

(No Model.)

3 Sheets—Sheet 1.

M. DENNIS.

CROSS TOOLING AND CRANDALLING MACHINE.

No. 595,094.

Patented Dec. 7, 1897.

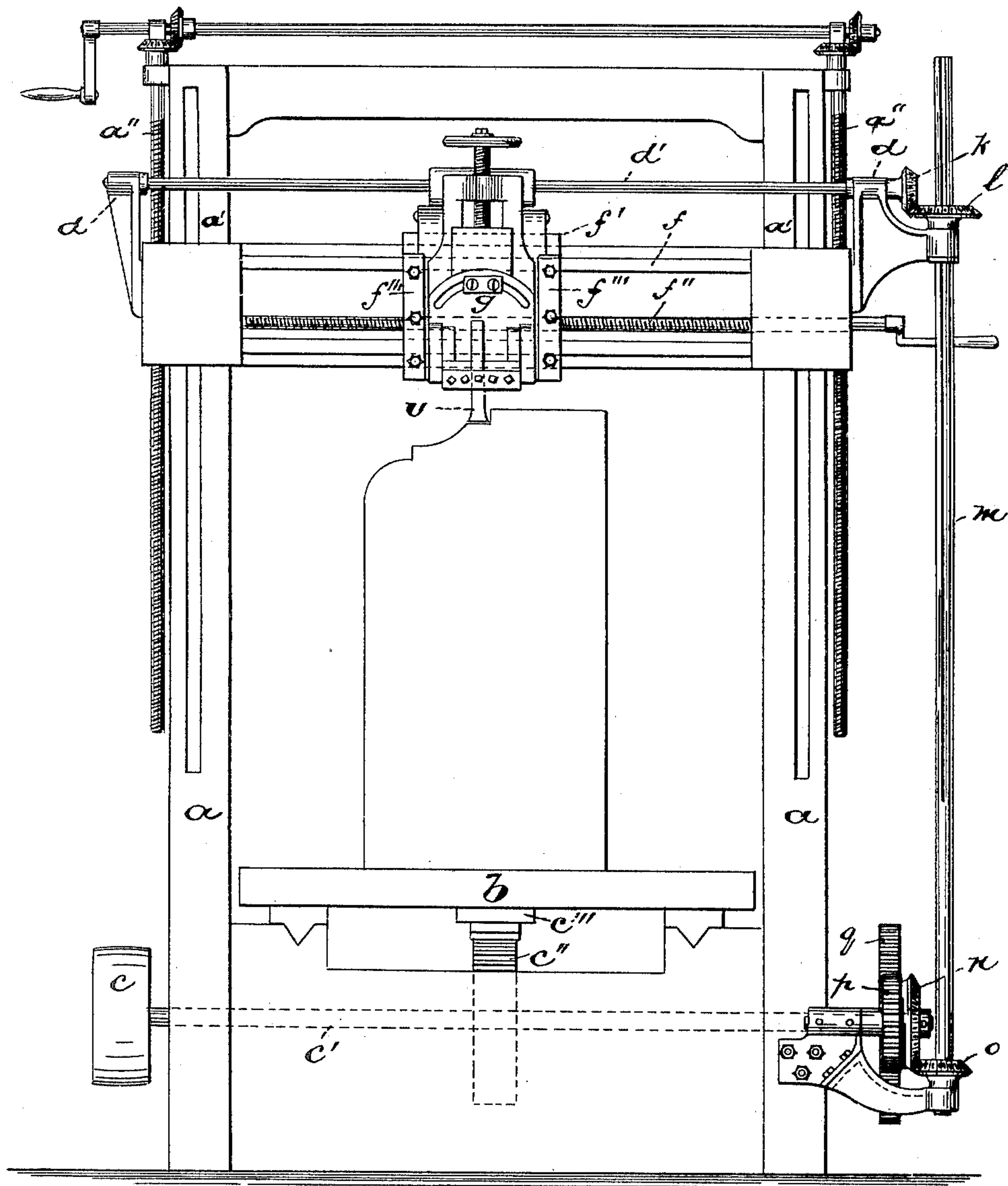


Fig. 1.

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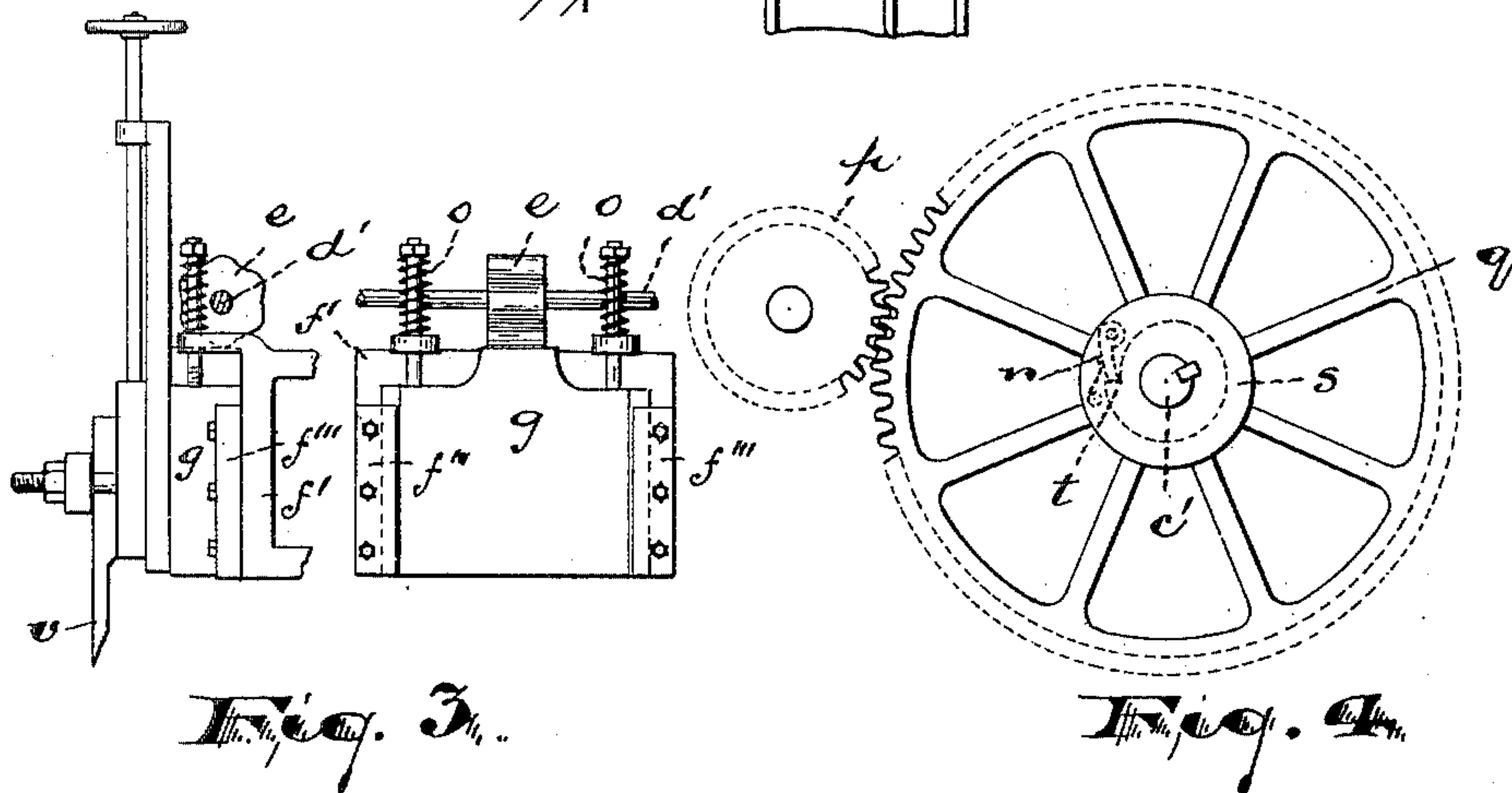
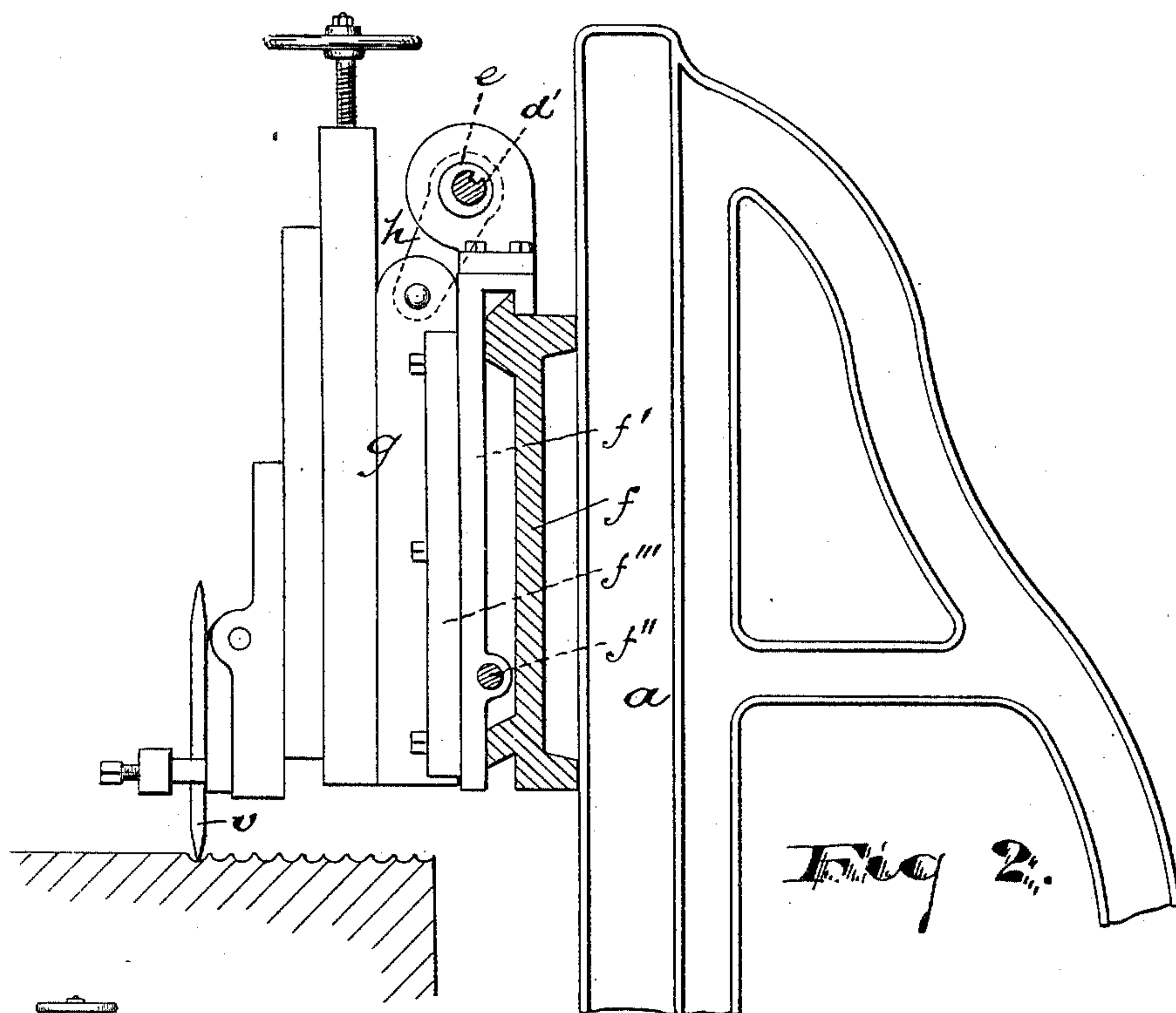
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Patented Dec. 7, 1897.



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3 Sheets—Sheet 3.

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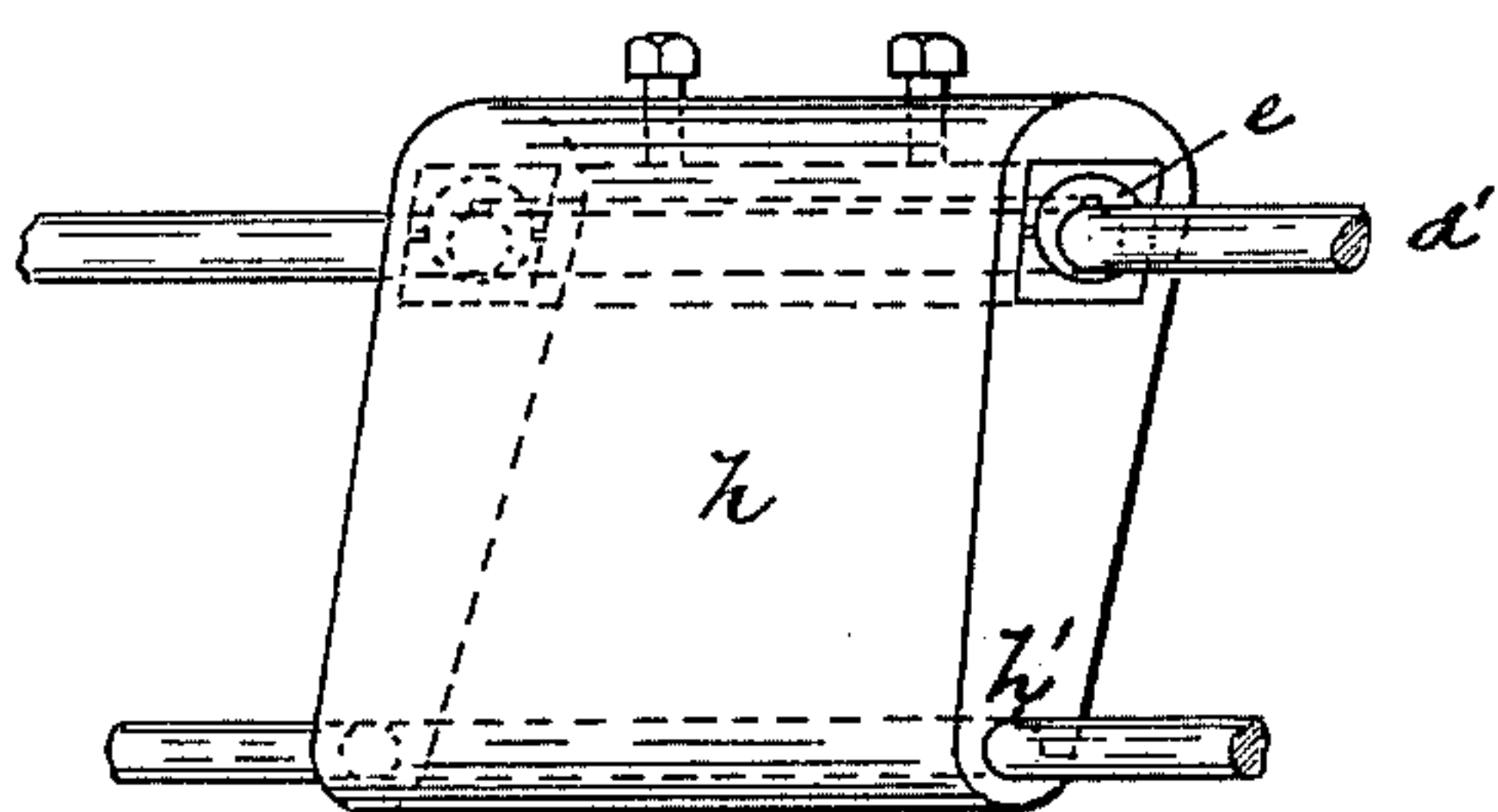


Fig. 5.

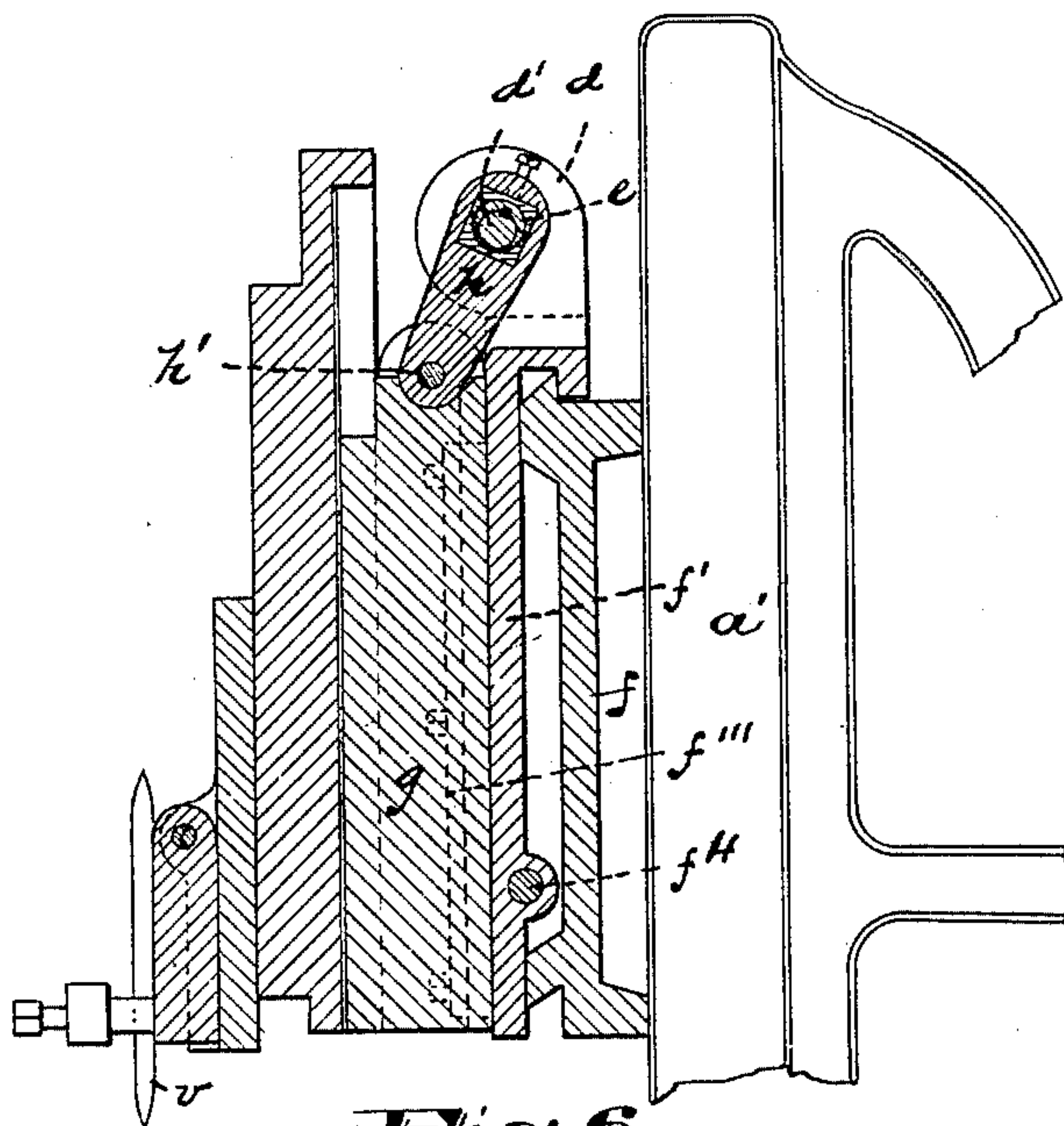


Fig. 6.

WITNESSES:

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UNITED STATES PATENT OFFICE.

MONTGOMERY DENNIS, OF NEWARK, NEW JERSEY.

CROSS-TOOLING AND CRANDALLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 595,094, dated December 7, 1897.

Application filed February 21, 1896. Serial No. 580,174. (No model.)

To all whom it may concern:

Be it known that I, MONTGOMERY DENNIS, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Cross-Tooling and Crandalling Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of this invention is to facilitate the work of cross-tooling and "crandalling" stone when finishing it for building purposes. The operation of cross-tooling consists in giving to the surface of the stone after planing a striped appearance, due to the formation of a series of fine grooves, six, seven, or eight grooves to the inch, more or less, said grooves being, say, one thirty-second of an inch in depth.

The invention consists in the improved cross-tooling or crandalling machine and in the arrangements and combinations of parts thereof, all substantially as will be hereinafter set forth, and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the views, Figure 1 is a front elevation of a portion of an ordinary stone-planing machine having my improvements, and Fig. 2 is a side elevation and sectional view of portions of the same. Fig. 3 illustrates a modification of construction which may be sometimes employed to advantage. Fig. 4 illustrates in side elevation a clutch by which power is communicated to the tool-operating mechanism. Fig. 5 is a detail perspective view of a certain link and cam and connections, and Fig. 6 is a section taken vertically through the center of the tool-carrier and connections.

In said drawings, *a* indicates the frame or bed of an ordinary stone-planing machine having vertical bearings *a'*, on which certain tool-supporting devices may operate and having means *a''* for raising or lowering said supporting devices, and *b* is a movable carriage

or table adapted to support and carry the stone beneath the finishing-tool *v*, suitable means *c c' c'' c'''* of any ordinary construction being provided to operate said table to secure the desired horizontal reciprocations. On the frame *a*, or upon the vertical slideways or bearings *a' a'* at the opposite sides thereof, is arranged a horizontally-disposed and vertically-movable slideway *f*, and on the same is a horizontally-movable head or supporting-plate *f'*, operated by a hand-screw *f''*. Upon said vertically-movable horizontal slideway *f'*, at the opposite ends thereof, are formed or secured boxes or bearings *d d'*, which are movable vertically with said slideway and carry the horizontal shaft *d'*, so that it lies parallel with the vertically-movable horizontal slideway and also moves vertically with the said horizontal slideway. The said vertically-movable horizontal slideway is adjusted or raised and lowered by the means—preferably screws *a''*—before referred to. These last operate simultaneously, and as they are uniformly threaded the said horizontal way *f* is adjusted vertically, while maintaining its proper horizontal relations to the stone-carrying table or carriage *b*. On the said plate *f'* are formed vertical slideways *f'''* for a tool-carrier *g*, said carrier having a vertical reciprocating movement in said slideways, secured by means of a link *h*, arranged on said cam or eccentric *e*, so as to be moved reciprocally thereby as the said cam rapidly rotates with the shaft *d*. At its end opposite the eccentric said link *h* is connected to said tool-carrier *g*, and thus the rapid reciprocating movement of the link is transmitted to said carrier and thence to the tool *v*, as will be understood. The tool-carrier may be provided with means for changing the inclination of the tool and for fastening said tool upon its carrier.

To operate the cam-shaft, I provide bevel-gearing *k l*, a shaft *m*, another set of bevel-gearing *n o*, and cog-wheels *p* and *q*, the last being loosely arranged on the power-shaft *c'*, from which the power for operating the sliding table *b* is received. These parts may be arranged as shown or in any manner suitable for the purpose, or the operations may be obtained through the medium of any other positive power-transmitting devices. The

loose cog-wheel *q*, when employed, is clutched to the shaft *c'* by a spring-actuated pawl *r*, arranged on a disk *s*, fast to the shaft and engaging a clutch projection *t* on the wheel *q*.

5 In employing the word "positive" as applied to the power-transmitting means I wish to be understood as meaning incapable of slipping or losing motion or producing irregularity of motion after the manner of an ordinary leather belt or a spring interposed between parts in the train of power-transmitting devices.

In my machine the various parts are connected by intermeshing cog-wheels and their shafts, a cam *e*, which has the positive relation of an eccentric operating within a nicely-fitted link which connects said cam with the tool-carrier *g*, so that there is no looseness admitting of lost motion. Thus by my construction after producing a series of parallel grooves in the manner described the stone may be returned, so as to bring the tool in line or in proper relation to the first groove of said series. Then the hand-screw *f''* can be turned so as to throw the tool to one side of the said series of grooves. The power may then be applied, and a second series of cuts effected. Because of the positive relations of parts transmitting motion to the table and tool the individual grooves of one series will coincide with those of the other, and the coincidence will be uniform throughout the series, so there will be no break or jog at the meeting ends, but there will be a uniform alinement throughout, producing a more regular finish, as will be understood.

As the table *b* travels forward under the power of the shaft *c'* and its connections the shaft *d* is rotated and with it the eccentric *e*, and the link *h* on said eccentric is given a positive reciprocal movement, which is transmitted positively to the tool-carrier *g*. The lower end of the link *h* being pivoted upon the carrier at *h'* and having an end bearing thereon, as shown in Fig. 6, there is no looseness or play allowed at the joints tending to admit of independence of movement or loose vibration of the tool. Thus the operations of the reciprocating tool-carrier are regular, uniform, and positive, and the action of the tool on the stone, whereby it cuts out at each downward stroke a slight groove and by its repeated action a series of such grooves, effects a cross-tooling result very closely, if not exactly, resembling that of hand-tooling. On a reversal of the movement of said shaft *c'* the pawl *r* rides over the clutch projection *t*, and movement is not transmitted to the tool, but the latter lies idle.

60 To secure a more rapid hammering or indenting movement—or, perhaps, more properly, a gouging-out action—of the tool, I may and in some cases I prefer to provide the cam *e* with a series of cam projections adapted to engage the sliding carrier, as shown in Fig. 3. By this construction a series of reciprocations of the said carrier is produced at each revolu-

tion of the cam. In this case the link *h* is dispensed with, and a spring or springs *o* serve to return the carrier after each depression by a cam projection.

I am aware that other variations and modifications may be made in the construction of my invention without departing from the spirit or scope thereof, and so I do not wish to be understood as limiting myself by positive terms employed in the specification, excepting as the state of the art may require.

Having thus described the invention, what I claim as new is—

1. The improved cross-tooling machine for effecting a plurality or series of alined cross-tooling cuts as specified, comprising a frame having horizontal ways for a stone carriage or table and vertical ways or bearings *a'*, *a'*, a stone carriage or table and means for operating the same, a horizontal and vertically-movable slideway and means for moving the same vertically; a head or supporting-plate *f'*, and means for moving the same horizontally on the slideway, a tool-carrier having bearings on said head or supporting-plate *f'*, a tool, a cam and means for operating the same, said cam imparting reciprocating movement to said carrier, and a train of positive gearing connecting the stone-carriage and cam and effecting positive and regular movements of the two simultaneously and together, whereby the tool is enabled to effect a series of cuts, the said cuts in contiguous series being in regular and uniform alinement, substantially as set forth.

2. The improved cross-tooling machine herein described, in which is combined a frame having horizontal ways for a stone carriage or table, vertically and horizontally adjustable ways for a reciprocating tool-carrier and means for adjusting the same, a tool-carrier vertically and horizontally adjustable with said ways, a rotary cam, a shaft *d'*, a stone-carriage having a rack, a pinion engaging said rack, a shaft *c'*, and a train of gearing connecting the shafts *c'*, and *d'* and occasioning a movement of the two simultaneously and together, substantially as set forth.

3. The combination with the stone-carriage and means for operating the same, a frame having a horizontal way *f*, a horizontally-movable supporting-plate carried thereby and means for operating said plate, vertical ways on said supporting-plate, a vertically-reciprocating tool-carriage carried by said horizontally-movable plate, and a rotary cam arranged and adapted to transmit power to said tool-carriage, a cam-shaft *d*, and a train of gearing in connection with the means for operating the stone-carriage, whereby said tool-carrier and stone-carriage are operable simultaneously and together, substantially as set forth.

4. The improved stone-tooling machine in which is combined a frame, having vertical bearings *a'*, a stone-supporting table *b*, a power-shaft *c*, and means for securing hori-

zontal reciprocations of said stone-supporting
table, cog-wheels *p*, *q*, bevel gear-wheels *n*, *o*,
shaft *m*, bevel gear-wheels *k*, *l*, a shaft *d*, re-
ceiving power through said wheels *k*, *l*, from
5 said shaft *m*, an eccentric sliding longitudi-
nally on said shaft *d*, and rotating therewith,
a horizontal slideway *f*, vertically adjustable
on said vertical bearings *a'*, a supporting-
plate arranged on said horizontal slideway
10 and movable thereon, and having vertical
ways, means for sliding said plate on said
slideway, a vertically-reciprocating tool-car-

rier, a link on said eccentric and positively
attached to said carrier and a tool, all ar-
ranged and combined, substantially as set 15
forth.

In testimony that I claim the foregoing I
have hereunto set my hand this 11th day of
February, 1896.

MONTGOMERY DENNIS.

Witnesses:

CHARLES H. PELL,
C. B. PITNEY.