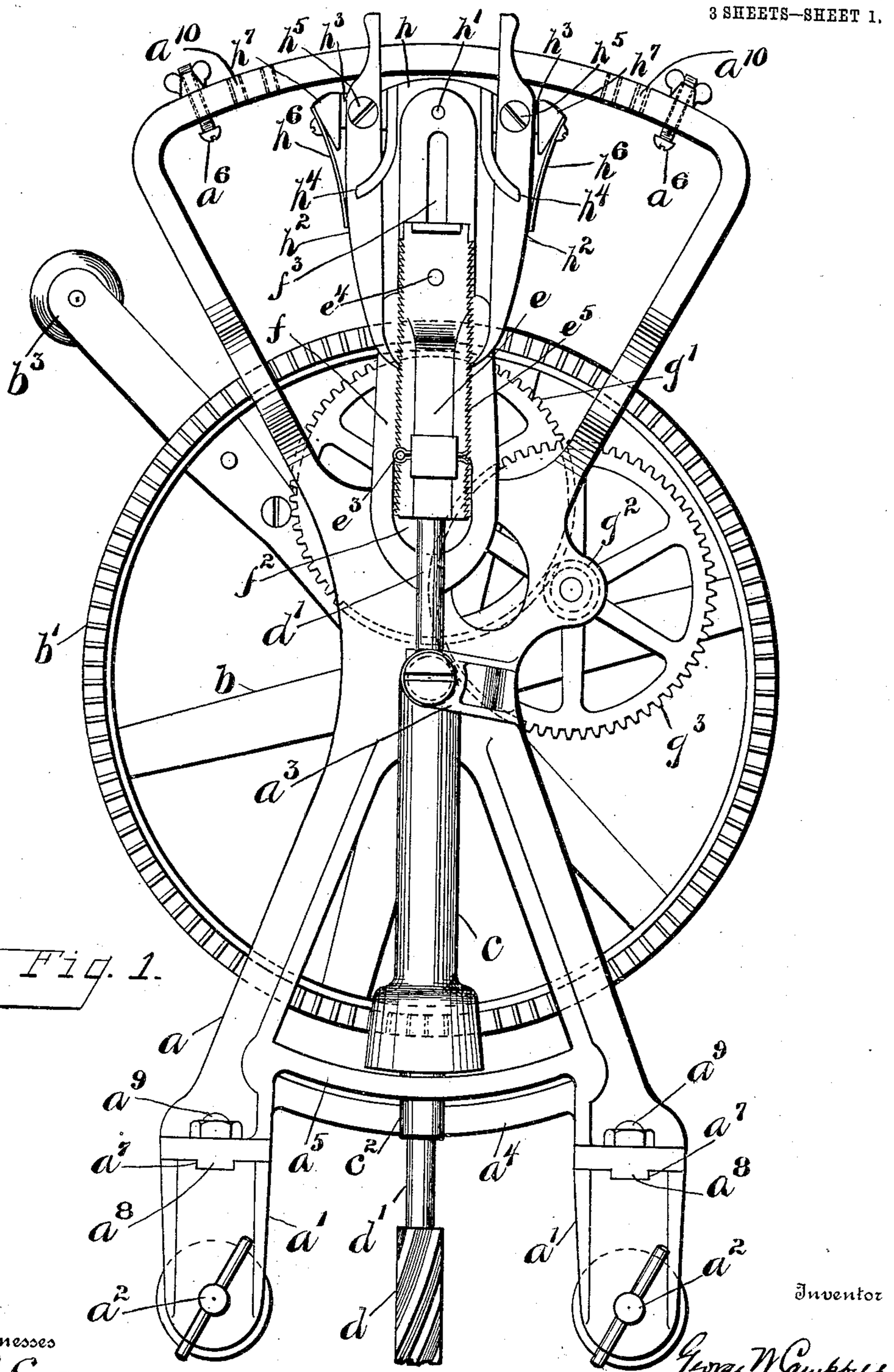

Fig. 1.

Witnesses

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3 SHEETS—SHEET 2.

Fig. 2

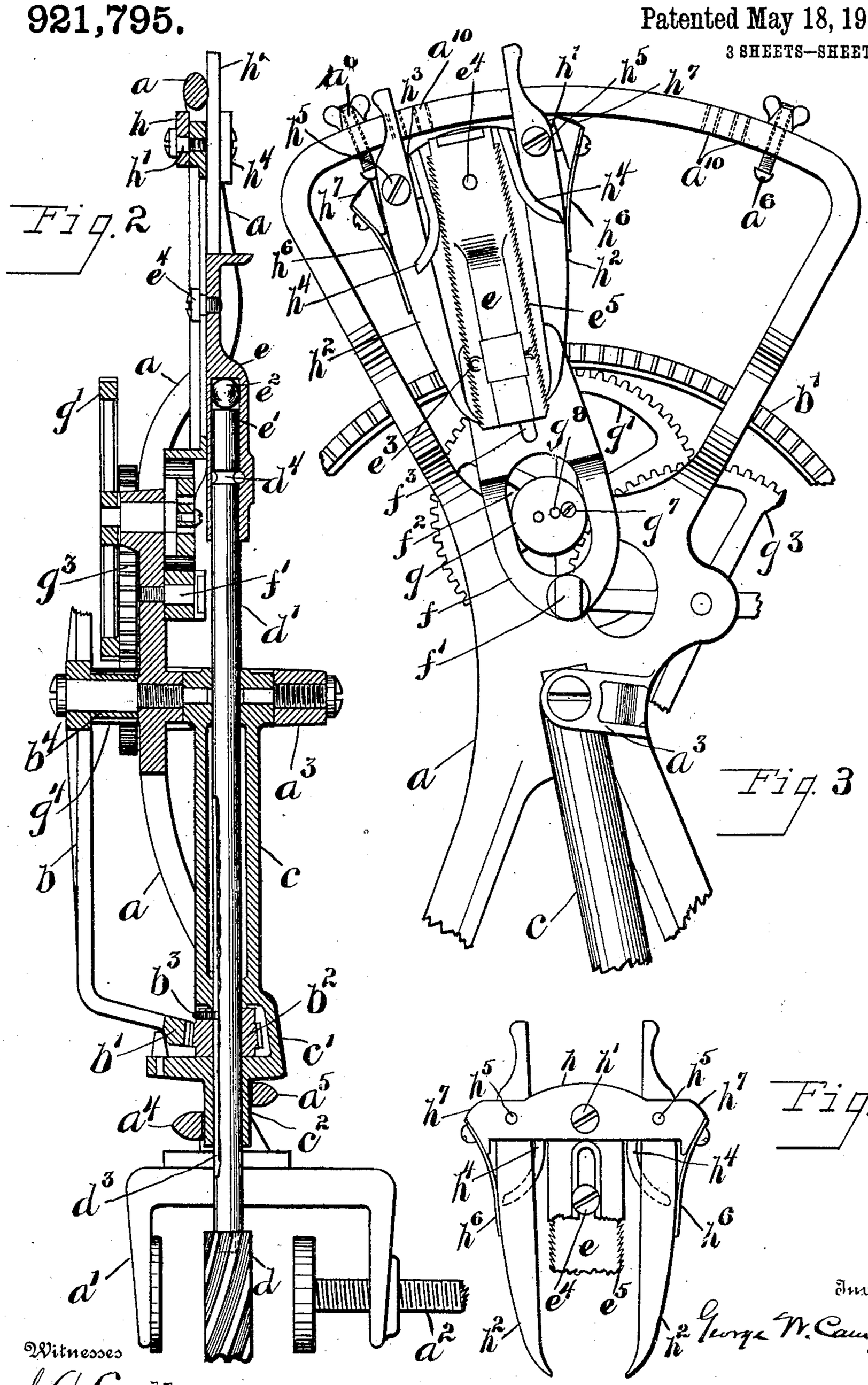

Fig. 3

Fig. 4

Witnesses

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3 SHEETS—SHEET 3.

Fig. 5

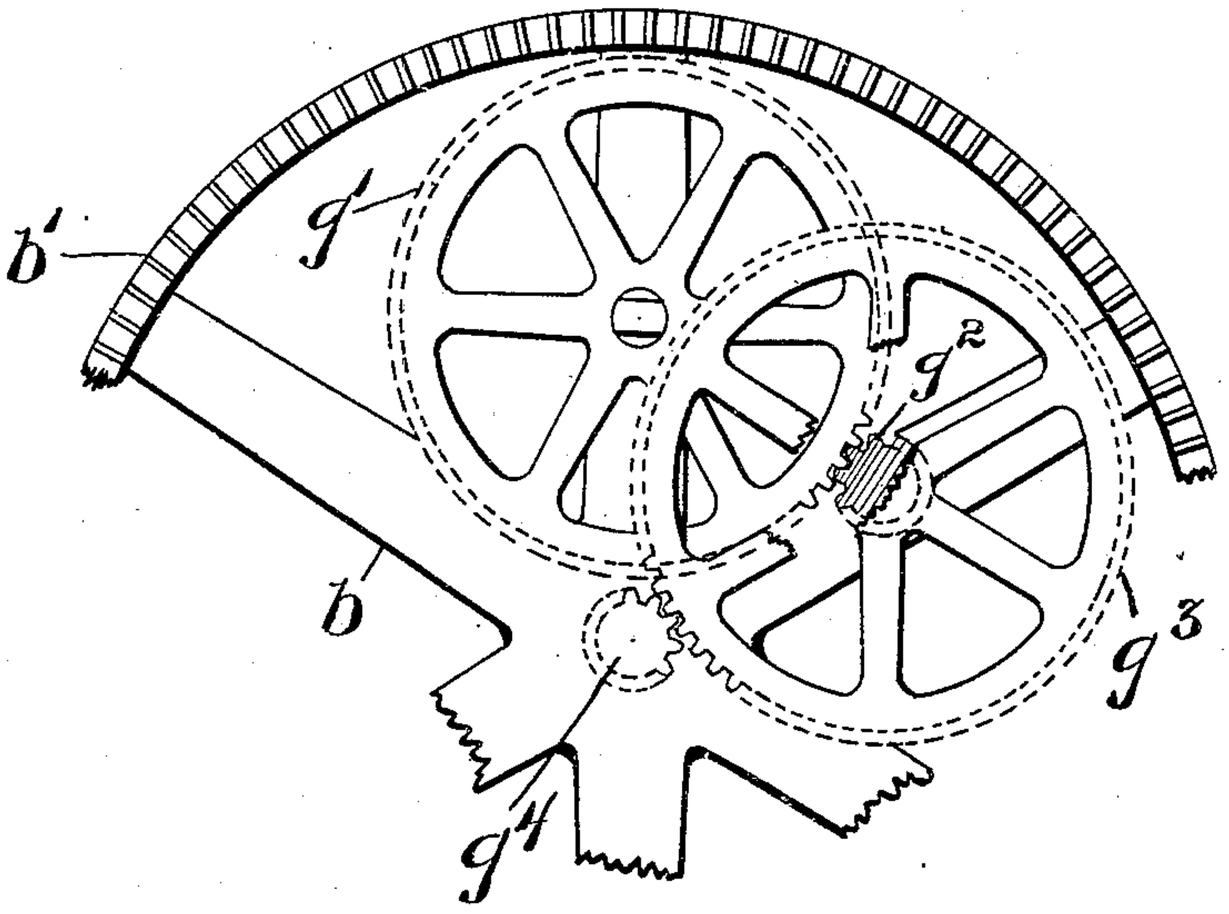


Fig. 6

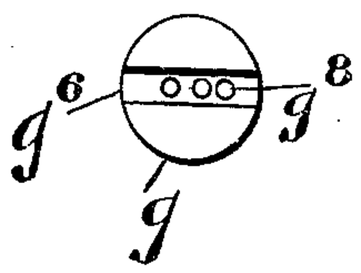
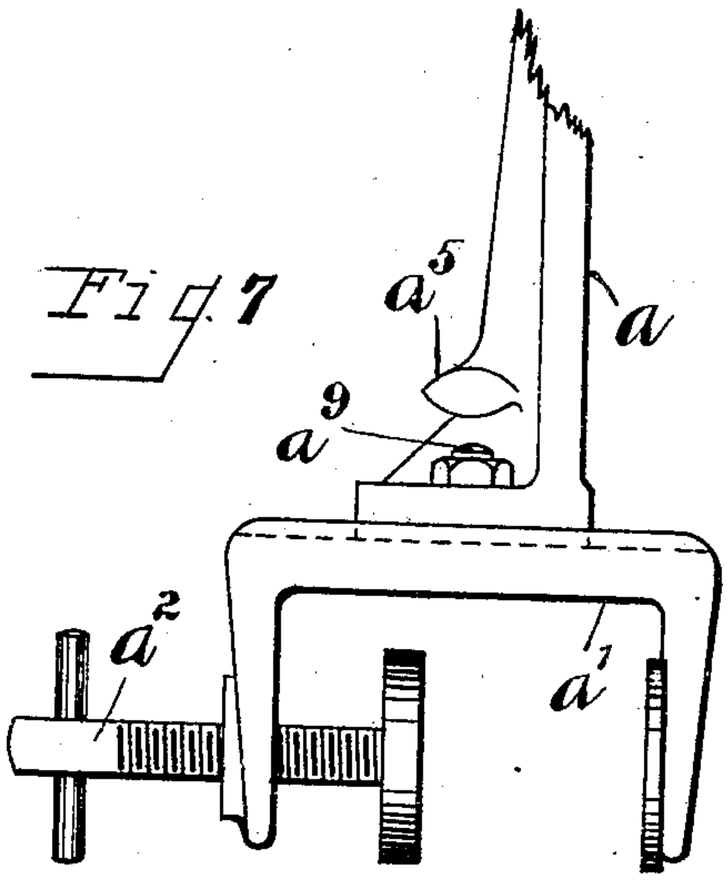


Fig. 7



Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE W. CAMPBELL, OF COLUMBUS, OHIO.

MORTISING-MACHINE.

No. 921,795. Specification of Letters Patent. Patented May 18, 1909.

Application filed April 6, 1908. Serial No. 425,426.

To all whom it may concern:

Be it known that I, GEORGE W. CAMPBELL, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Mortising-Machines, of which the following is a specification.

My invention relates to improvements in mortising machines and especially to machines that are designed to mortise doors or similar devices for the reception of locks.

The object of my invention is to provide a new and useful machine for mortising doors and similar purposes, the machine being constructed and arranged that a mortise will be constructed rectangular and obviate the necessity of finishing the mortise by the use of chisels or other hand tools.

The invention consists in the constructions hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a device embodying my invention. Fig. 2 is a longitudinal sectional elevation of the same. Fig. 3 is a side elevation of the same with some of the parts removed. Fig. 4 is a detail view of a part of the feeding mechanism. Figs. 5, 6 and 7 are details.

Like parts are represented by similar letters of reference in the several views.

The operating mechanism of my improved device is supported upon a main frame *a* which is provided at one end with clamps a^1 having suitable thumb screws a^2 by means of which the main frame may be properly attached to the article to be operated upon.

Mounted upon the main frame by a suitable pivot or journal is a main driving-wheel *b*, carrying at its outer periphery a beveled gear b^1 which is preferably offset with reference to the arms of the driving-wheel as shown in Fig. 2. This beveled gear is adapted to engage with a pinion b^2 mounted within a tool-carrying sleeve *c*. The tool-carrying sleeve is pivoted at its rear end to the main frame *a* preferably through the instrumentality of an L-shaped arm a^3 which projects outwardly from the main frame to form a support for this pivoted tool-carrying sleeve which is pivoted to the arm a^3 concentric with the main driving-wheel *b* so that the sleeve may oscillate about its pivoted center while the pinion is always engaged with the beveled gear b^1. The pivoted tool carrying sleeve is formed at its forward end with a housing c^1 in which the pinion b^2 is located, the sleeve being extended in front of the said housing, forming a bearing c^2 which extends between guides a^4 and a^5 formed on the main frame *a*.

The mortise forming tool consists of a bit or drill *d* formed on or attached to the end of a shank or shaft d^1 which extends through the tool-carrying sleeve *c*, the rear end thereof being inserted in a bearing or socket e^1 in a movable block *e*. The end of the shank rests preferably against an antifriction ball e^2 located in the socket e^1 which takes the end thrust against the shank in feeding as hereinafter more fully specified. The end of the shaft d^1 is removably secured in the socket e^1 by means of a pin e^3 which is adapted to be inserted through a suitable opening in the side of the block *e* and engages in a groove d^4 in the shank or shaft d^1. The shank d^1 is provided throughout a portion of its length with a groove or key way d^3 into which projects a pin, screw or key b^3 in the pinion b^2. The construction being such that the shank will always revolve with the pinion while free to slide longitudinally through the same.

There is pivoted to the main frame *a* an oscillating head *f* by a screw-threaded pin or stud f^1 which is located at or near its forward end. In proximity to this pivoted connection is an opening f^2 into which projects a cam *g* which when rotated, gives the head an oscillating movement about its pivoted center f^1.

The slide block *e* is attached to the oscillating head, *f*, by the means of a screw-threaded stud e^4 which projects through a slotted opening, f^3, in the oscillating head *f;* there being an enlarged head on the stud e^4 which holds the block and the oscillating head, *f*, together thus permitting the slide block to slide longitudinally along the head, while at the same time it is caused to move back and forth with the head as the head is oscillated.

At the free end of the oscillating head *f* is a pawl carrying arm *h*. This arm is pivoted at or near the middle of its length as shown at h^1 and carries near its outer extremities two feeding pawls, h^2. The arm, *h*, is preferably recessed as shown at h^3 to receive these pawls and is also preferably provided with projecting fingers h^4 to extend over the pawls, acting in the nature of guides which permit the pawls to move a limited distance about their pivoted connections h^5 by which they are attached to the pawl carrying arm *h*. At the end of this pawl carrying arm are

springs h^6 which rest against the pawls and tend to press them inwardly and against the sliding block e which they are adapted to engage on opposite sides. For the purpose of this engagement the sliding block is provided on opposite sides with ratchet teeth e^5.

On the rear side, or that side of the pawl carrying arm, h, farthest from the pivoted center h^1, are cam faces h^7 adapted to be contacted alternately by projections a^6 on the frame a, the frame a being for this purpose preferably formed at this end on the arc of a circle as shown in Figs. 1 and 3.

Motion is imparted to the cam g through a train of gears g^1, g^2, g^3 and g^4, the latter gear g^4 being in the nature of a pinion formed on the hub b^4 of the main driving wheel b. A handle or crank b^3 attached to the main driving wheel b serves to rotate the said wheel and thus give motion to the mortising tool and also to the cam g and through the cam to the oscillating head f and parts carried thereby.

It should be remarked that the pivot f^1 of the oscillating head f and the pivotal connection of the tool-carrying sleeve are separated so that the said tool-carrying sleeve, the tool shank and the sliding block e to which the shaft is connected oscillate in a different radius from the oscillating head f so that when the head is swung to its extreme position up or down, a line drawn through the center of the shank or shaft d^1 will stand at an angle to a line drawn through the pivotal center f^1 of the oscillating head and the pivotal connection e^4 between said head and the sliding block. It will also be understood that as the sliding block is moved to or from the pivotal connection f^1 along the oscillating head f the angle between these lines will be increased or diminished. The distance between the pivot, f^1, and the pivotal connection of the tool carrying sleeve is arranged proportionately to the distance that the tool travels up and down under the influence of the oscillations of the swinging head f. As this head is swung up or down the cam faces h^7 come in contact with one of the projections a^6 which gives to the pawl-carrying arm, h, an oscillation which will advance one of the pawls h^2 and retract the other, thus causing the pawl to correspondingly advance the slide block e, moving the tool d longitudinally to force it into the work in connection with which it is operated. This movement of the sliding block to feed the tool occurs substantially at the time the tool reaches its extreme upper or lower position in its travel and inasmuch as the arc through which the block travels varies proportionately with the amount the tool is fed longitudinally, by reason of the differences in centers and the difference of angularity between the tool shank and the swinging head, the outer or working end of the tool will be caused to move at its extreme upper or lower position on a line substantially parallel with the line of the tool when in the center of its oscillating movement, so that the edge of the mortise will be bounded by a plane substantially parallel to the tool when in its middle position. The difference in the centers of oscillation of the tool-carrying sleeve and the swinging head would also cause the outer or working end of the tool to move in a substantially straight line so that the bottom of the mortise will be formed on a substantially straight line at right angles to the line of the tool when in its middle position.

I have shown the clamps, a^1, formed adjustable on the end of the frame, a, by means of guides or ways, a^7, formed on the frame fitting in corresponding grooves, a^8, on the clamp, a bolt, a^9, serving to secure the parts in any position of adjustment so that the frame may be adjusted laterally with the clamps to bring the tool centrally of the door when doors of varying thickness are to be mortised. I also provide means for varying the throw of the cam and thus the length of the mortise to be cut. This I accomplish by forming the stud or trunnion on which the cam is secured with flattened sides adapted to fit in a groove or way g^6 formed on the back of the cam. The cam is secured in different positions of adjustment by means of a screw g^7 which is adapted to pass through openings, g,^{8} of varying distance from the center of the cam, thus permitting the throw of the cam to be adjusted to vary the travel of the end of the mortising tool. For each adjustment of the cam I provide an adjustment for the projections a^6 which operate the pawls h^2. I have indicated by dotted lines two additional screw-threaded openings, marked a^{10}, to receive the screw-threaded projection a^6, thus providing a corresponding adjustment for these projections for each adjustment of the cam.

A brief description of the operation of the device thus described is as follows.

The machine is clamped to the door or other articles to be mortised by the clamps a^1 and by means of the crank handle b^5 the cam is rotated until the swing head f and the tool carrying sleeve are brought into exact alinement at the center of movement. The tool is placed against the work and the feeding pawls are caused to engage the sliding block. The handle is then rotated which causes the tool to rotate rapidly and the swinging head to oscillate. At each oscillation the tool-carrying pawls are fed inwardly by the pawl-carrying arm contacting with the projections a^6. As the tool oscillates from side to side it is fed inwardly against the work at each side and being rotated rapidly cuts away the material at the sides then moves in the line of travel in the length of the mortise until it comes to the

opposite side and the operation is continued until the mortise is to the required depth.

Having thus described my invention, I claim:—

1. In a mortising machine, a main frame, a pivoted tool-carrying member and a tool carried thereby, means for driving the tool in different positions of the tool-carrying member, a swinging head adapted to impart an oscillating movement to said carrying member and said tool, said oscillating head being pivoted eccentrically to said tool-carrying member, feeding mechanism for said tool carried by said swinging head the arrangement being such as to feed the edge of said tool to successive positions in a line diverging from the center line of said tool at the instant of feed, as specified.

2. In a mortising machine, a rotating tool, a pivoted tool-carrying member, means for rotating said tool in different positions of said tool-carrying member, a swinging head having a fixed movement about a pivotal center differing from the pivotal center of said tool and tool-carrying member, and a connection between said swinging head and said tool to impart an oscillating movement to said tool, a feeding device for said tool, and means for operating said feeding device at the extremities of travel of the swinging head, and means for guiding said feeding device toward the pivotal center of the swinging head and at an angle to the line passing through the center of said tool.

3. A main frame, a tool-carrying sleeve pivoted thereto, a main driving wheel concentric with said pivotal connection, a driving connection between said wheel and tool, a swinging head pivoted eccentric to said tool-carrying member, means connected with said driving wheel for oscillating said swinging head, and feeding devices carried by said swinging head to cause the tool to move longitudinally at each oscillation of said head, the difference between the pivotal connection of the swinging head and the tool-carrying member being such as to cause the tool to vibrate in arcs measured by chords of substantially equal length, as specified.

4. A main frame, a pivoted tool-carrying member, a main driving wheel concentric with the pivot of said tool-carrying member, a tool driven thereby, an oscillating member pivoted eccentric to said tool-carrying member, means for imparting motion to said oscillating member from the main driving wheel, a sliding block carried by said tool or tool shank, a pivoted connection between said oscillating member and said block, and means for feeding said block, as specified.

5. In combination with the main frame a rotating tool and oscillating member, a connection between the tool and said oscillating member, said oscillating member and said tool being pivoted at different points as specified, a pawl-carrying arm and pawls on said oscillating member, a connection between said tool and said oscillating member, means for moving said tool by said pawls, and means for oscillating said pawls alternately at opposite extremities of the movement of said oscillating member, as specified.

6. In a machine such as described and in connection with an oscillating tool and the driving mechanism therefor, the swinging head, the pivoted pawl arm on said swinging head, pawls pivoted to said arm, a sliding block pivoted to said oscillating member engaged by said pawls, and engaging projections in the line of travel of said swinging member to cause said pawls to be alternately advanced and retracted, as and for the purpose specified.

7. In combination with the main frame having guides, an oscillating tool-carrying member pivoted to said frame and having a projecting part extending between said guides, a housing on said tool-carrying member, a pinion located in said housing, a main driving gear to engage said pinion, and means connecting said main driving gear to oscillate said tool, as specified.

8. In combination with the main frame and driving gear a tool-carrying member pivoted concentric therewith, an extension on said tool-carrying member projecting between guides on the main frame, a housing on said tool-carrying member, a pinion located in said housing and engaging said driving gear, a tool shaft extending through said tool-carrying member and having a feeding block socketed on said shaft, and means for feeding said block in a line divergent to the line of said shaft when the tool is at or near the limit of its oscillation, as and for the purpose specified.

9. A main frame, a tool-carrying member pivoted thereto, a driving wheel concentric with the pivot of said tool-carrying member, a tool carried by said tool-carrying member, and driven by said driving wheel, means for oscillating said tool and means for feeding said tool at or near the extremities of its oscillation, and for causing the end of the tool to be moved by successive increments of feed in a line substantially parallel with the axis of said tool when at the center of its oscillation, as and for the purpose specified.

10. In a mortising machine, a main frame, a rotating cutting tool, a feeding device for said tool consisting of a sliding block, a connection between said block and said tool, a pivoted pawl on each side of said block, said pawls being carried by a pivoted arm and located in recesses therein, projecting fingers as guides for said pawls, springs on said arm for pressing said pawls toward each other, means for oscillating said block, and a projection on said main frame on each side of

said pawl-carrying arm and located in the path of movement thereof to engage said pawl-carrying arm to cause said pawls to be alternately advanced and retracted to feed and hold said tool, substantially as specified.

11. A main frame, a tool-carrying member pivoted thereto, a driving wheel concentric with said pivot, a swinging head, connections between said swinging head and said tool to cause the same to oscillate together, a cam for moving said oscillating head, and a driving connection between said driving wheel and cam, and means for adjusting the throw of said cam, as and for the purpose specified.

12. In a mortising machine a swinging head, a feeding device carried thereby consisting of a sliding block and pivoted pawls on opposite sides of said block, contacting devices to cause said pawls to be alternately advanced and retracted, and a cam for moving said swinging head, and means for adjusting said cam to vary the length of travel, and means for adjusting the contact devices for said pawls, as specified.

In testimony whereof, I have hereunto set my hand this 14th day of March, 1908.

GEORGE W. CAMPBELL.

Witnesses:
CHAS. I. WELCH,
MARJORIE S. MORROW.