

J. De Lihatcheff.

Dressing Stares.

Sheet 1-2, Sheets.

N^o 30,210.

Patented Oct. 2, 1860.

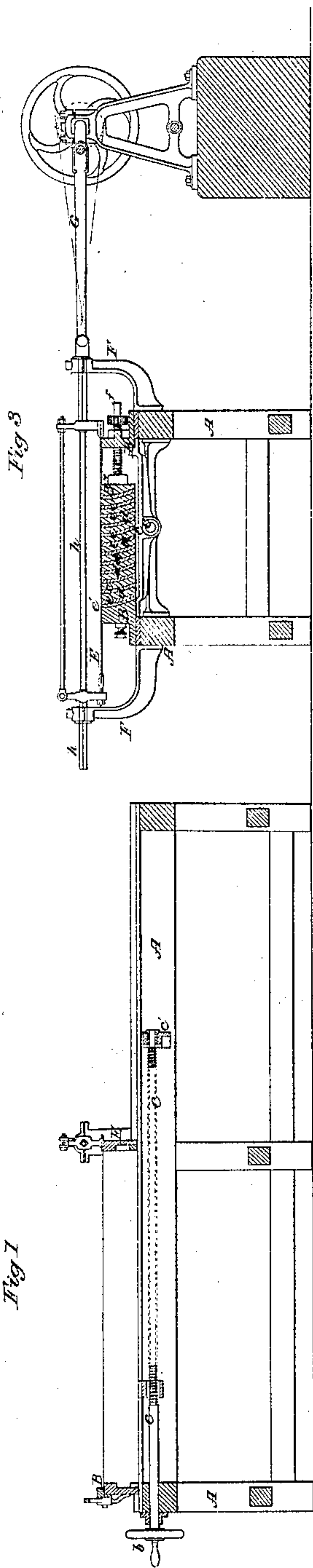


Fig 3

Fig 1

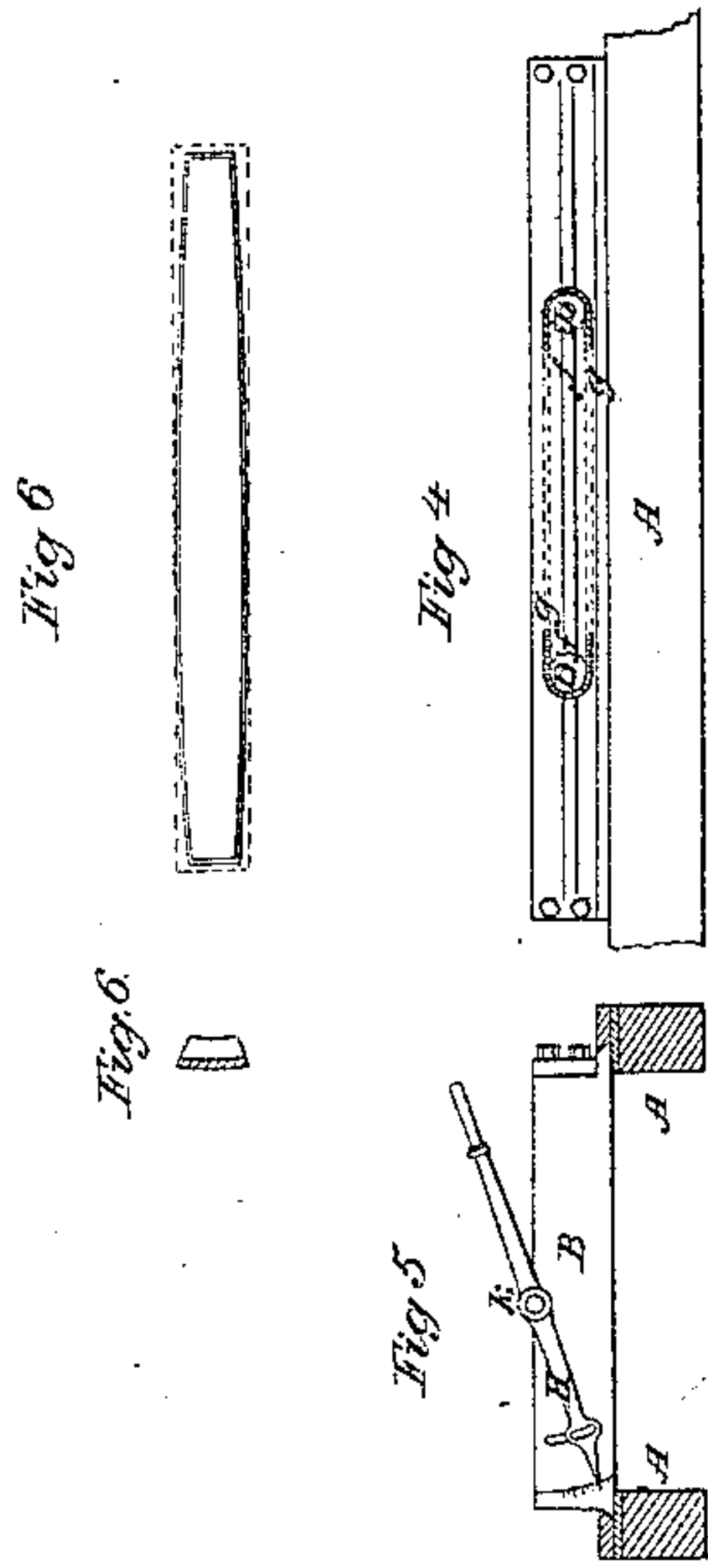


Fig 6

Fig 6

Fig 4

Fig 5

Fig 7

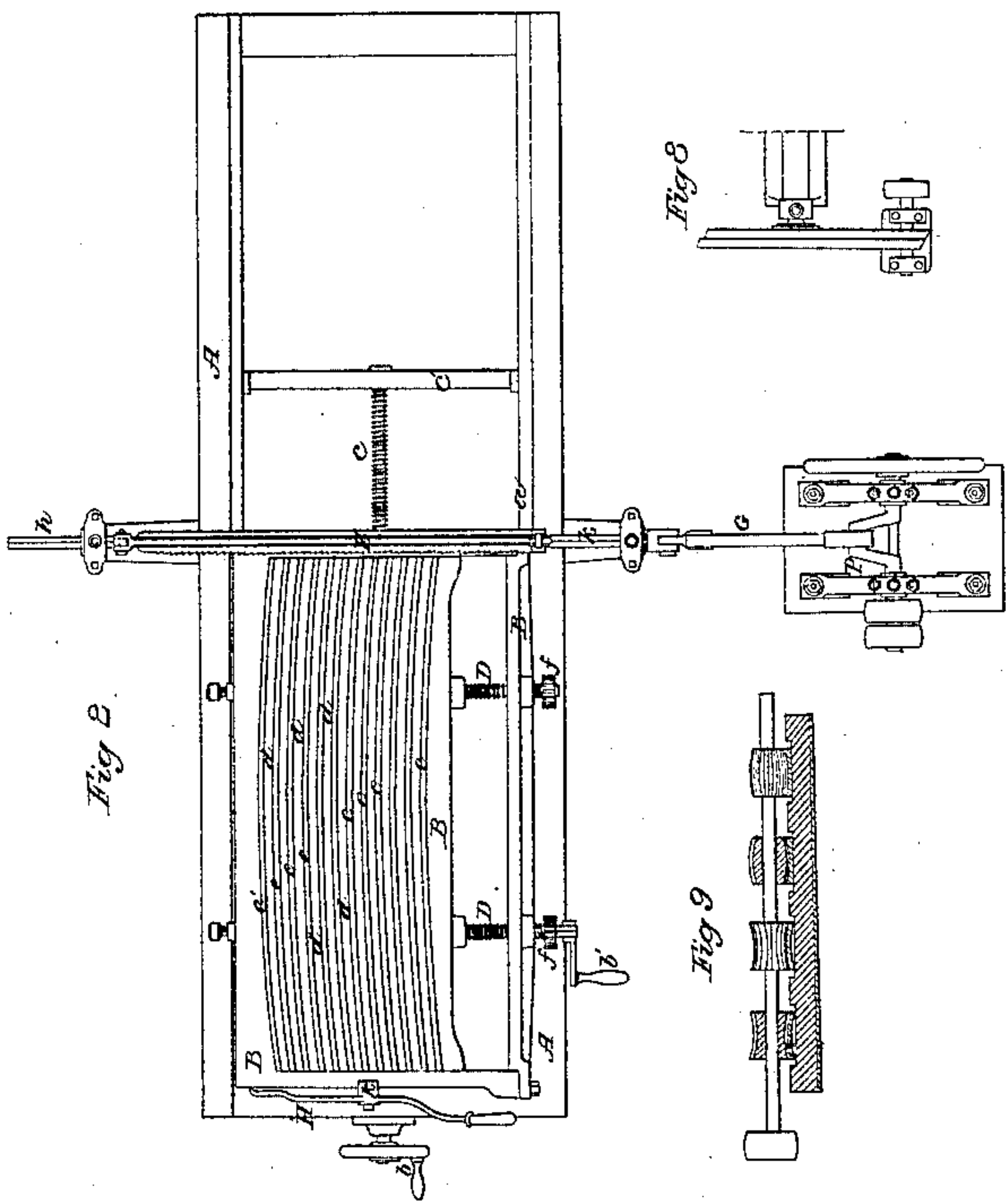


Fig 2

Fig 8

Fig 9

Witnesses:

James W. Fairbank

Inventor:

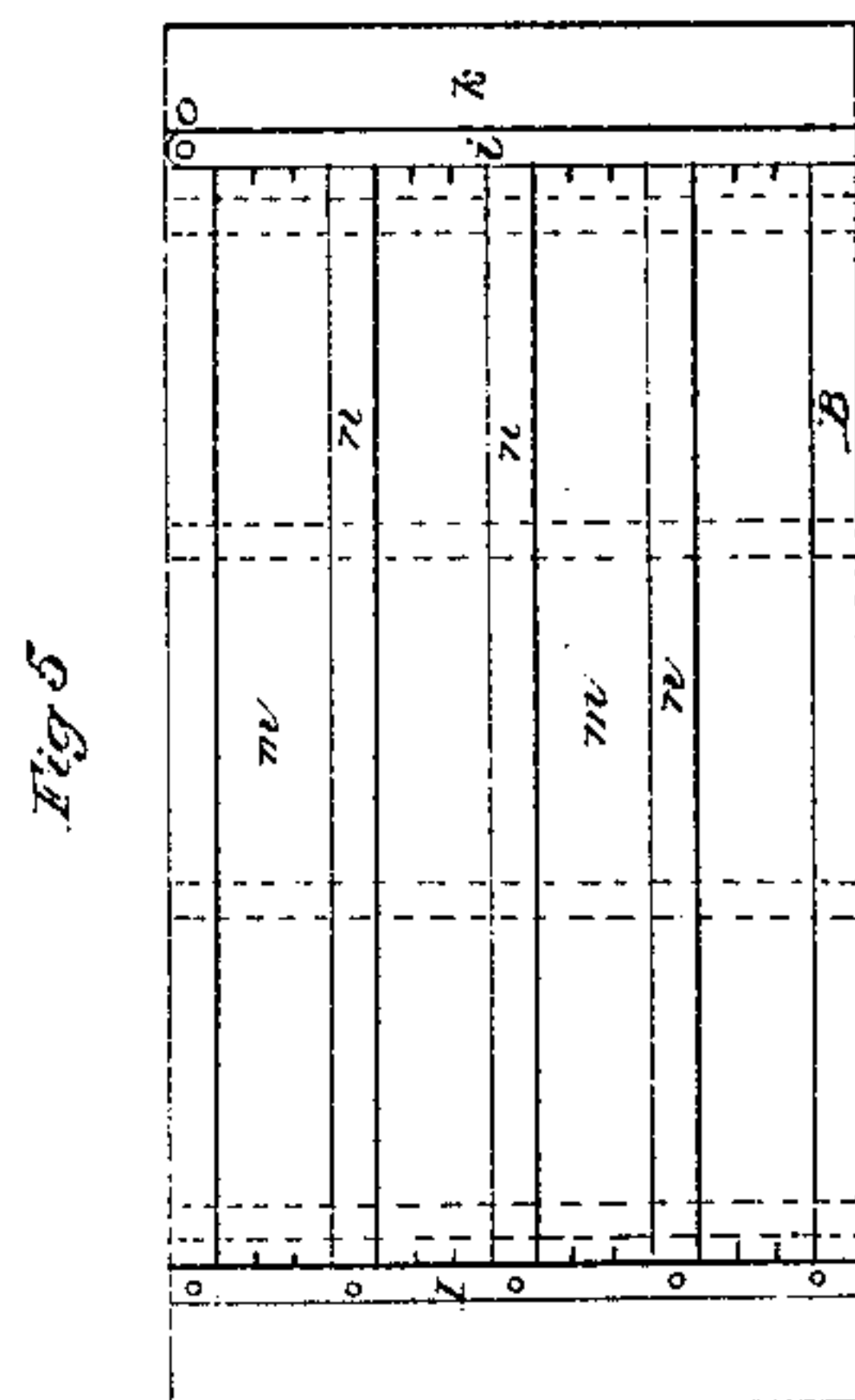
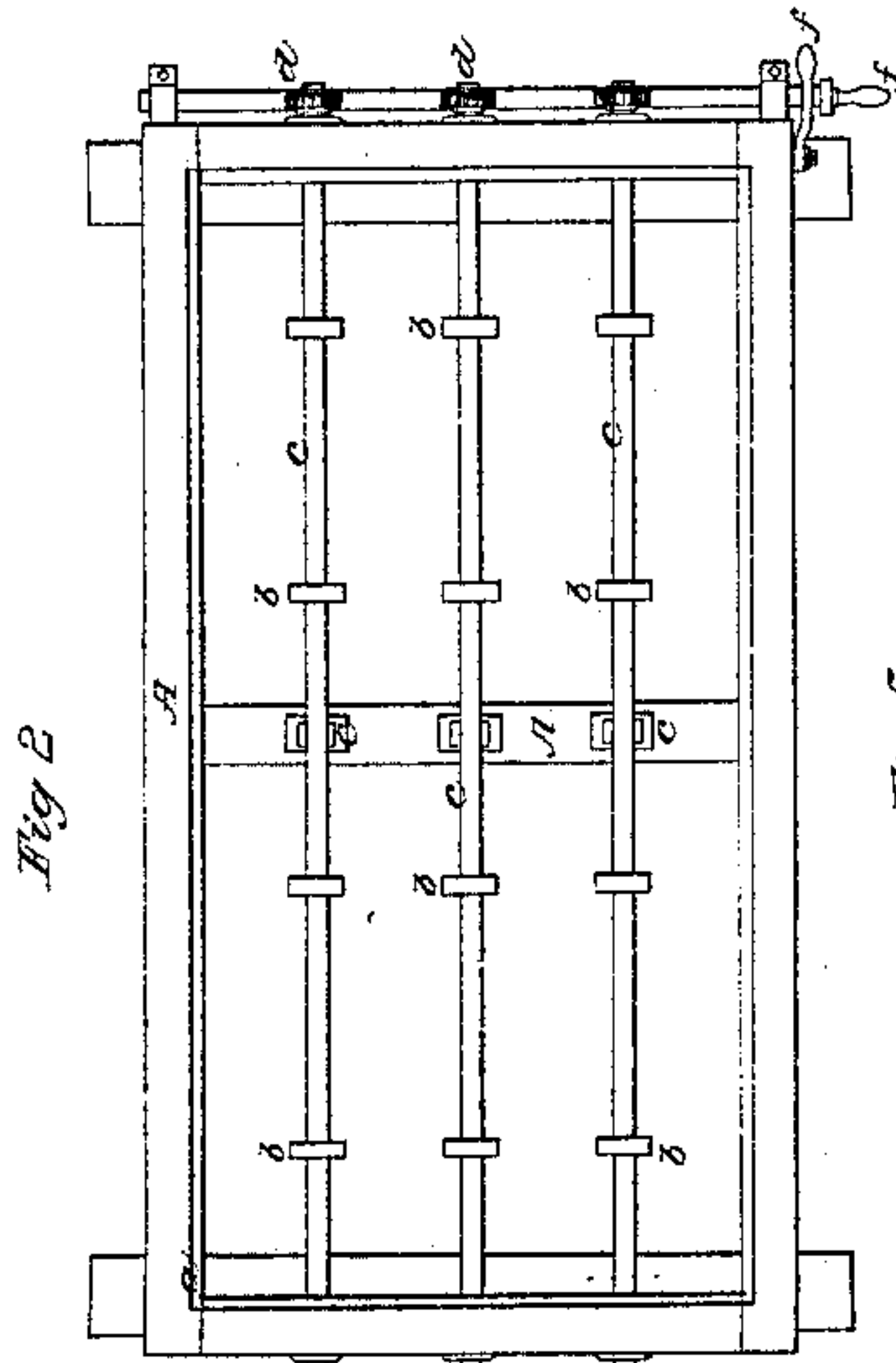
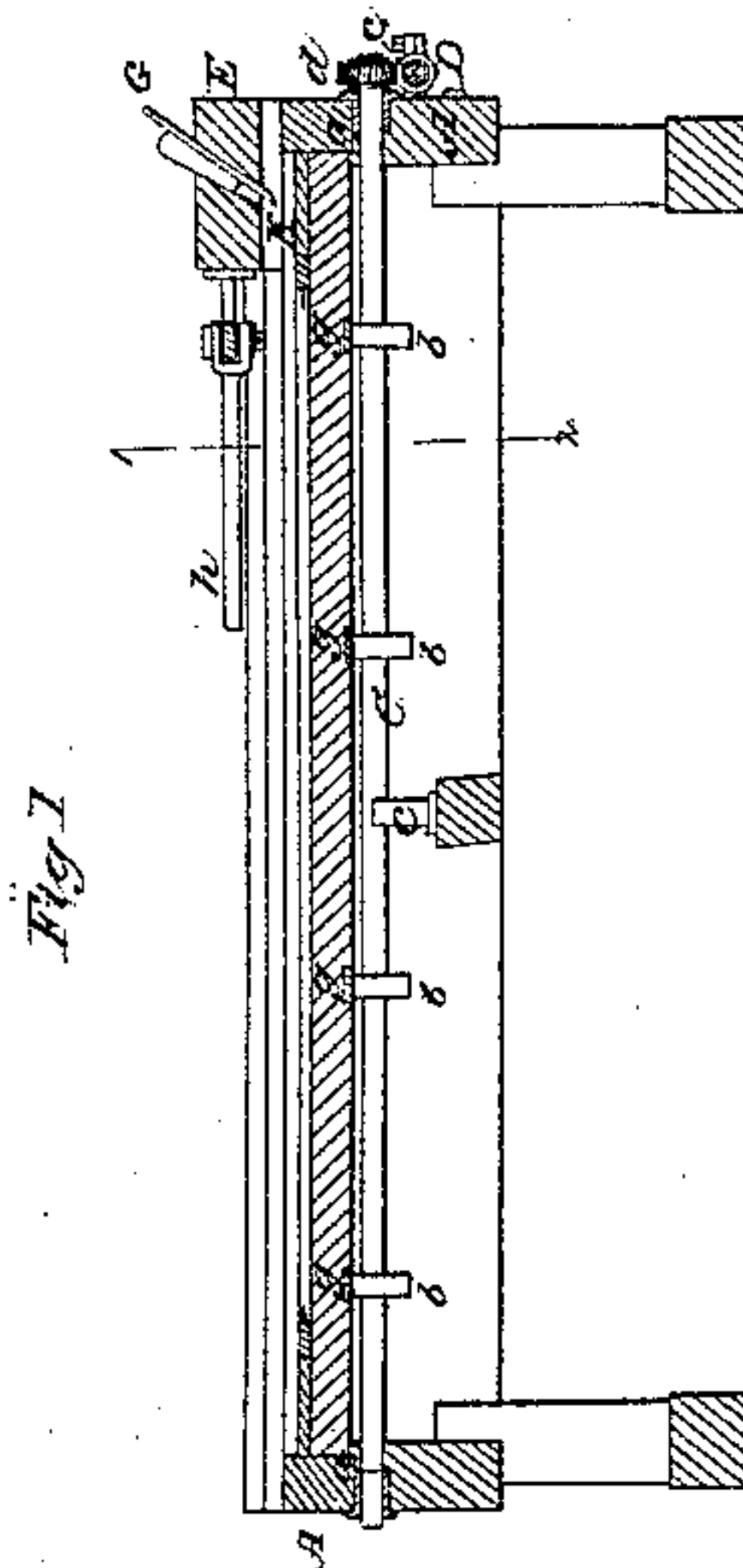
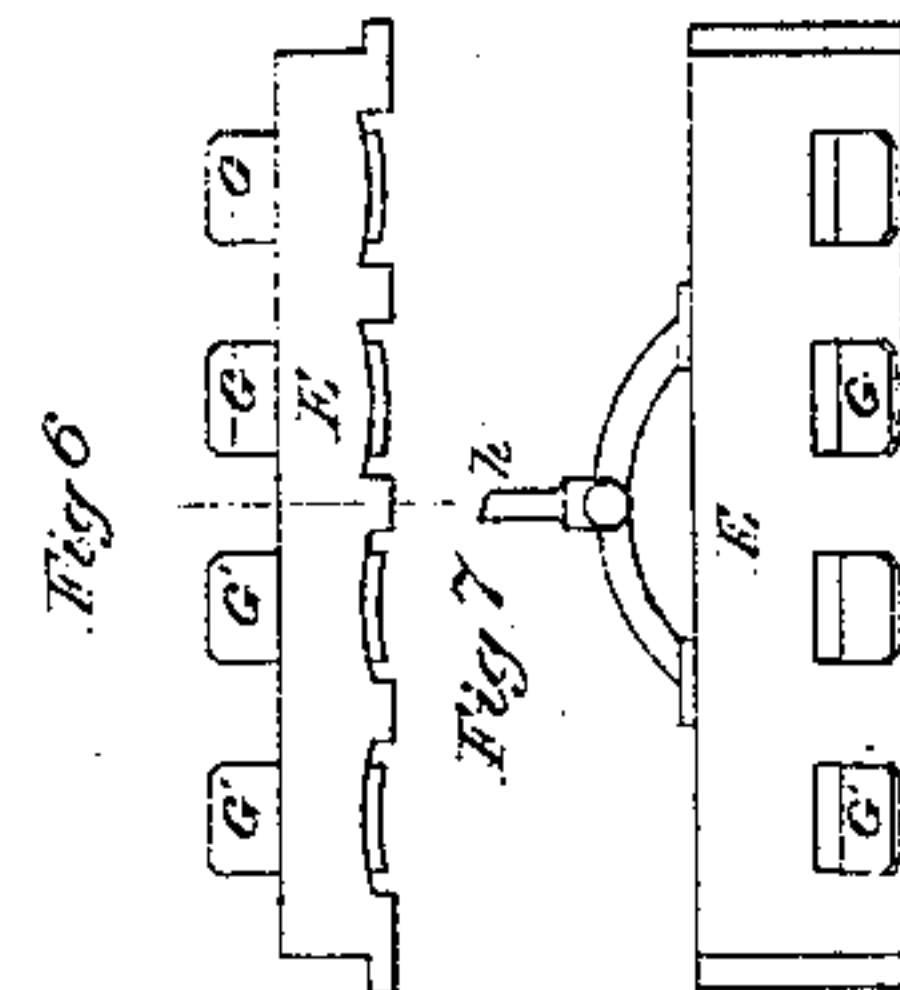
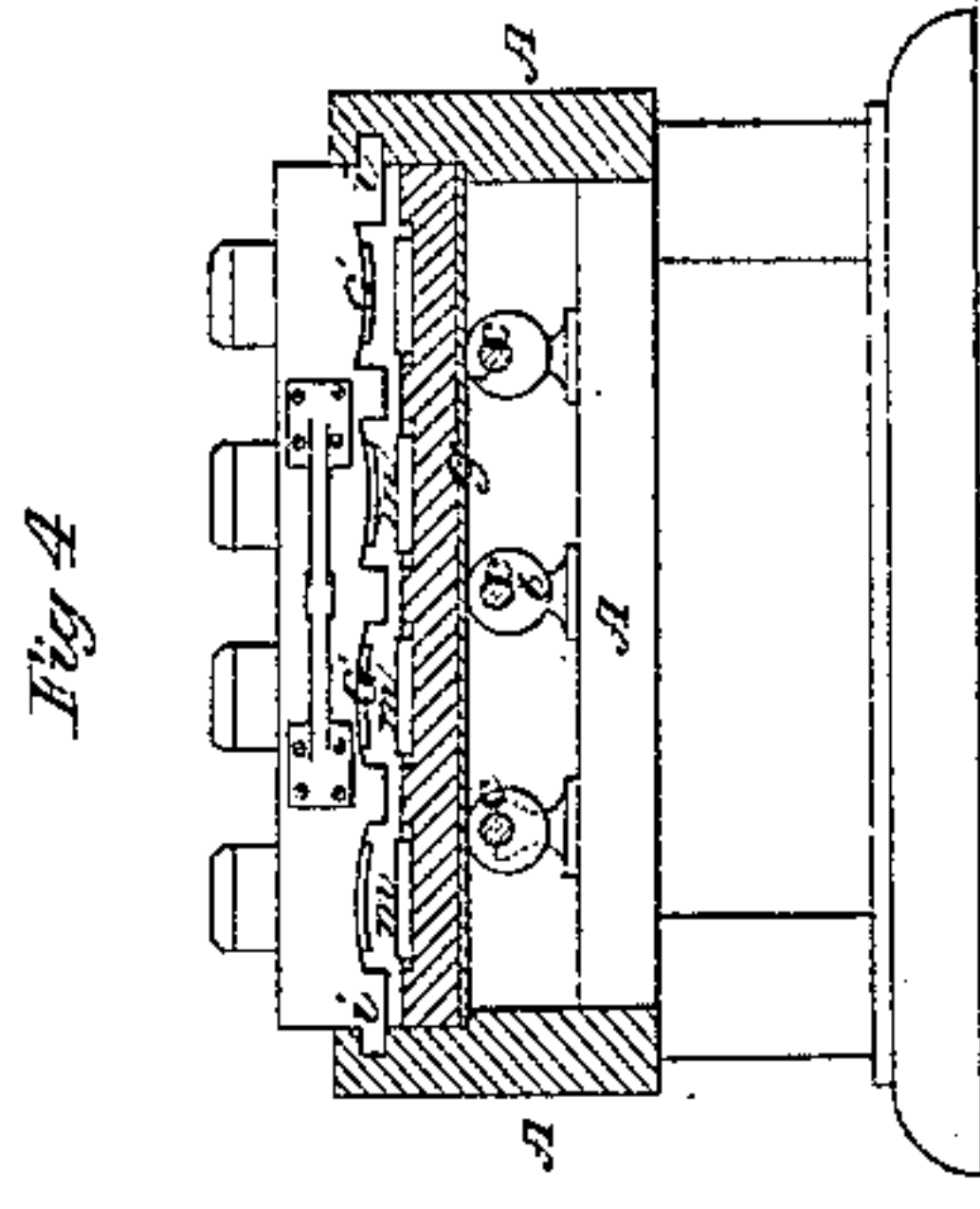
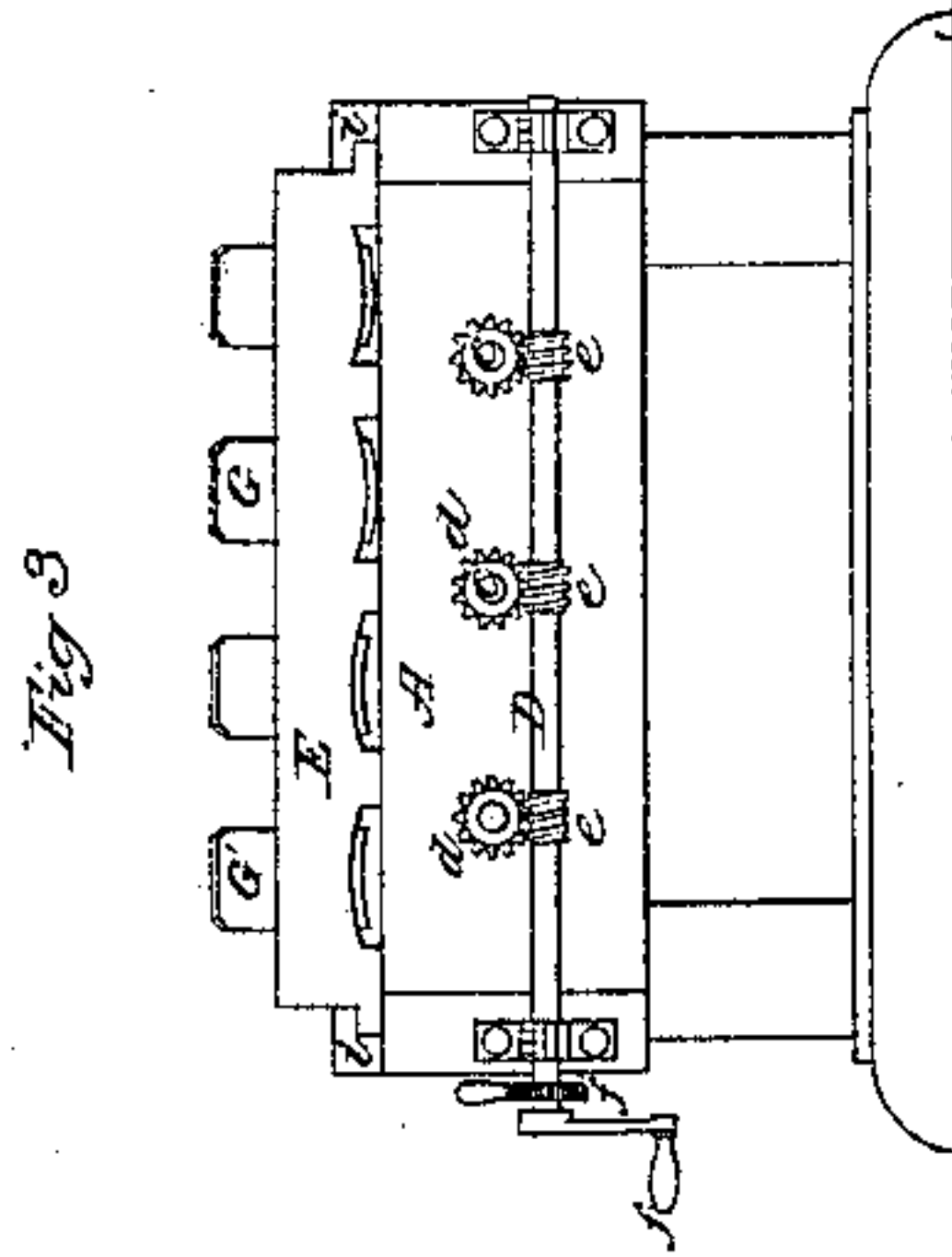
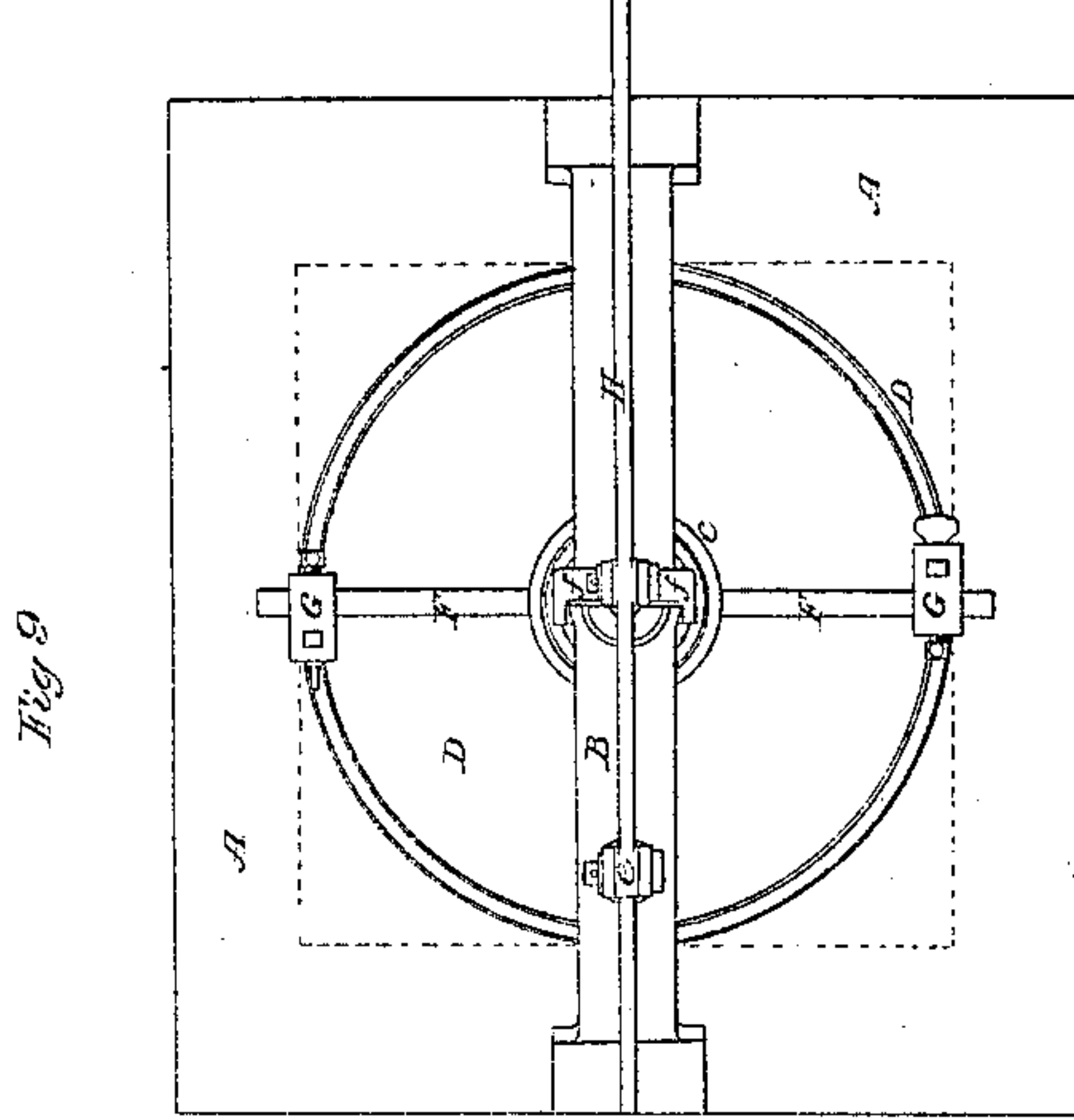
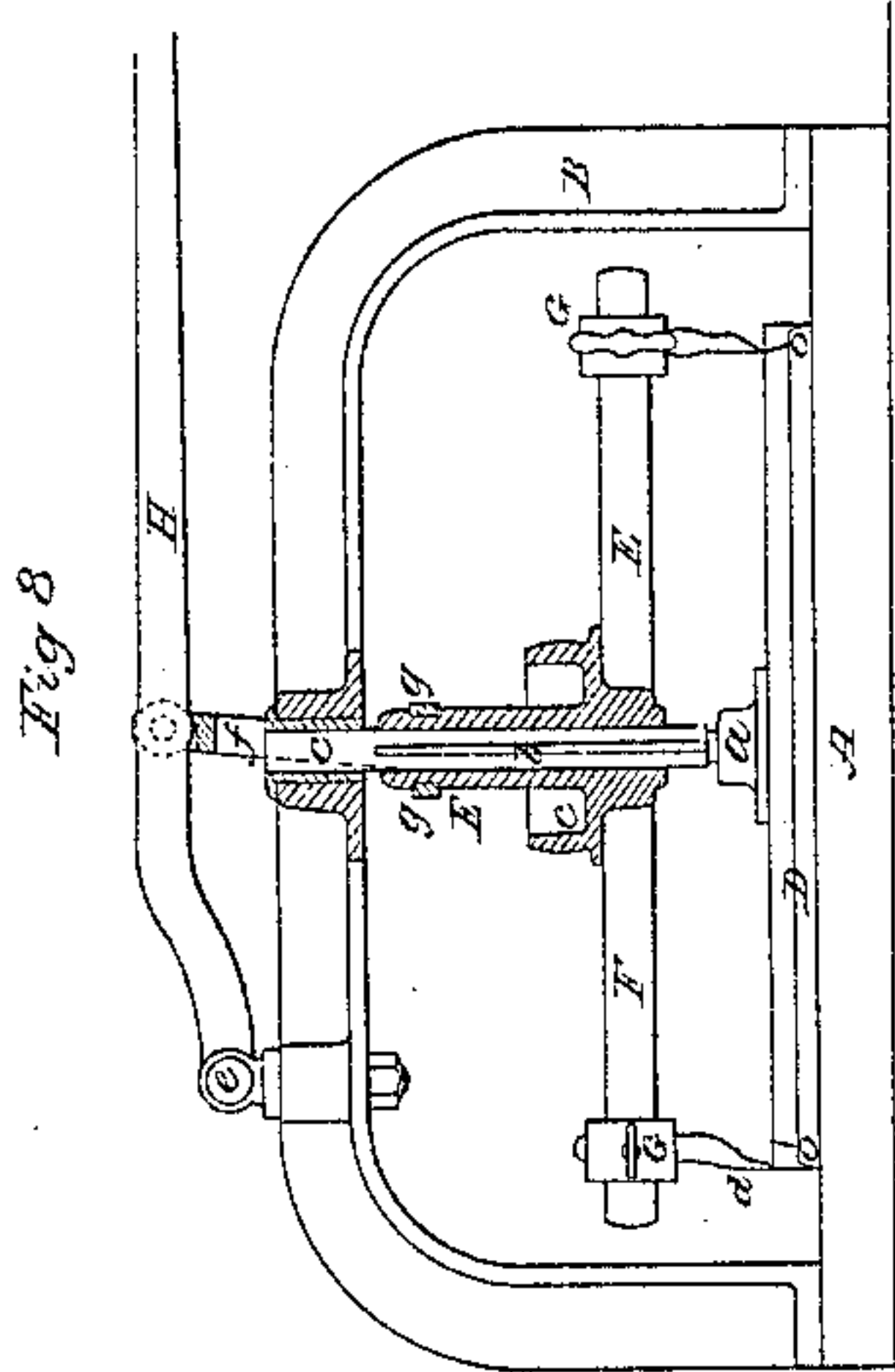
Jean de Lihatcheff by A. Black

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Dressing Staves.

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Witnesses:

James M. Fairbank.

Inventor:

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UNITED STATES PATENT OFFICE.

JEAN DE LIHATCHEFF, OF YAROSLAV, RUSSIA.

MACHINE FOR PLANING STAVES.

Specification of Letters Patent No. 30,210, dated October 2, 1860.

To all whom it may concern:

Be it known that I, JEAN DE LIHATCHEFF, of Yaroslav, in the Empire of Russia, have invented certain new and useful Improvements in the Manufacture of Casks, Barrels, &c.; and I do hereby declare the nature of the said invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement, reference being had to the drawings hereunto annexed and to the letters and figures marked thereon.

By the employment of the improved construction of casks, and the machinery or apparatus employed in such manufacture, and which form the subject of the present invention, the following advantages are obtained viz: First, any workman, although not acquainted with the manufacture of casks and such like vessels, is enabled to carry it on with great perfection. Second, the joints and notches fit with regularity, nicety and strength; third, the form, caliber and measure or capacity requisite for the cask or other vessel are exactly obtained; fourth, great economy of time and labor is effected, and consequently considerable diminution in the cost of the manufactured articles; fifth, staves are produced varying in thickness as desired, and casks so well made that they may, if required, be used without hoops until the dryness of the wood renders them requisite.

The various mechanical arrangements constituting part of the present invention, and for effecting the desired objects, are represented in the accompanying drawings, drawn to a scale of one tenth the real size, and may be divided into three parts, which are intended for performing three distinct operations viz., I, the preparation of staves; II, the formation of the joints, and III, the cutting of notches and heads and their adjustment.

Sheet I, represents the machine for preparing the staves, Figure 1, being a longitudinal sectional elevation; Fig. 2, a horizontal plan of the same, the upper part of the framing (shown at Fig. 5) being removed; Fig. 3 is an end elevation; Fig. 4 is a transverse section of the same taken in the line 1, 2, of Fig. 1; Fig. 5 is a detached view of the frame for carrying the staves in course of manufacture and presenting them to the planing tools; Fig. 6 shows the tool carrier

in front elevation, and Fig. 7 is a plan view of the same.

(A) is the main framing of the machine, which is provided with a rabbet (*a*), which receives the fixed frame (B), shown detached in plan at Fig. 5. This frame also rests at various parts of its length upon four series of eccentrics (*b*), mounted upon shafts (C), which turn in bearings set along the framing, and supported at their middle by brackets (*c*), carried by a traverse running across the framing (A). The shafts (C) also carry at one of their extremities a pinion (*d*), having helicoidal or worm teeth, which take constantly into a portion of a worm or endless screw (*e*) (see Fig. 3) set upon a transverse shaft (D), that turns in bearings at that end of the machine. This shaft (D) is worked by hand by means of a winch handle (*f*), for the purpose to be presently explained, and is held in any desired position by means of a click (*f*¹). At the lower part or under side of the frame (B) are secured metallic bands (*g*), for the purpose of protecting the wood against the friction of the cams or eccentrics (*b*). Toward the upper part the longitudinal side traverses of the framing (A) are provided throughout their length with a rectangular groove on each side for the reception of the shoulder (*i*) of the cutter carrier (E) (Figs. 6 and 7), and in which grooves the cutter carrier is capable of moving backward and forward. This cutter carrier is jointed to a connecting rod (*h*) (Fig. 7), which is worked by a steam engine or other prime mover and gives it the necessary backward and forward movement over the work.

The planks of wood to be fashioned into staves are first cut to a determined size and set in the compartments (*m*) of the frame (B), by which they are presented with great exactness under their respective tools or planes (G), which are of the same width as the staves to be produced. These latter are mounted and adjusted for this purpose at equal calculated distances in the guide piece (E), in the same manner as in an ordinary plane. In order to keep the planks firmly in position, they are forcibly pressed against points in a fixed iron traverse (*i*¹), set in the upper part of the frame, which is provided with a similar traverse (*i*¹¹) at the other end, but which is movable, and is mounted on a hinge (*o*) and which holds

the planks firmly at the opposite end. This traverse is afterward shut in by a rectangular piece of wood (*k*) of the requisite dimensions for forming the other end of and completing the outer framing of the machine, or instead of the piece (*k*), any other contrivance for effecting the purpose may be employed, such, for instance, as a pressing screw at the end opposite to that of the hinged traverse. The frame (B) having been thus set in its place, it is only necessary to put the tool carrier (E) in its place, and then to bring it into communication with the driving shaft, by which a rectilinear reciprocating movement will be imparted to it within a certain length, according to the length of the frame. The attendant in charge of the machine has now only to work the handle (*f*) at the proper time, by which means the eccentrics (*b*) will be acted upon, and be caused to raise the frame (B) in a differential manner, so as to bring the cutting tools (G) continually in contact with the staves to be fashioned. The thickness of the staves will, of course, be determined by the depth of the compartments (*m*) which receive them. In fact, the action of the cutting tools ceases as soon as the upper surface of the frame (B) comes in contact with the under part of the tool carrier. Now, if the compartments (*m*) have a greater depth for a given thickness of rough plank to be operated upon, this contact will take place after a shorter time; the contrary will be the case for a less depth. The thickness of the staves will therefore depend solely upon the depth above mentioned, and as all these depths are equal, it follows that all the staves manufactured by the machine will be of the same thickness. It will therefore only be necessary to have additional frames (B) having the dimensions of the parts (*m*) modified, in order to obtain staves of any required thickness. Or, a single frame might be employed having movable compartments, which might be set to the required height by means of adjusting screws underneath.

It will be observed that some of the cutting tools (G) are of a convex form at their cutting edges, while the others (G¹) are of the opposite or concave shape. The object of this arrangement is to give the staves the required uniform curve upon both sides, the degree of which curve consequently depends only upon the shape of the cutting tools; these may, therefore, easily be arranged so that each tool shall form a segment of the circle forming the barrel. Thus, for instance, supposing the cask or barrel be required to have sixteen staves, the arc of the circle formed by each stave will be exactly one sixteenth of that circumference.

From the foregoing it will be seen that after having been operated upon by the con-

vex cutters (G) the staves pass under and are submitted to the action of the concave cutters (G¹), in order that their other face may be reduced to the required form. The staves are then submitted to the second operation, the machinery for effecting which is represented in Sheet II, of the drawings.

After the operations above described, the preparation of the joints or edges of the staves is the next process or operation required. This operation has for its object to give to the staves at their sides, first, such an inclination that on being put together they shall present lines running truly toward the center, which inclination is variable according to the number or breadth of the staves employed in the formation of the casks; second, such a convex curve that each of the points of their length shall be a segment of a different circle in diameter of the circle passing through the following point, which diameters regularly increase from the extremities toward the middle of the cask so as to give it the appearance of two trunks, more or less conical, united at their bases. These objects are attained by means of the apparatus represented in Sheet II of the drawings, in which Fig. 1, is a sectional elevation taken through the middle. Fig. 2, is a plan view of the same. Fig. 3, is a vertical section taken in the line 1, 2, of Fig. 1. Fig. 4, is a detached view of the mechanism which connects and works the screws that give the necessary curve to the staves. Fig. 5, is a detached view of the mechanism employed for cutting the pieces flush, that is to say, for making the joints in such a manner that the staves shall be exactly of the required breadth. Figs. 6 and 6^a, are a front view and transverse section of a stave manufactured according to this invention, the dotted lines showing the parts of the rough plank which have been removed by means of the improved machinery. Fig. 7 represents on a smaller scale in vertical section a complete cask, manufactured according to this invention.

The upper part of the framing (A), (Figs. 1, 2, and 3,) is provided throughout its whole length with a rabbet or guide groove (*a*) cut obliquely, which receives the movable frame (B) that carries the staves that are to be submitted to the second operation.

The movement of the frame (B) is effected by the hand wheel (6) (Figs. 1, and 2), keyed to the extremity of a long screwed rod (C), which passes through a female screw (*c*) in the base of the said frame, and is fixed at its opposite end to a traverse (C¹) of the framing. The staves (*e*) (Figs. 2 and 3) are placed upright upon the bottom of the frame, and are separated from each other by bands of iron (*d*) on a level with the plane of the cut of the saw (E). These metallic bands have the curve which is re-

quired to be given to the staves, and which necessarily varies according to the diameter of the cask to be manufactured. The frame is afterward closed by the movable piece 5 (B¹), and the staves are submitted to pressure and clamped on that side in order to bend them by means of screws (D), working in the fixed side of the frame. These screws are operated by means of a winch 10 handle (b¹) on the end of one of them.

In order to communicate to the second screw a similar movement and action parallel to the first each of these pressing screws is provided at its extremity with a toothed 15 pinion (f), over which passes an endless chain (g) (see Fig. 4), with which it forms a kind of gearing. The pressure is put on until the staves have taken the curve of the metallic bands (d). When this has been 20 done the frame (B) may be moved forward against the horizontal saw (E), which must cut the staves uniformly and form the joints. The arms of this saw, which is mounted after the manner of an ordinary saw and 25 just comes in contact with the surface of the frame, are connected by an iron-rod (h), the extremities of which are squared and pass through brackets (F) attached to the standards, and in which the said rod has a 30 free reciprocating rectilinear movement. The rod (h) is hinged to the connecting rod (G) of a crank (P), driven by any motive engine, and which thus communicates to the saw (E) a backward and forward move- 35 ment between the brackets (F). When the frame (B) has arrived gradually at the end of its course, by means of the handle (b) it is brought back to its first position by turning the handle in the opposite direction. It 40 is then only necessary to unscrew the screws (D), in order to open the frame. The staves (e) may then be turned to the opposite side, and the same operation may then be repeated.

45 In order to determine the exact width of the staves, a strip of metal (e¹), (Fig. 2 and 3) is applied like a stave at the back or bottom of the frame, and a portion of the extremity of this strip of metal is prolonged 50 in the form of a tongue to the outside of the front end of the frame. This tongue is introduced into an opening or slot in a lever (H), having its fulcrum at (k), and worked by a handle at the other end, as 55 shown at (Fig. 5). It will therefore be understood, that on raising the end (H) of this lever by means of the handle, the strip of metal (e¹) will be raised to the same extent. A graduated dial (v) may be made 60 to indicate the height to which it should be raised, in order to bring the staves (e) exactly to the same level, so as to give them a definite width corresponding to a certain diameter of cask, or to a cask formed of 65 a certain number of staves.

It may be here remarked, that this method of manufacture is equally well adapted to staves which have been made by the ordinary method, as they may by this means be 70 thus made all of equal size. After having been submitted to this last operation, the staves have a double curve, and their sides are inclined to the inside, as represented in Figs. 6 and 6^a, which form is due to their 75 peculiar position in the movable frame (B), by which they are presented to the saw (E).

The machinery for forming the heads of the casks is represented in Sheet I of the drawings, Fig. 8, being an elevation partly 80 in section, and Fig. 9, a plan view of the same. (A) is the foundation plate of the machine, upon which is firmly mounted a strong cast iron standard (B), at the top of which is an opening or slot, serving as a stuffing box for a vertical rod (C). This 85 rod rests at its lower extremity upon a kind of step piece or block (a), the base of which is armed with points, which take into the piece of wood (D) to be operated upon. This piece (D) having been cut to the re- 90 quired size and thickness, is laid upon the foundation plate (A) care being taken that it be of such size that a head of the requisite diameter can be cut out of it. The shaft (C) is provided with a long key or 95 feather (b), which serves to fasten a sleeve shaft (E) mounted thereon, and which, when rotary motion is given to the pulley (c) from any first mover by means of a driving band, carries the shaft (C) around 100 along with it. Below this pulley, which is constructed in one piece with the shaft (E), are four arms (F), set at right angles to each other, near the extremities of which, or at any required point, are adjusted by 105 means of set screws, the tool carriers for holding the cutters by which the head is to be cut to the required size.

The dotted lines in Fig. 9, show the form 110 of the piece of wood before it has been operated upon, and consequently the parts of the wood which are removed in order to form the head. The necessary pressure is given to the hollow shaft (E), and consequently to the cutting tools (d) during their 115 action, by means of a long lever (H), jointed at one end to the standard (B), and to which is hinged a forked lever (f), embracing the top of the standard and linked below to a collar (g). This collar is set in 120 an annular groove in the sleeve shaft (E), by which means it embraces this shaft without interfering with its rotary motion, and by this means communicates to the tools (d) the amount of pressure put upon the work 125 (D) by the lever (H). The four cutting tools (d) are formed each with a cutting edge of a different bevel, and consequently each of them performs a distinct operation 130 upon the work. Thus one tool cuts or forms

the contour or outer circumference of the head, another cuts out a rabbet, which is to enter the notches inside the staves at their extremities; the two other cutters form and
 5 finish the circumference of the required bevel. It will be understood, that if considered desirable, the number of arms (F) may be doubled and other cutters added.

From the foregoing description of the
 10 machinery for cutting and preparing the staves and heads of casks, barrels, and such like articles, it will be understood that the casks are constructed in a novel and peculiar manner, whereby their strength is consider-
 15 ably increased. The heads of the casks are formed (as above mentioned) with a rabbet which fits into the notched ends of the staves, so that when the cask is put together the outer surface of the head will be flush
 20 with the ends of the staves, which will thereby be protected from the effects of violence. The staves are secured to the head by means of pins or nails, which are driven through the staves into the head. The several parts
 25 may, if desired, be still further secured by means of hoops; but by means of the improved machinery before described, the joints or edges of the staves are made with such accuracy and exactness that when put
 30 together they will fit so well as not to require hooping in the first instance to form a complete and water-tight cask.

After the various operations of cutting and preparing the staves and heads of the
 35 casks, the several parts may be very quickly put together by inverting the rabbet of the head into the notches of the staves as shown at Fig. 7, Sheet II. It will be seen that the outside surface of the head comes flush with
 40 the ends of the staves, and thus these latter are protected from the effects of violence. Casks constructed in this manner will therefore last much longer than those made according to the ordinary method. When the
 45 several parts are thus put together the cask might be made to serve without any further fastening by reason of the perfect joining and firm attachment of the staves, resulting from the exact mode of fitting and prepar-
 50 ing the joints and forming the latter in the direction of the radii of circles of which the contour of the cask forms the circumference. For greater security, however, it is advisable to drive nails through the staves
 55 into the heads as shown in Fig. 7. One or two hoops may also be added; for instance, one may be adapted to the middle when this shall seem desirable in consequence of the dryness of the wood. The notches may be
 60 cut in the staves by the ordinary means.

I would here remark that although I have shown and described a peculiar arrangement

of mechanism for cutting or forming the head, I reserve to myself the following modifications, viz., the employment of an ordi- 65
 nary lathe instead of the machine or apparatus represented at Figs. 8 and 9, Sheet I, for the manufacture of the improved heads, the work having been first cut to the required form by an ordinary saw. Instead 70
 of the planing tools and machine above described for producing the required curve on the two faces of the stave, the desired object may be effected by the employment of the rotary cutting tools shown at Fig. 9, 75
 Sheet II. For this purpose, two of the cutters are made of a convex form as shown at Fig. 9, and the others are made of a concave form, as represented at Fig. 9^a. Instead of a saw for operating upon the edges 80
 of the staves when they have been bent in the apparatus for that purpose as above described, the edges may be cut and prepared by means of a hand plane, this would be advantageous, and would render the ap- 85
 paratus less complicated for the manufacture of small casks, as the bending apparatus would be the only apparatus employed, the employment of the saw being more convenient for those of large dimensions. When 90
 a hand plane is used for the purpose the lower sides of the plane must project slightly beyond the plane iron in order that this latter may not touch the surface of the table when it has arrived at the end of its 95
 work.

Any motive power may also be employed instead of steam for working the machinery.

Having now described this invention of improvements in the construction and manu- 100
 facture of casks, barrels, and such like vessels, and in the machinery or apparatus to be employed for such manufacture, and having explained the manner of carrying the same into effect, I wish it to be understood 105
 that what I claim under the above in part recited Letters Patent is—

Supporting the frame or table carrying and presenting the staves to the planing tools, and at various parts of its length upon 110
 a series of eccentrics mounted upon shafts having pinions at their extremities each and all of which are operated by means of one common tranverse shaft provided with a worm or endless screw as set forth and for 115
 the purpose and purposes specified.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

JEAN DE LIHATCHEFF.

Witnesses:

CHARLES SCHNEIDER,
 WM. S. CLAXTON.