

W. JASPER & S. BOUSHEY.
Machine for the Manufacture of Cube Sugar.
No. 230,131. Patented July 20, 1880.

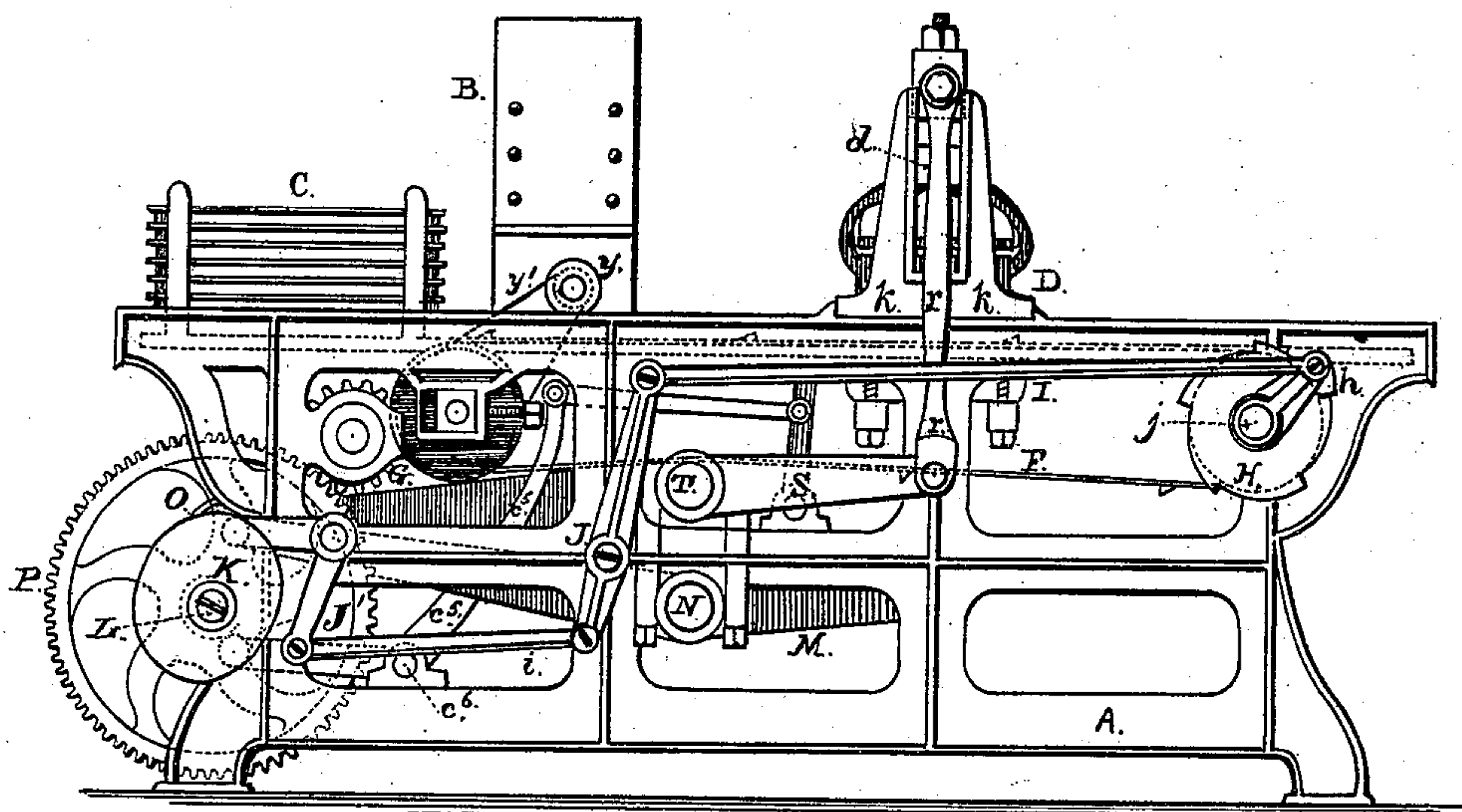


Fig. 1.

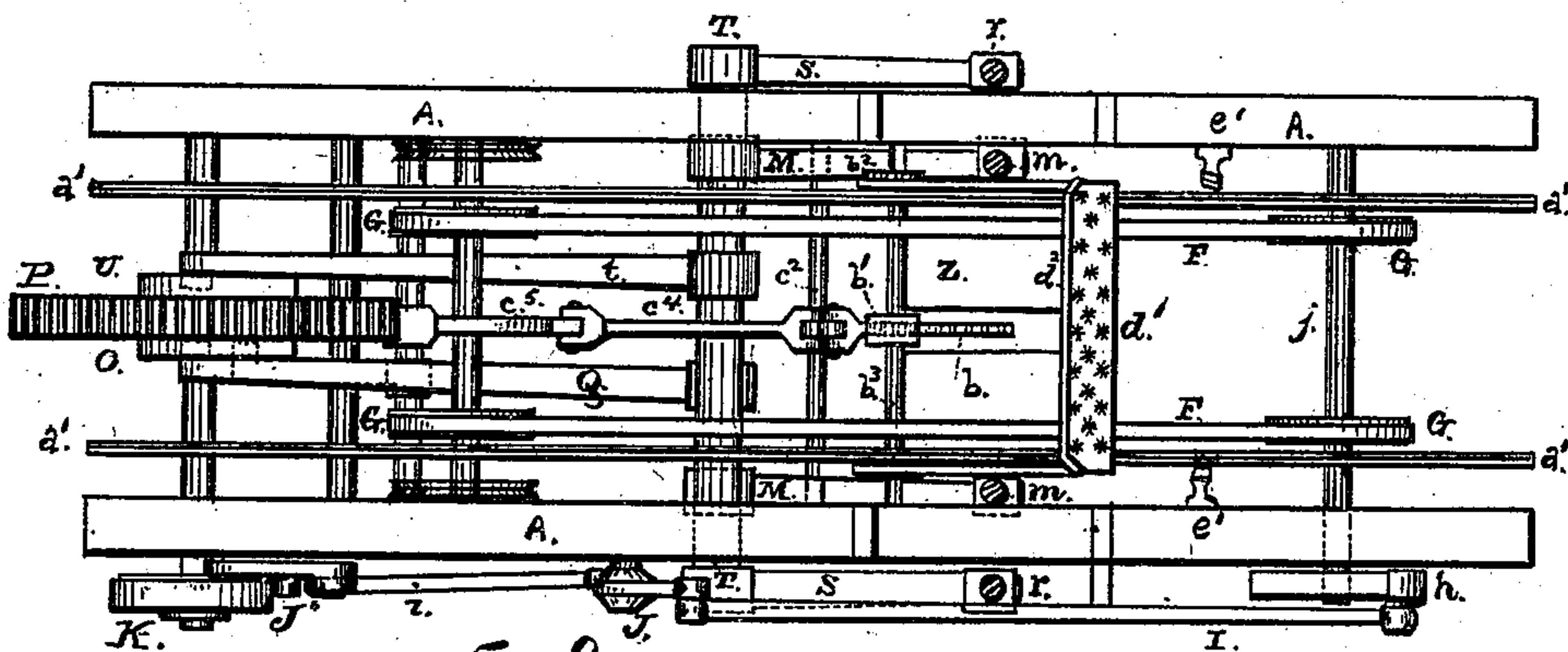


Fig. 2.

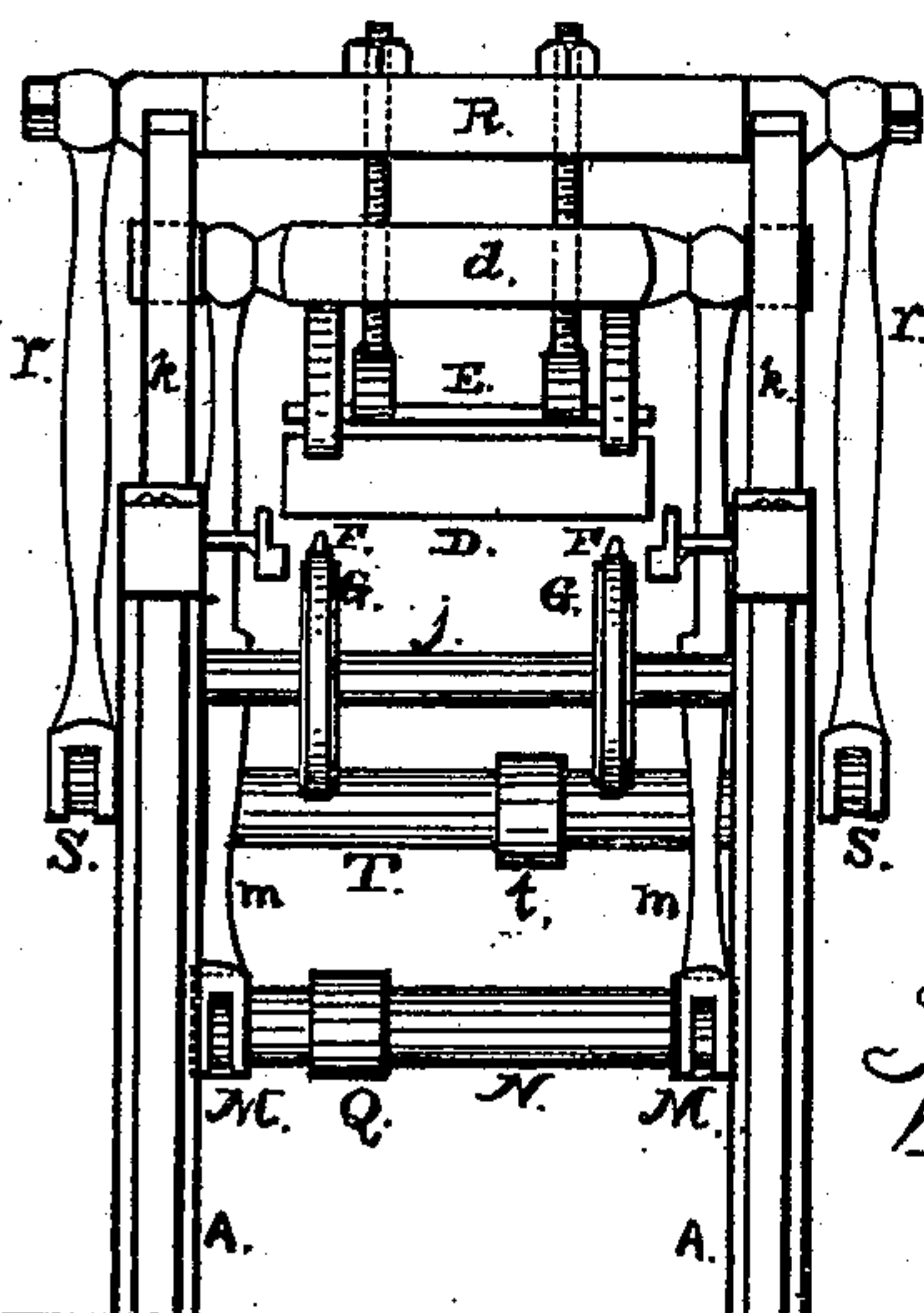


Fig. 3.

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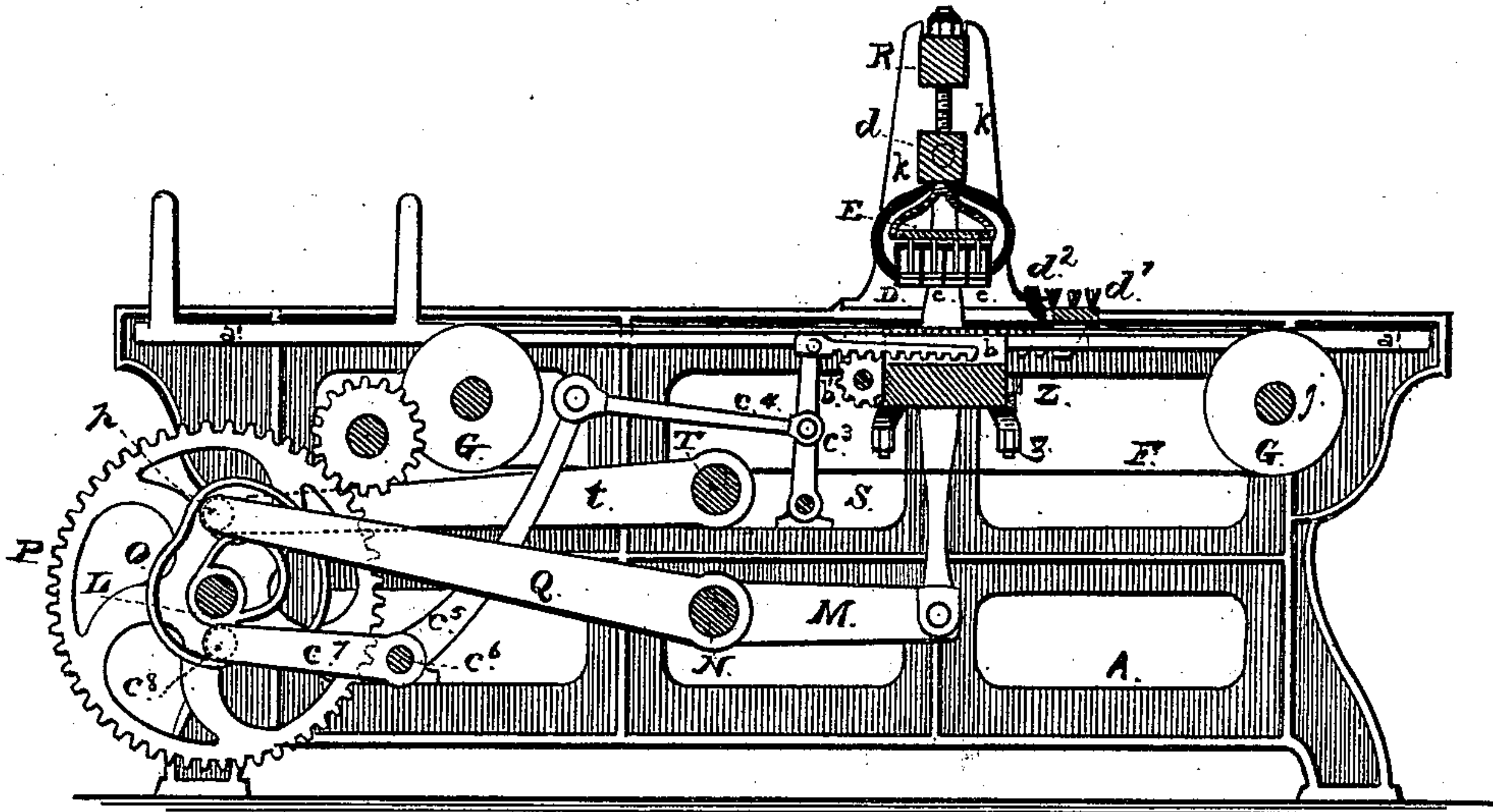


Fig. 4.

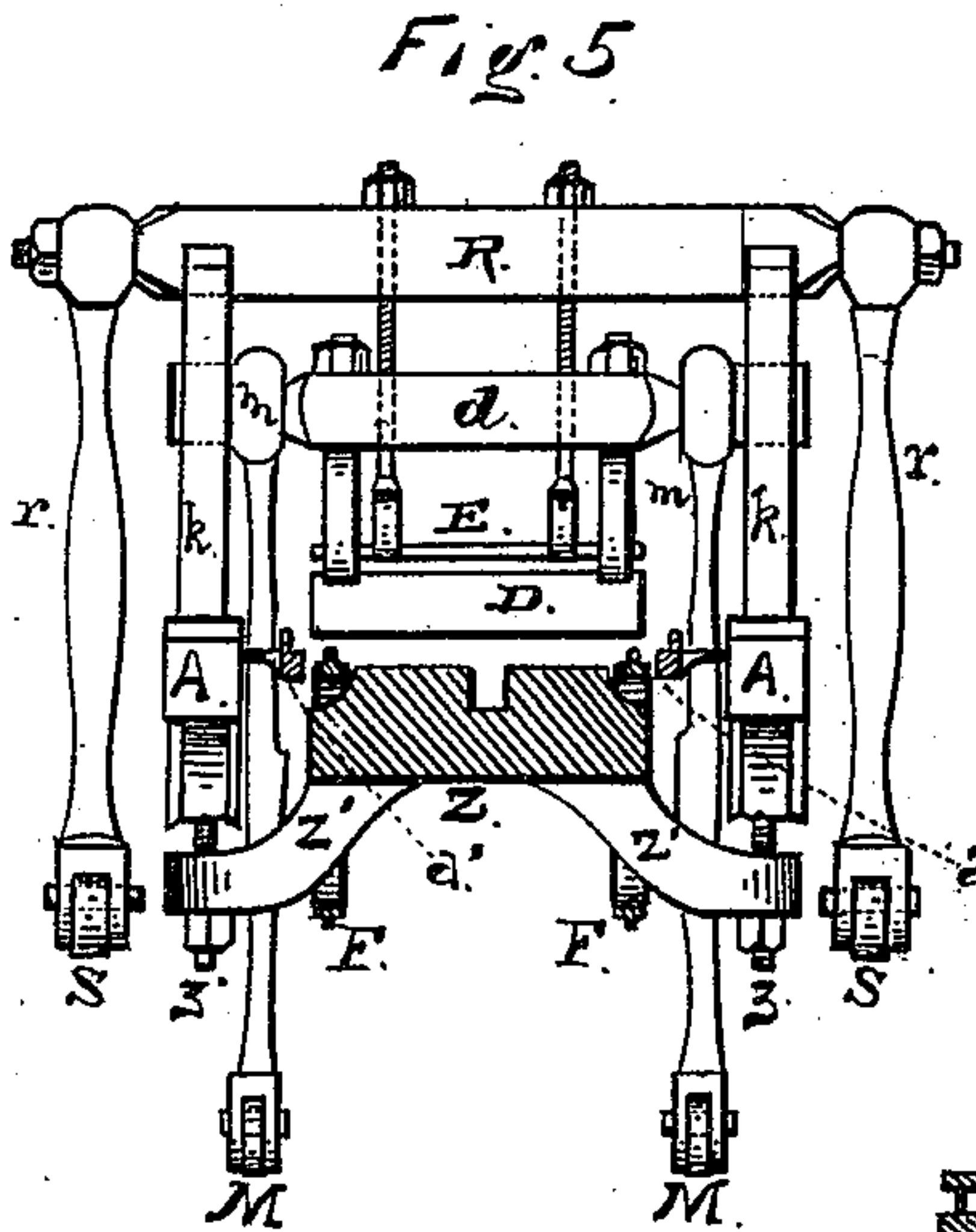


Fig. 5.

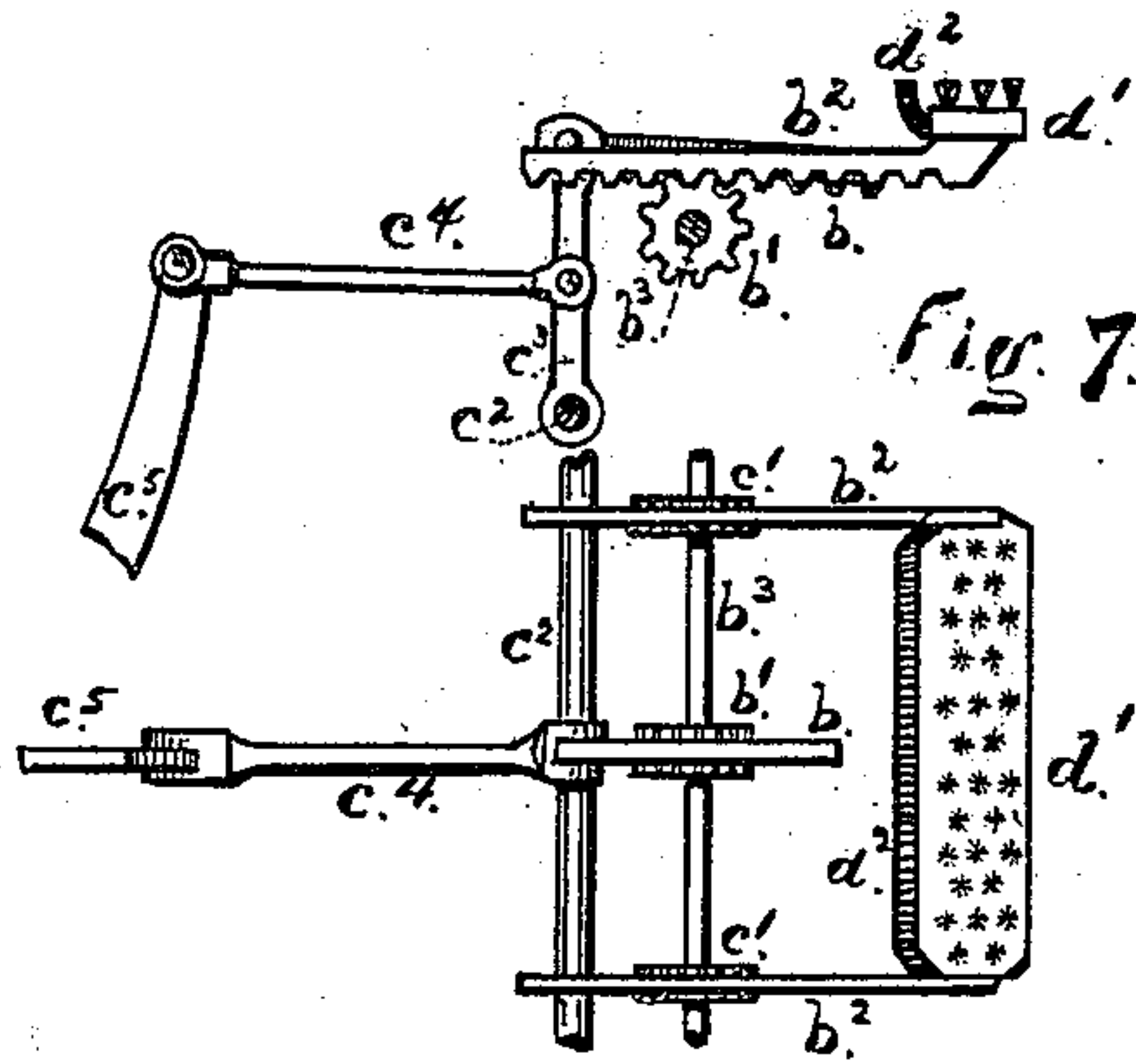


Fig. 7.

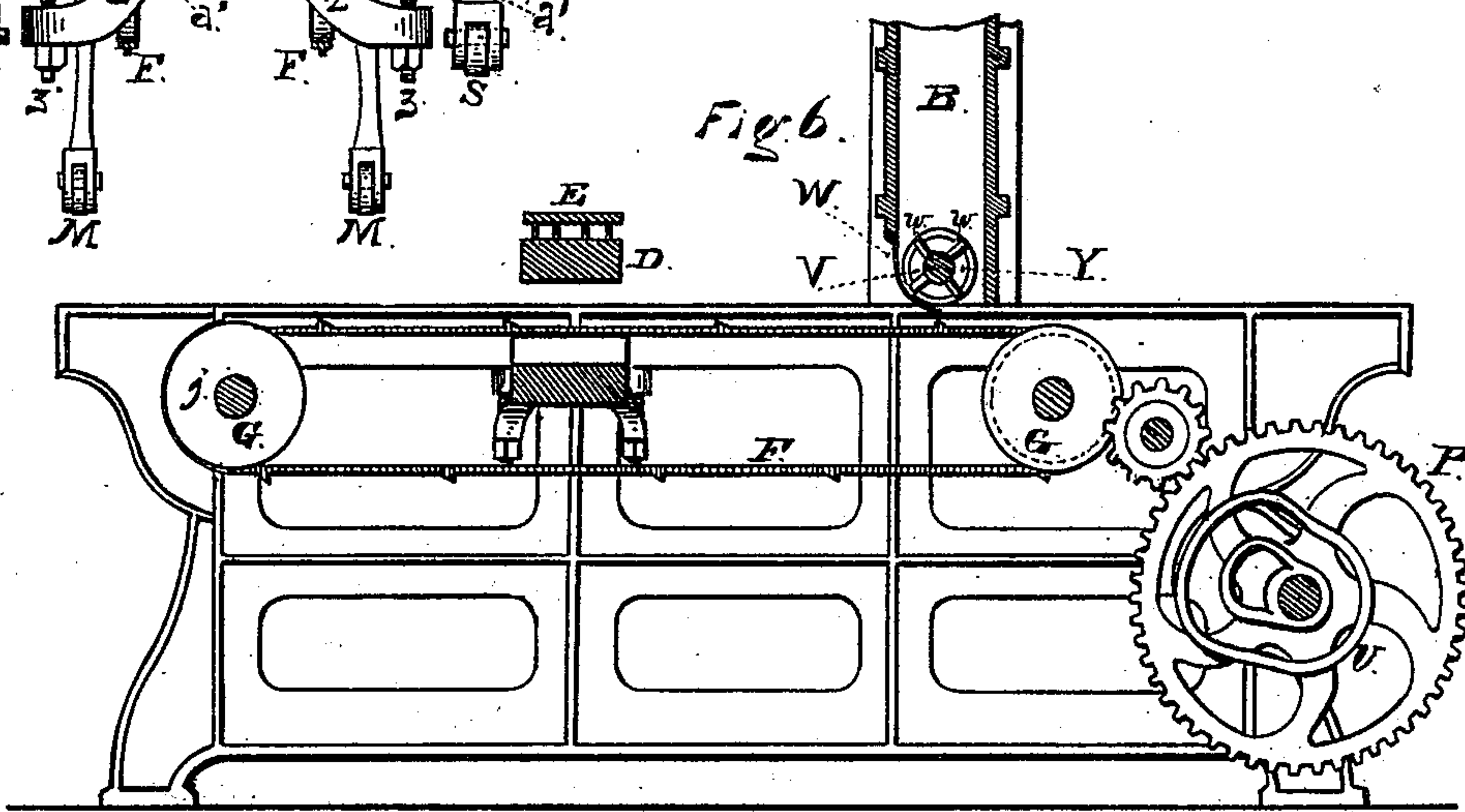


Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM JASPER AND STEPHEN BOUSHEY, OF SAN FRANCISCO, CAL.

MACHINE FOR THE MANUFACTURE OF CUBE-SUGAR.

SPECIFICATION forming part of Letters Patent No. 230,131, dated July 20, 1880.

Application filed October 27, 1879.

To all whom it may concern:

Be it known that we, WILLIAM JASPER and STEPHEN BOUSHEY, of the city and county of San Francisco, State of California, have invented a new and useful Improvement in Machines for the Manufacture of Cube-Sugar; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the figures and letters of reference thereon, making part of this specification.

Our invention relates to machinery for cutting and pressing sugar into the form of cubes; and it consists in a certain new and useful combination of parts and mechanism for distributing the sugar in a moist state upon a tray or plate, and forming it into a block having a uniform density and even sides and faces; for presenting this block or mass of sugar automatically to a cutting and pressing or cube-forming mechanism, by which the block is divided into a number of cubes of uniform size and density and with sharp edges and smooth-faced faces, and for afterward carrying the finished cubes away from the forming mechanism and out of the machine.

It also consists in a device or means, combined with the cutter-plate and reciprocating pressers, for trimming off the small quantities of sugar left by the cutters along the outside row of cubes, so that the bottom as well as the top edges of the cubes in the outside rows are formed with clean sharp corners.

It further consists in a device or means, combined with the cutting-plate and reciprocating pressers, for brushing off or removing the sugar particles from the edges of the knives or cutters after each action of the cutter-plate; all which will be fully set forth hereinafter.

In the drawings herein referred to Figure 1 is a side elevation of our improved machine. Fig. 2 is a top view, with the trays, feeding-hopper, and cube-forming mechanism removed from the frame. Fig. 3 is an end view taken from the right-hand end of Fig. 2. Fig. 4 is a sectional view in elevation, being a section longitudinally through the center, to show the mechanism for operating the cutters and pressers. Fig. 5 is an end view, in detail, of the cutter-plate and its pressers, and shows the parts for actuating them. Fig. 6 is a longitud-

inal sectional view through the center of the machine, and shows the parts for throwing the sugar upon the trays or plates, and for afterward feeding these trays along and beneath the cutting and pressing apparatus; and Fig. 7 is a detail view of the device for brushing and cleaning off the edges of the cutting-plate.

A A represent the side frames of the machine, in which the shafts and working parts are held, and suitable rods bind and hold them together.

B is the feed box or hopper containing the moist sugar; C, the plates or trays, held in a rack behind the hopper and fed forward one after the other under the hopper, and thence beneath the cube-cutters.

D is the cutter-plate, formed of knives or cutters placed at equal distance apart and in rows intersecting each other at right angles, so as to inclose and form square spaces.

The form and manner of constructing this cutter-plate is described more particularly in the Letters Patent No. 194,244, granted to us on the 14th day of August, 1877.

E is the presser-plate, carrying a series of pressers or plungers that fit and move within the cubical spaces surrounded by the cutters, and F is the endless conveying-belt for carrying the trays or plates forward and through the machine.

G G are grooved pulleys, placed at each end of the frame on horizontal shafts, and around which the chains or belts F F are stretched. The mechanism for giving the required intermittent forward movement to these belts consists of a ratchet-wheel, H, Fig. 1, on the shaft *j*, a pawl, *h*, an oscillating lever, J, the connecting-rods I *i*, the bell-crank lever J', and the cam K. These cause the shaft *j* to rotate intermittently forward and move the belts a distance equal to the width of the cutter-plate, or the distance from the left-hand to the right-hand edge of the plate, as in Figs. 1 and 4, at or during every upward movement of the cutter D, while the knives are clear of the sugar.

The trays C are made two or more times longer than this size or width of the cutter-plate D, so that several cuts of the plate are required to divide the entire block presented on one tray; and therefore, after the first part of

this block or mass of sugar has been acted upon by the knives and pressers, and both are raised clear of the cubes, the plate or tray is fed forward another distance, equal to the space covered by the knives, to bring another portion of the block beneath the knives. This movement of the tray is so timed that the succeeding motion or action of the cutter-plate D shall cause the first or edge cutter to enter the last cut or division made in the block of sugar, so that but little waste shall result.

At the right-hand end of the machine an endless conveying apron or belt is arranged, near to and in line with the belts on the pulleys G, for the purpose of receiving and carrying off the trays, with the finished cubes, to the drying-room.

On the bottom of the trays are lugs or projections to engage with the teeth or projecting parts on the belts.

The means or mechanism for throwing down and distributing the sugar evenly and in a uniform mass upon the tray or plate, and for trimming the faces and edges of the slab or block of sugar, are shown in the detail-view figure.

At or near the bottom of the hopper or feed-box is placed a horizontal shaft, V, provided with short projecting arms W W, arranged alternately and radially. To this shaft is given a continuous rapid rotary motion by means of a belt running from above down to a wide-faced pulley on the end of the shaft.

By this means the sugar in the bottom of the box is divided and broken up into a uniform mass, and is, by the rotary motion of the shaft, thrown and distributed upon the plates or trays as they pass beneath the mouth of the box. The height of the block thus formed is regulated by the adjustable curved planer or scraper placed in front of the box. The curved end of this planer acts upon the top face of the block of sugar as the plate is drawn through, and retains the surplus sugar within the box, while it produces a smooth level surface on the sugar block drawn forward beneath it. The vertical faces at the sides of the sugar block are cut or trimmed off smoothly by the action of rotating cutting-disks Y Y at the sides of the box inside, to which motion is given by means of pulleys y y and belts y'. These cutters also cause the sugar in the box to feed down along the edges of the plate and keep the moist particles from adhering to the sides of the box. The plates or trays having the block of sugar thus formed are carried forward to the adjustable table, where they are supported while the cubes are being formed. This table is adjusted vertically toward and from the cutting and pressing plates, and the degree of pressure upon the sugar is controlled according to the amount required by the thickness of the slab or the quality of the sugar.

The cube-forming mechanism consists of the apparatus or parts for cutting or dividing the cubes and for pressing them into a solid and regular cube, as patented to us in the Letters Patent No. 208,522, granted on the 1st day

of October, 1878, and described particularly therein.

The cutter consists of a plate, D, supported from the cross-head d, and moving up and down between the standards K K. Its movements are produced by the rocking levers M M, secured upon the rock-shaft N, which has an intermittent motion given to it by the groove-cam O and the lever Q, fixed on the shaft. Two rods, m m, connect the levers M with the cutter cross-head d, and the movements are so timed that the cutter rises to permit the sugar block to pass under, and then, as the tray stops, it moves down to cut and press the portion of sugar under it, and then it rises again to allow the tray to move forward a certain distance and bring a fresh portion of the block beneath it.

The rectangular plates or cutters forming the cutter are composed of metal blades crossing each other at right angles and inclosing between themselves a series of rectangular spaces of the length and breadth required for the cubes. The height of these spaces is somewhat greater than the width of the cube, in order to accommodate the pressers and permit a vertical movement to take place in moving down upon the sugar cube inclosed in the cutter. These pressers are each carried on the end of a short vertical rod working through a hole in the top of the cutter-plate, and fixed to and moved by a presser-plate, E, having an intermittent vertical movement. This motion is produced by the action of the rocking levers S S, secured on the shaft T, to which an intermittent movement is given by the cam U and the lever t, and it is so timed with respect to the plate D that the cutters first move down and make the cut, and remain stationary while the pressers descend and compress the confined sugar within the cubical spaces, and the cutters are lifted while the pressers are held at rest, until the continued upward motion of the plate D causes it to strike against and lift with it the presser-plate E.

The edges of the cutting-blades are cleaned after each cut by the action of a reciprocating brush or wiper moved forward and back with a quick motion by the mechanism shown in the detail view, Fig. 7. This cleaner consists of a horizontal plate having bristles d' and a flexible wiper, d². It moves over the track a' above the sugar slab, and is actuated from a shaft, b³, by means of the racks b² b², secured to the ends of the plate, and the pinions c' c', engaging with said racks. The partial rotary back-and-forth movement of the shaft b³ is produced from the rock-shaft c⁶ by the action of the rocking-lever c⁵, connecting-rod c⁴, and rocking-arm c³ on the intermediate shaft, c², that carries the rack b. The back-and-forth motion of this rack b over the center pinion, b', on the shaft b³, gives to this shaft the required partially-rotating movement.

The cam O, that moves the rock-shaft N, also gives motion to the shaft c⁶, by means of the lever c⁷, and the movement is so timed that

the cleaner-plate d' d^2 is actuated in between the movements of the cutter D and while it is held up at rest above the sugar slab.

Immediately above the track a' a' , and in line with the vertical sides of the sugar slab, are placed two plows or trimming-blades, e' e' . These are secured to the side frames, A, and serve to trim off the burr or small quantity of sugar left by the cutters along the outside row of cubes on the plate or tray. As the cubes move along past these fixed blades they remove this adhering portion of sugar from the outside edges of the tray, so that the bottom as well as the top edges of the cubes in the outside rows are formed with clean sharp corners.

In the operation of this machine the cutter-plate is brought down upon the slab of sugar presented beneath it, and its blades are pressed through the mass until they strike the plate beneath, and at the end of this movement the pressers are brought down against the top of the inclosed cubes, and a strong pressure is given by them to the sugar. When this takes place the cutters are first raised to clear them from the sugar particles that may adhere to the blades, and the pressers are held down to act as strippers to the cutters and prevent their upward movement from throwing the edges of the cubes out of shape or line while yet in a moist state; and, lastly, as the cutter-plate continues to rise, it strikes against and carries with it the presser-plate E. The forward cutting-edge of the plate D, at the next descent will enter the last cut made in the slab, and the second series or set of cubes will be formed on the next uncut portion of the slab, without any waste or surplus left in the slab between the rows of cubes. The downward movement of the cutters is so timed with respect to the movements of the tray that the cutters begin to descend just before the tray and its slab or block of sugar reaches the end of the forward movement, and the cutters are pressed against the sugar as the tray comes to rest.

The effect of the operation of our machine

as thus constructed is to form cubes of sugar from a mass of granules or particles in a rapid and perfect manner, and to turn them out with sharp edges, and of a uniform density, whereby they will stand transportation and handling without breaking or crumbling off at corners and edges.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A machine for cutting and pressing sugar into cubes, consisting of the following parts or elements: a feed box or hopper to hold the sugar, a distributing mechanism to form the sugar into a slab or block of uniform density and with even sides and faces, as described, upon a tray or plate, mechanism, substantially as described, for conveying the said tray or plate from the feed-box and presenting it to the cube-forming mechanism, an intermittently-vibrating cutter composed of a series of blades crossing each other at right angles, substantially as described, a series of intermittently-reciprocating pressers working within the cubical spaces between the cutter-blades, all constructed, combined, and operated together, substantially as set forth.

2. In a cube-sugar machine, the combination of the cutter-plate D and reciprocating pressers with the intermittently-acting brush and wiper d' d^2 , the several parts constructed, arranged, and operating substantially as described and shown.

3. In a cube-sugar machine, the combination of the fixed plows or cutters e' e' with the cutter-plate D and reciprocating pressers, the several parts constructed and arranged, substantially as described, for the purposes set forth.

In testimony that we claim the foregoing we have hereunto set our hands and seals this 2d day of August, 1878.

WILLIAM JASPER. [L. S.]

STEPHEN BOUSHEY. [L. S.]

Witnesses:

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