

(No Model.)

2 Sheets—Sheet 1.

G. YULE.

HAT MACHINE TOOL VIBRATOR.

No. 315,209.

Patented Apr. 7, 1885.

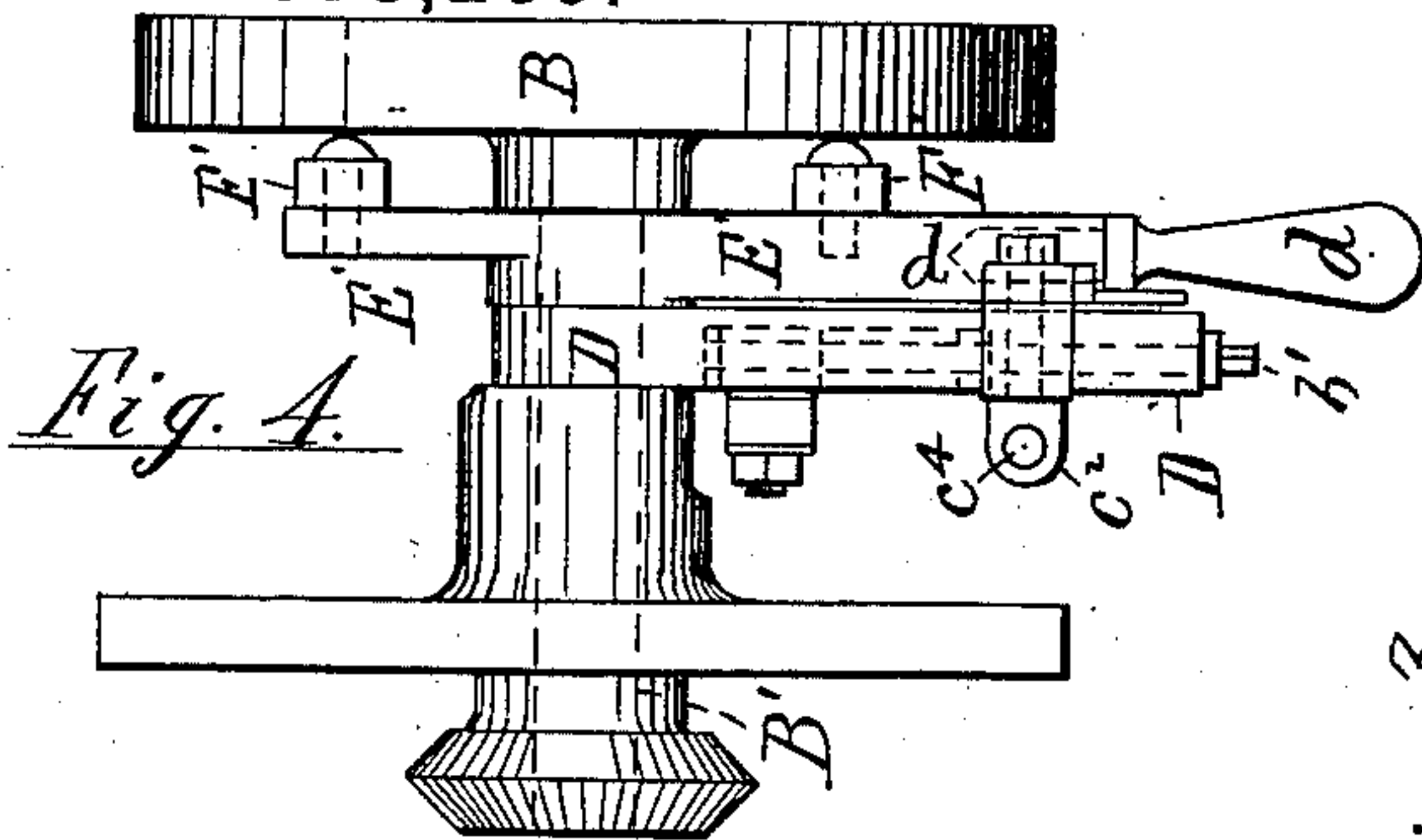


Fig. 4.

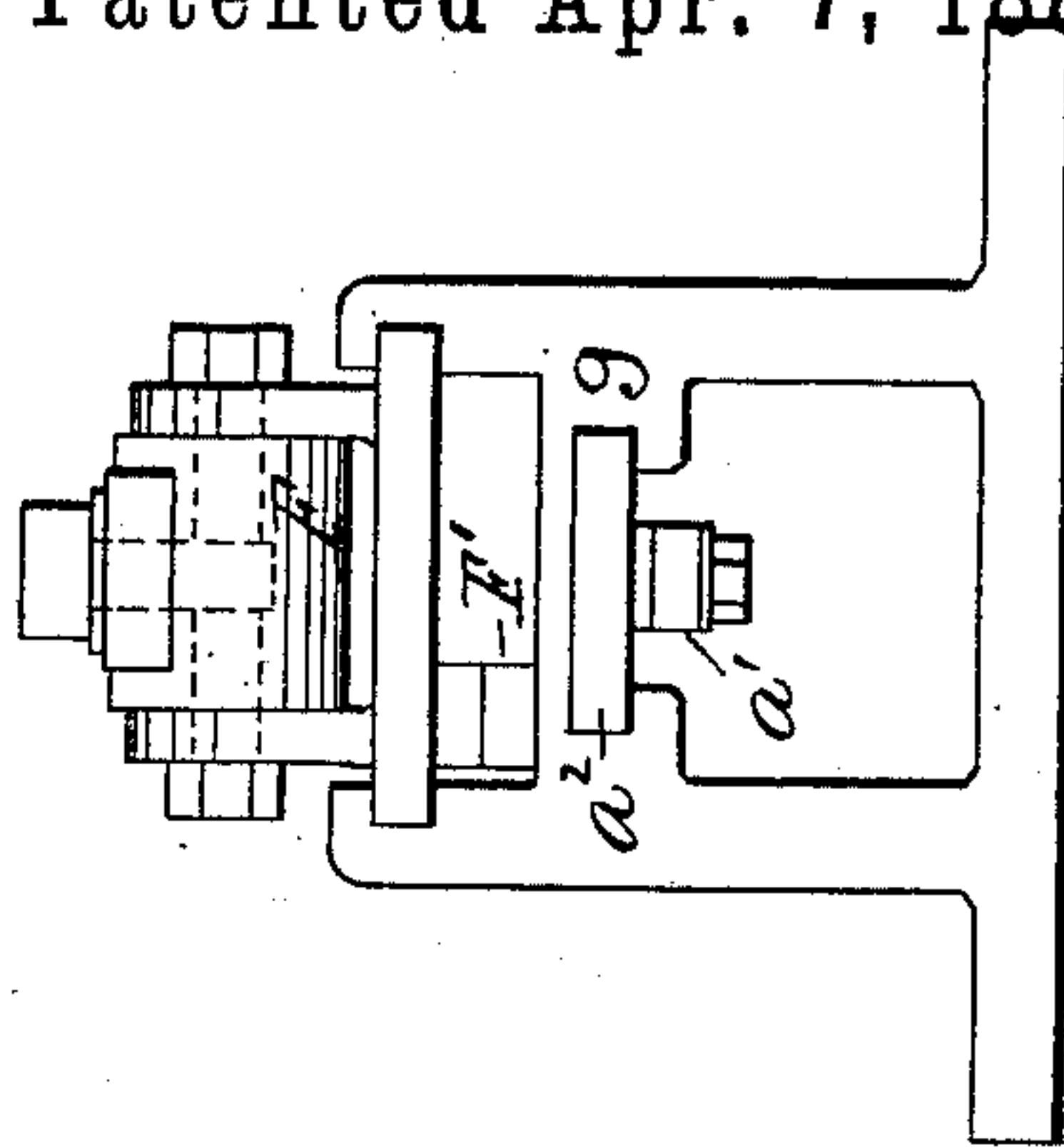


Fig. 3.

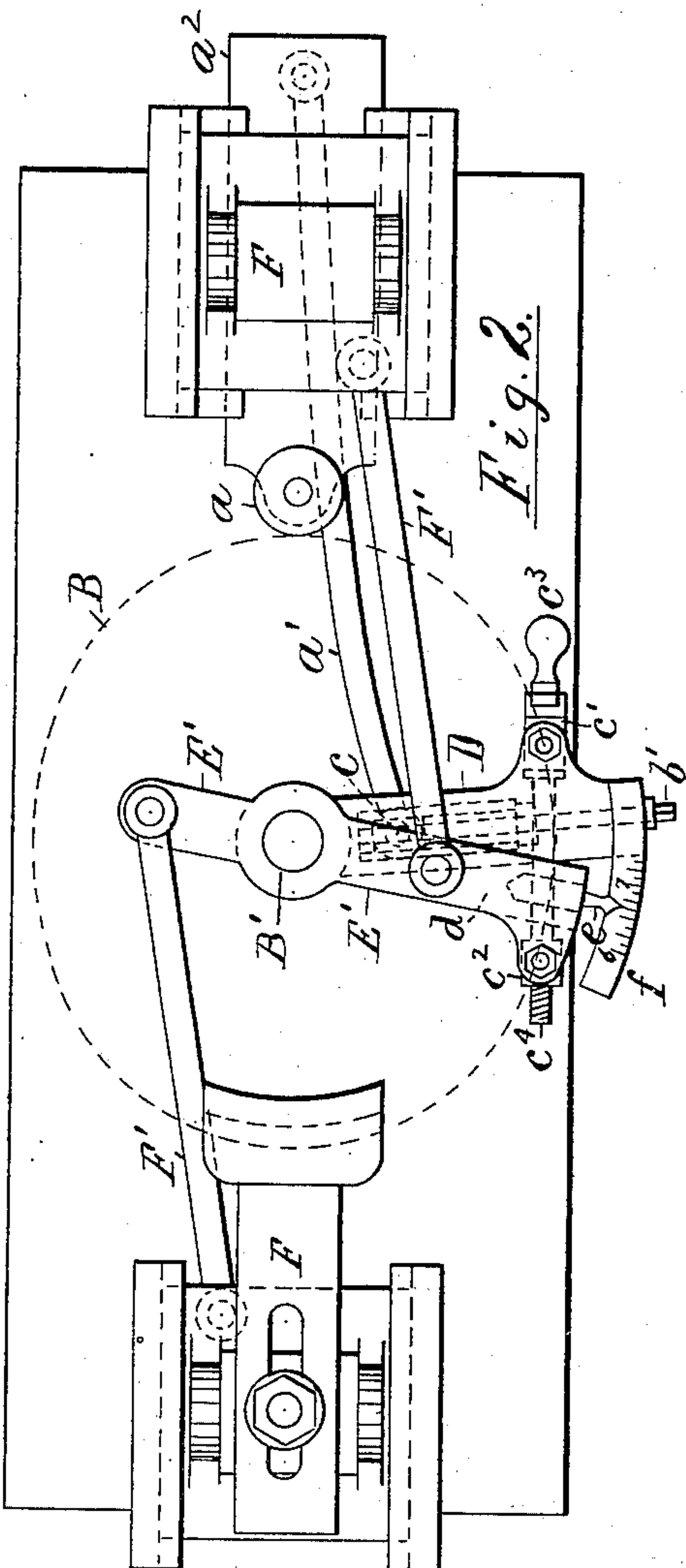


Fig. 2.

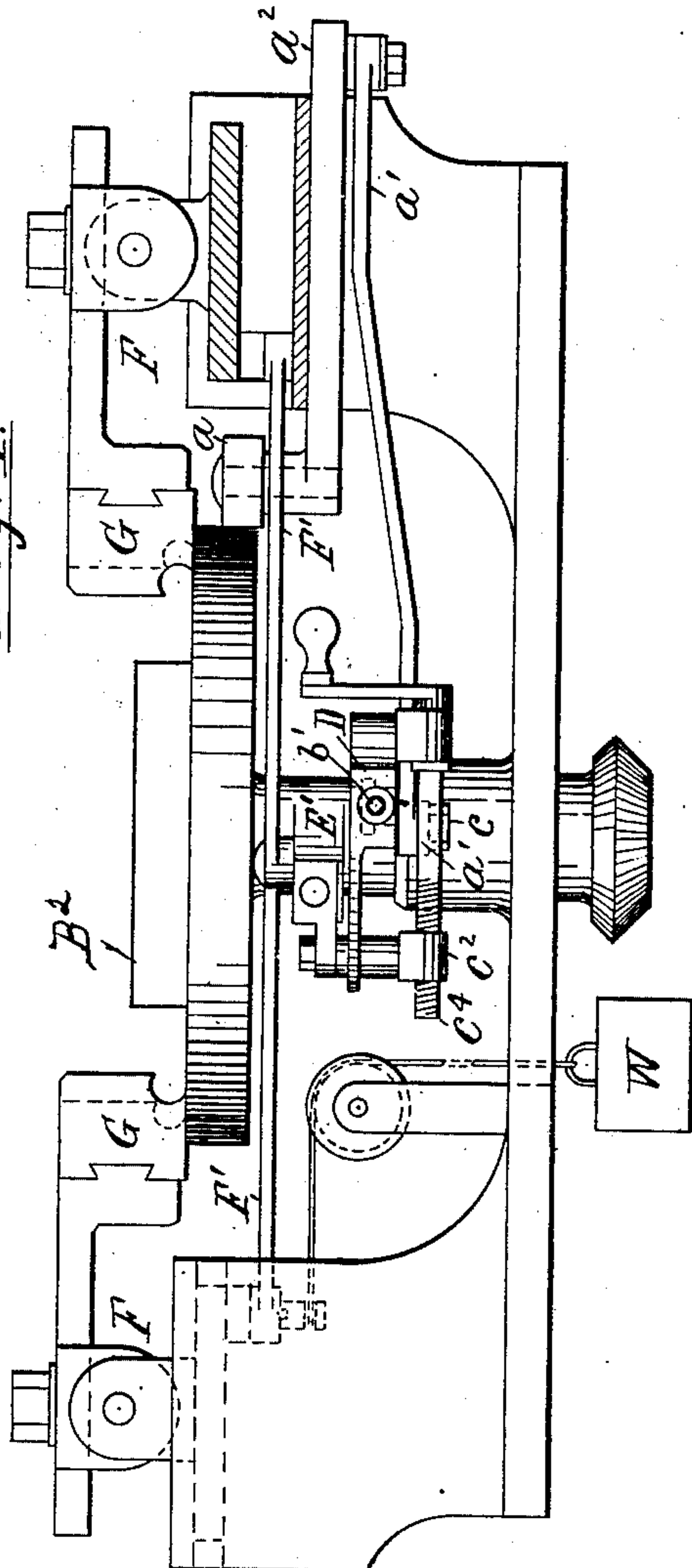


Fig. 1.

Attest:

L. Lee.  
H. J. Sheberath

Inventor

George Yule,  
per Thos. S. Crane, Atty.

(No Model.)

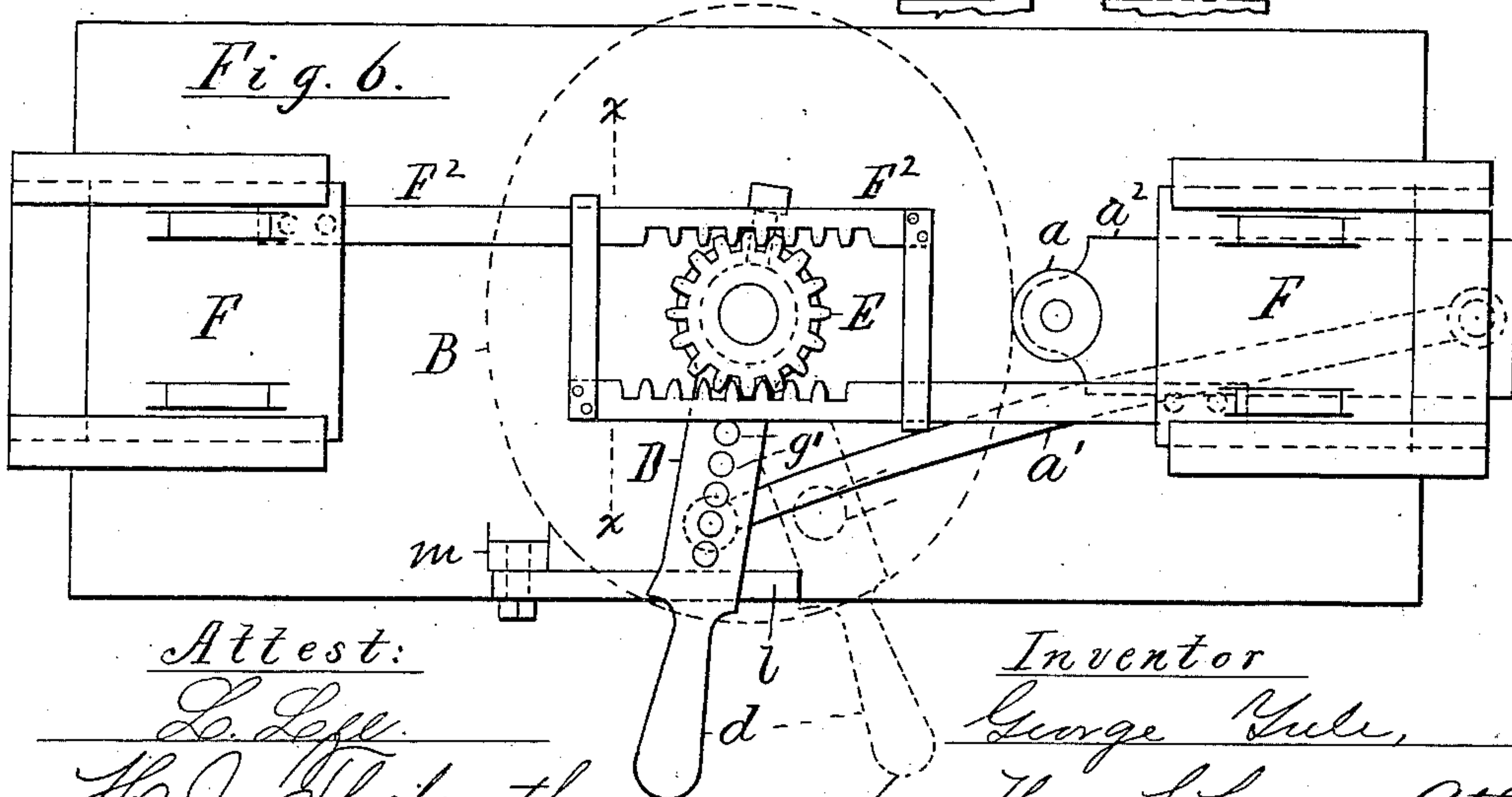
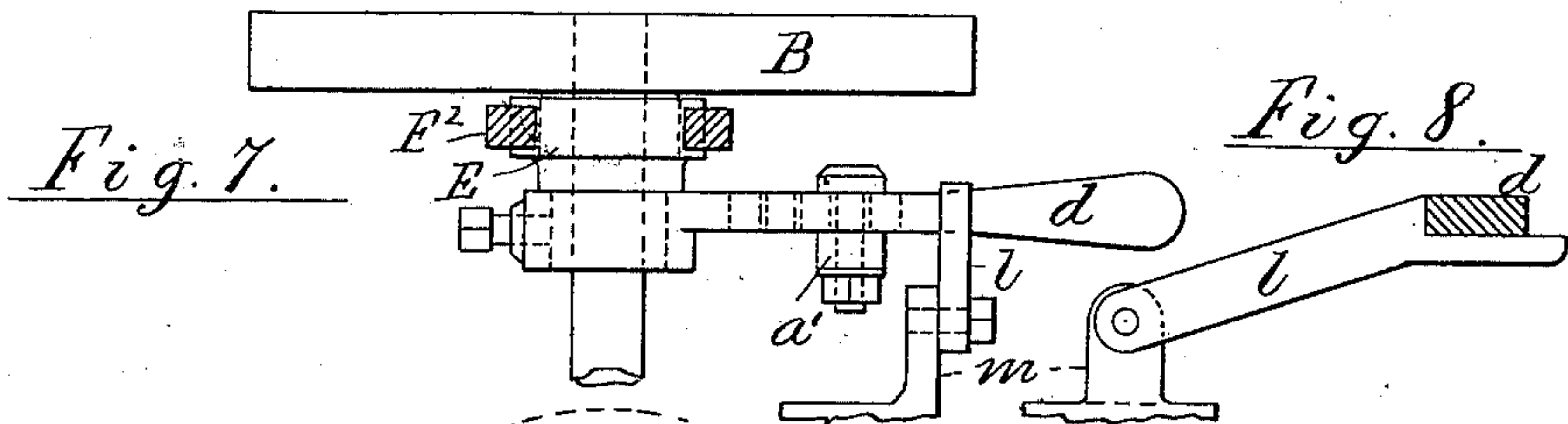
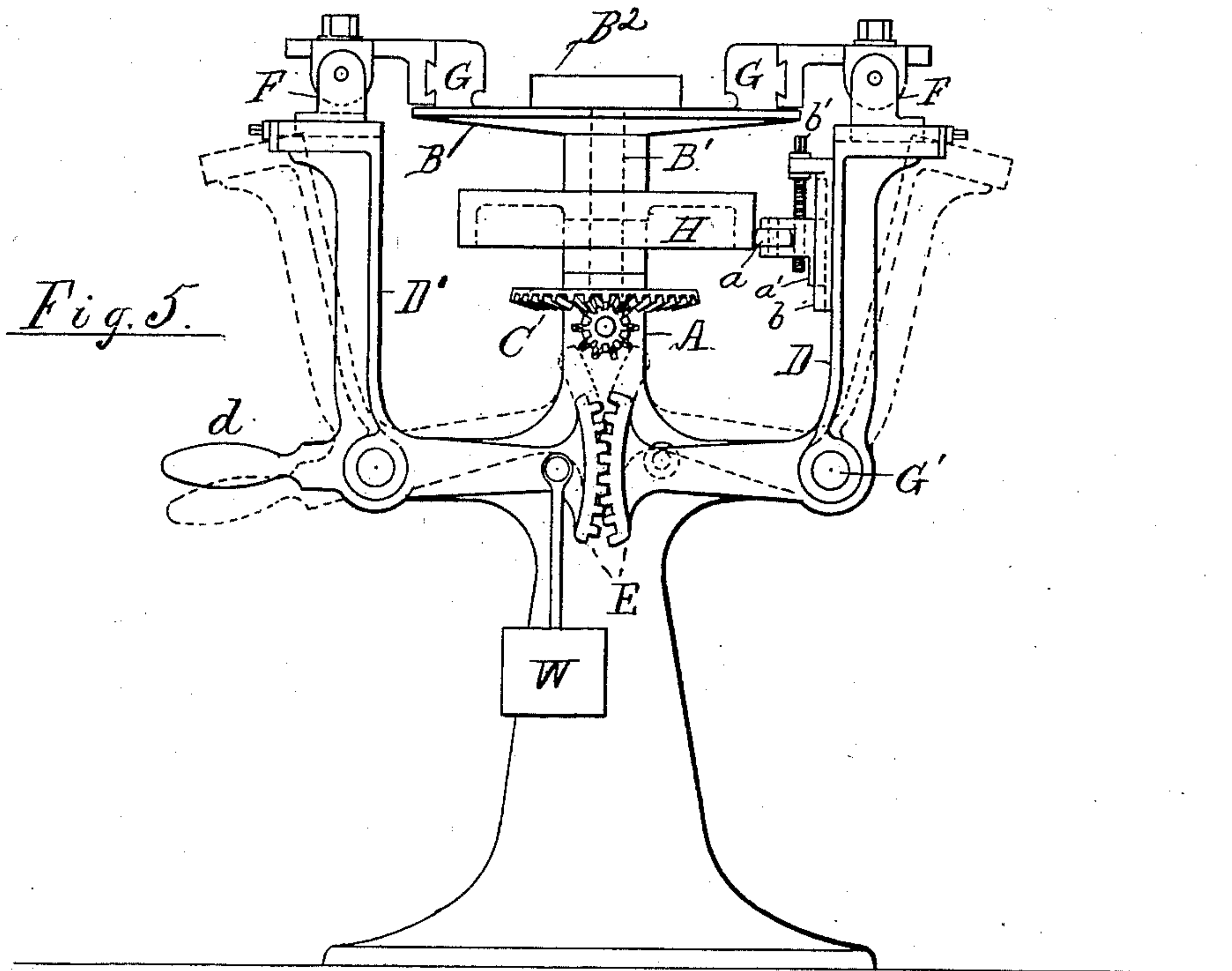
2 Sheets—Sheet 2.

G. YULE.

HAT MACHINE TOOL VIBRATOR.

No. 315,209.

Patented Apr. 7, 1885.



*Attest:*

*L. Lyle*

*H. J. Theberath*

*Inventor*

*George Yule,*

*per Thos. S. Crane, Atty.*



# UNITED STATES PATENT OFFICE.

GEORGE YULE, OF NEWARK, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE HAT CURLING MACHINE COMPANY, OF DANBURY, CONN.

## HAT-MACHINE-TOOL VIBRATOR.

SPECIFICATION forming part of Letters Patent No. 315,209, dated April 7, 1885.

Application filed September 4, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE YULE, a citizen of the United States, residing in the city of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Hat-Machine-Tool Vibrators, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 This invention relates to such hat-manufacturing machines as are provided with a tool vibrated to and from the rotating hat for operating upon the brim in a given elliptic curve.

15 Heretofore when it has been necessary to vary the vibration of the tool to suit a different style of hat, the vibrator-cam has been changed, or a cam having inclined or varying faces has been employed, and the required movements have been derived from the differently-curved parts of such cam. In either case, the variation in the movement of the vibrating tool has been effected, practically, by a cam of different curve; and the object of my present invention is to secure a very considerable range of variation from a cam of uniform curve, or from some other analogous source of vibrating motion, such source being for convenience' sake, termed in this specification  
25 a "vibrator."

30 In this invention I employ a vibrator having a fixed movement, and may, therefore, use for such vibrator a single cam, crank, or equivalent agent having a positive throw; and I interpose between such vibrator and the tool-carrier an adjustable and variable connection, whereby the tool-carrier may be actuated with greater or lesser vibrations, as may be required. Such an adjustable connection I have  
40 shown herein as a lever connected at different points with both the vibrator and tool-carrier, and having one of such connections adjustable to or from the fulcrum of the lever, to vary the imparted movement.

45 The invention also consists in combining such a lever with a coupler for joining and moving two tool-carriers simultaneously, such as I have claimed jointly with E. Tweedy in a pending patent application, No. 142,206, and thus affords the means of varying the throw  
50 of both tools equally.

It also consists in various constructive features, as will be fully set forth hereinafter.

In the drawings, Figure 2 is a plan of the vibrating mechanism of a hat-curling machine 55 having two tool-carriers mounted in slides. Fig. 1 is a side elevation of the same with the curling-tools. Fig. 3 is an end elevation at the right hand of Fig. 1, and Fig. 4 is an elevation of the machine with the entire left-hand 60 tool-carrier and its supports removed to exhibit the coupler. Fig. 5 is a front elevation of a machine having two tool-carriers mounted upon vibrating arms coupled together. Fig. 6 is a plan of a vibrating mechanism applied 65 to a coupler formed of toothed racks at opposite sides of a pinion. Fig. 7 is a section of such mechanism on line *x x* in Fig. 6, with the brim-plate affixed to the spindle; and Fig. 8 is a side elevation of the catch shown in 70 Fig. 7, with a section of the coupler-handle.

The vibrator is shown herein as a roller, *a*, pressed upon the periphery of a revolving cam, and the operation of the adjustable lever connection or attachment will be best understood by reference to Fig. 5, in which is represented a machine of the form shown in another patent application filed herewith, and having a hat-brim plate, *B*, mounted upon a spindle, *B'*, at the top of a frame, *A*, and provided with a hat-clamp, *B<sup>2</sup>*, and gears *C*, to rotate it. 75

*D D'* are two rocking arms or levers coupled together by toothed segments *E*, and provided at the top with tool-carriers *F* and curling- 85 tools *G*. A cam, *H*, is secured to the spindle *B'*, beneath the plate *B*, and the vibrator-roller *a* is shown connected to one of the lever-arms, *D*, by an adjustable shoe, *a'*, fitted to a slide, *b*, upon the lever, and provided with an adjusting-screw, *b'*. The slide is arranged so that upon turning the screw the roller may be set to and from the fulcrum of the lever, which, in this case, consists in the rocking shaft *G'*. The cam is made of uniform curva- 95 ture over its entire face, so that the vibrations imparted to the roller are equal, whether the roller *a* be moved up or down; but as the tool-carrier is fixed at a uniform distance from the fulcrum the movement of the tool is increased 100 as the roller is moved toward and diminished as it is moved away from the same fulcrum.



The adjustable slide *b* thus forms the connection between the vibrator and the lever-arm to which the tool-carrier is directly attached, and by means of the coupler *E* a precisely similar variable motion is imparted to the opposite tool.

In Figs. 1 to 4 the edge of the plate *B* is used as the cam, and is merely indicated by a dotted ellipse in Fig. 2, to avoid concealing the adjusting mechanism.

*a* is the roller; *a*<sup>2</sup>, a slide fitted to a guide, *g*; *D*, the vibrating lever, and *a'* the adjustable connection, formed as a link pivoted at one end to the slide *a*<sup>2</sup>, and by the other end to an adjustable pin, *c*, fitted in a groove in the lever and provided with an adjusting-screw, *b'*. The coupler is formed as an equal-armed cross-bar, *E'*, coupled to the carriers *F* by links *F'*, and the carriers are fitted to slide freely in straight guides mounted at opposite sides of the hat-plate *B*. The cross-bar *E'* and lever *D* are both fulcrumed or pivoted upon the spindle *B'*, beneath the plate *B*, and the carrier opposite the roller *a* is provided with a cord and weight, *W*, by which the roller is pressed toward the cam, and a similar motion transmitted through the coupler to both the carriers free from all lost motion. A similar weight is applied to the coupler in Fig. 5, being hung to the toothed segment opposite the arm to which the roller *a* is attached. The coupler-bar *E'* is secured to the lever by an adjusting screw, *c*<sup>4</sup>, fitted to a bearing, *c*<sup>1</sup>, upon one end and a nut, *c*<sup>2</sup>, upon the other, and a crank, *c*<sup>3</sup>, enables the operator to vary the relation of the coupler to the vibrating arm, and to thus set both the tools nearer to or farther from the hat, to operate on brims of different sizes. An index, *e*, and scale *f*, affixed, respectively, to the bar *E'* and lever *D*, indicate the position of any given pair of tools in relation to the hat, and enable the operator to change the position of both when in operation by merely moving the coupler-bar to or from the lever *D*. With a fixed movement of the roller *a* and connection *a'* the vibrations of the coupler obviously depend upon the position of the pin *c* upon the lever, the same actual movement of the link *a'* causing a greater or less angular movement of the lever and coupler as the pin is moved to or from the fulcrum *B'* by the screw *b'*. The coupler-bar is provided with a projecting arm and handle, *d*, by which the bar can be turned upon its fulcrum, thus furnishing a means of withdrawing both the tools simultaneously from the hat, to remove it from the plate *B*. In such movement of the coupler the lever is also retracted, and the roller *a* is pulled from contact with the cam, and the weight *W* is also lifted so that it operates to draw the parts again to their operative positions when the handle is released. A handle attached to one of the segments *E*, at *d* in Fig. 5, operates in the same manner to move the levers *D D'* as in dotted lines, and in Figs. 6, 7, and 8 is shown a means of locking such handle when retract-

ed, with the tools drawn away from the hat. In these figures the roller, cam, tool-carriers, and connecting-link *a'* are the same as in the machine last described in Fig. 1; but the lever is affixed directly to a pinion, *E*, which serves as the coupler, being pivoted, with the lever, upon the spindle *B'*, and connected with the tool-carriers by toothed racks *F*<sup>2</sup>. The lever is provided with the handle *d*, as the lever itself serves to actuate the coupler directly, and a latch, *l*, pivoted to the frame of the machine at *m*, has a notched end adapted to engage with the handle when retracted, and to thus hold both the tools away from the hat.

I have claimed in another application, No. 142,206, the combination of two tool-carriers coupled together and provided with means for vibrating one of such carriers; but my present invention differs from that referred to in having the vibrator act directly upon the coupler, and in applying a handle to the coupler to retract both the tools at once from the hat-plate. My present invention also differs from that in making the connection between the vibrator and tool-carrier variable in its effect upon the latter, as by a pin set to and from the fulcrum of a lever.

For adjusting and varying the vibrations of the carriers in given amounts, the pin may be set in a series of holes in the lever, as at *g'* in Fig. 6, and the location of the hole thus indicates the degree of vibration transmitted to the carriers.

In all the operations performed by the mechanism described herein the hat would be held and rotated by the clamp *B*<sup>2</sup>, and any part of its brim or body could therefore be treated by tools of any desired character.

I have claimed herein the application of a variable vibrating mechanism to the tool in a hat-making machine in general, although I have shown its combination herein with hat-curling tools only; but I have made a specific claim in another pending application, No. 142,207, to the combination of such a mechanism with a heated brim-softening tool, as the latter is required in practice to heat the edge of the hat-brim differently in proportion to the amount that the edge will be subsequently curled, the tool not being at all in contact with the hat in certain instances in such brim-softening machine.

I am aware that a mechanism has been devised for effecting a variable movement of a movable tool-carrier by means of a pivoted lever one end of which is actuated by contact with the surface of a cam; but in such case the only variable element in the combination consists in such cam-surface, which is differently shaped at different points, and the cam requires in all cases to be movably mounted upon its rotating supporting-shaft, so as to shift a different part of the cam-surface into contact with the lever-arm, which transmits the vibratory movement to the tool-carrier. My invention differs from this in forming the variable and adjustable attachment upon the le-



ver itself, as by changing the leverage of the vibrator connection thereto, as indicated at *a'* in my drawings; but it is obvious that in certain cases (so as to variably move a single tool mounted up a single lever) the adjustment may be effected with equal facility by making the lever-fulcrum or the connection from the tool-carrier adjustable, instead of the vibrator-connection, as shown in the drawings. Such a variable connection from the tool-carrier to the intermediate lever has been illustrated in Fig. 11 of the patent application No. 142,207, referred to above, and a different or roller connection is shown between the vibrator-cam and the intermediate lever.

I am also aware that it is common to unite hat-pressing dies by right and left hand screws, to actuate them simultaneously; but the coupler described above is claimed herein in combination with vibrating mechanism which could not be applied to such right and left hand screws.

My invention also differs from that just referred to in that the coupled tool-carriers are combined with a rotating hat-clamp.

Having thus fully set forth the nature and operation of my invention, what I claim herein is—

1. In a machine for manufacturing hats, the combination of a tool-carrier held movably, as described, a vibrator having a fixed movement, a lever intermediate to the carrier and vibrator, a variable and adjustable attachment upon the lever for actuating the carrier a greater or less distance by the uniform throw of the vibrator, and a connection between the lever and vibrator, such connection having the same fixed movement as the vibrator for all the variable movements of the tool-carrier.

2. In a machine for manufacturing hats, the combination of a tool-carrier held movably, as described, a vibrator having a fixed movement, a lever intermediate to the carrier and vibrator, a connection between the vibrator and lever, and means for attaching such connection to the lever at various distances from its fulcrum, and thereby actuating the carrier a greater or less distance by the same vibrator.

3. The combination, with a rotating hat-clamp and two or more vibrating tool-carriers, of a vibrating coupler for imparting a similar motion to each carrier, and means, substantially as described, for vibrating such coupler, and thereby vibrating the connected tools simultaneously.

4. The combination, with two or more movable tool-carriers and a coupler for imparting a similar movement to each, of a vibrator hav-

ing a fixed movement, a lever intermediate to the vibrator and the coupling device, and an adjustable connection between the vibrator and lever for changing the leverage of the latter, and actuating the coupler a greater or less distance by the same vibrator.

5. The combination, with two or more movable tool-carriers, and a coupler for imparting a similar movement to each, of a vibrator for actuating the coupler, and an adjustable connection provided with the screw *b'*, for adjusting the coupler to or from the vibrator, so as to vibrate the tool-carriers back and forth at different distances from the hat-crown to operate upon brims of different widths.

6. The combination, with two or more movable tool-carriers, and an oscillating arm and coupler for imparting a similar movement to each, of a lever pivoted upon the center of oscillation, and adjustably connected with the coupler-bar, a vibrator having a fixed movement, and means for connecting the vibrator to the lever at various distances from its fulcrum, for varying the movement of the tool-carriers, and also altering their distance from the hat-crown, substantially as set forth.

7. The combination, with the hat-clamp, its spindle, and the tool-carriers movable at opposite sides thereof, of the coupler *E'*, its arm *d*, and the lever *D*, all pivoted upon the said spindle, the arm and lever being adjustable to and from one another, the vibrator for actuating the arm, the adjustable pin *c* in the arm, and the connection from the vibrator to the adjustable pin, substantially as and for the purpose set forth.

8. The combination, with the tool-carriers, and a coupler for imparting to each a similar movement, of an adjustable and variable vibrating mechanism constructed and operated to actuate the coupler a greater or less distance, and to thereby operate the carriers and tools for hats of different shape or ellipticity.

9. The combination, with two or more movable tool-carriers, of a coupler for imparting a similar motion to each, means for pressing the carriers toward the hat, and means for locking the coupler with the carriers in an inoperative position, as when withdrawn from the hat.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

GEORGE YULE.

Witnesses:

THOMAS E. TWEEDY,  
THOS. S. CRANE.