No. 616,520.

Patented Dec. 27, 1898.

J. H. BATCHELDER.

EGG CASE MACHINE.

(Application filed Apr. 9, 1897.)

(No Model.)

7 Sheets—Sheet 1.

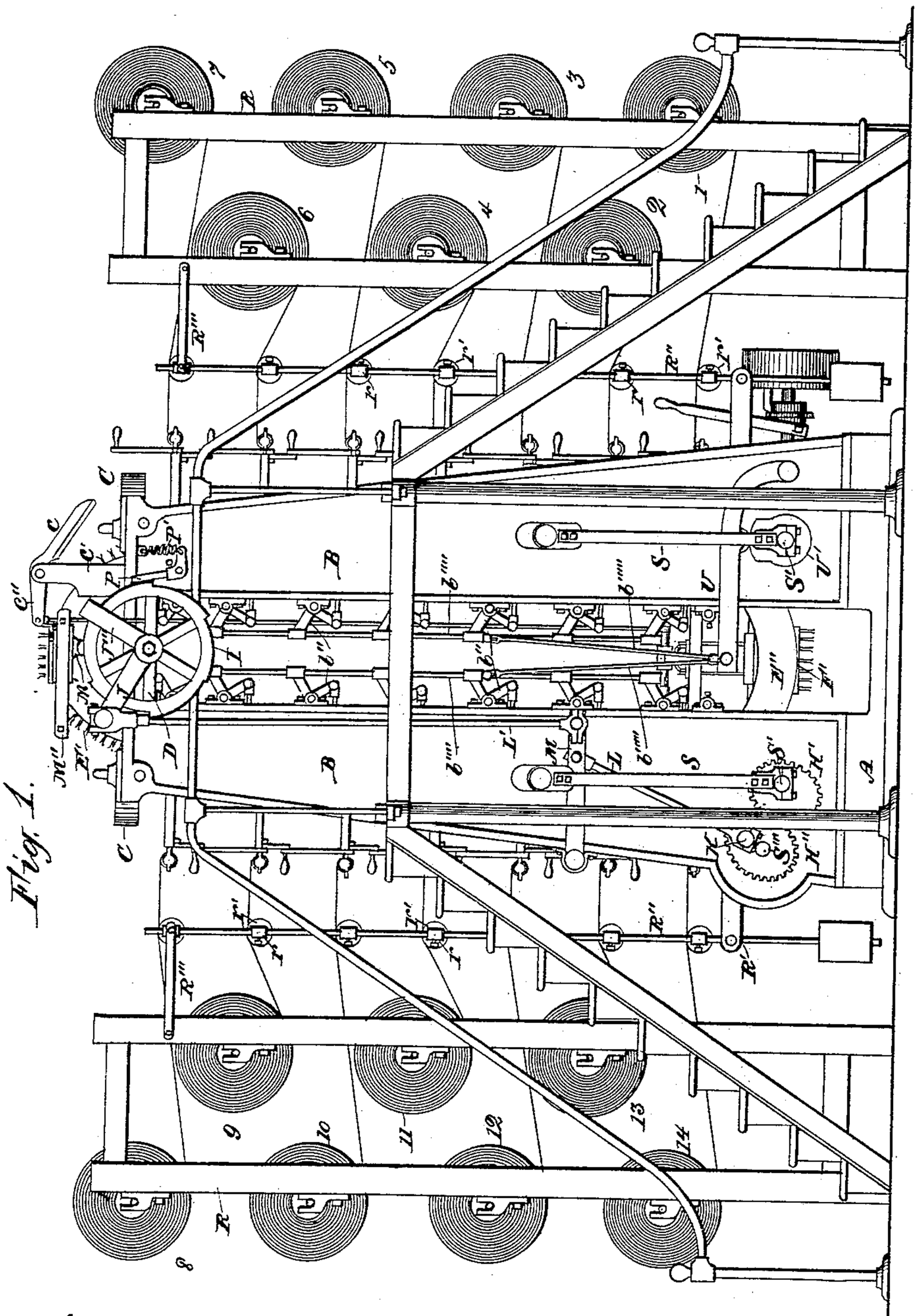

Fig. 1.

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(No Model.) 7 Sheets—Sheet 2.

Fig. 2.

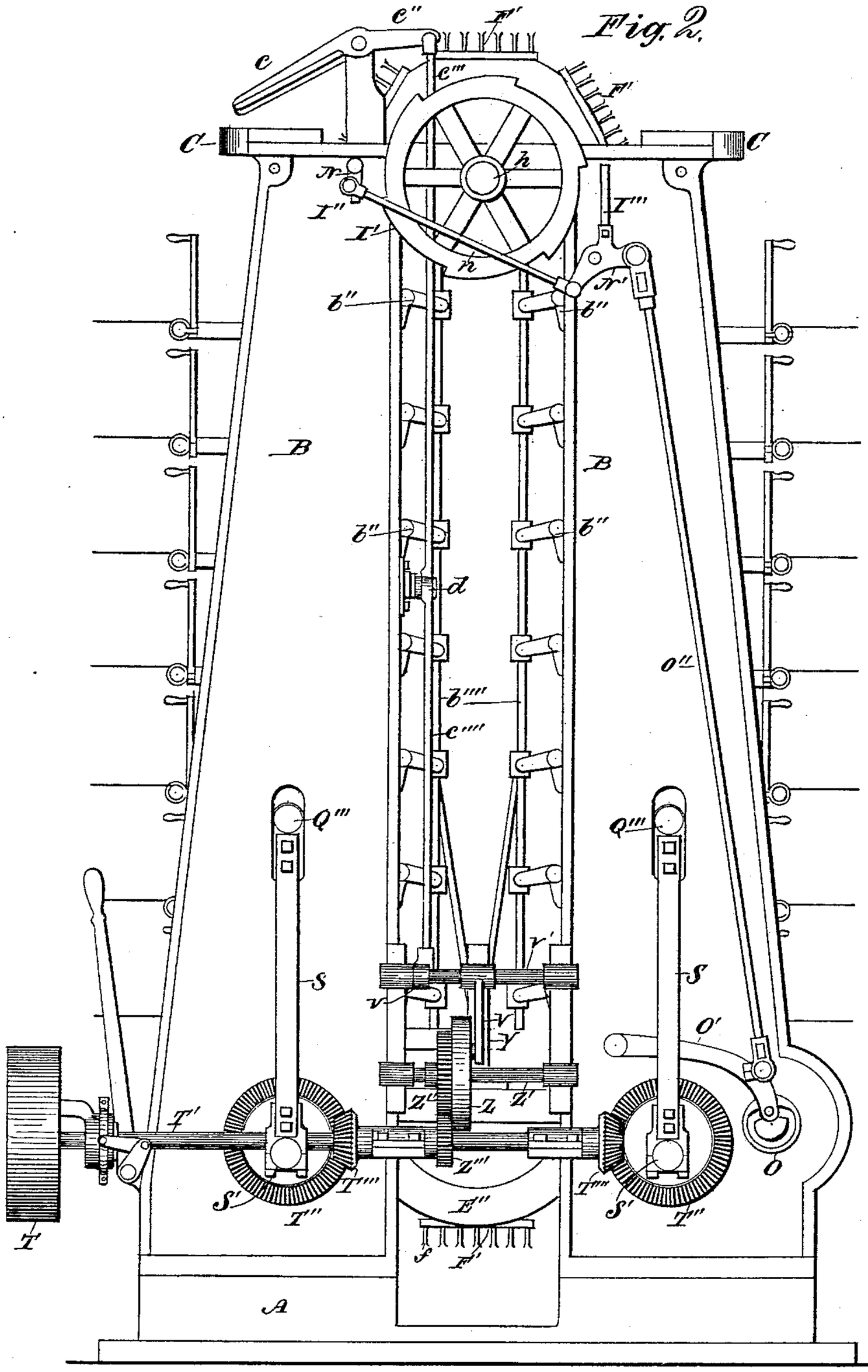

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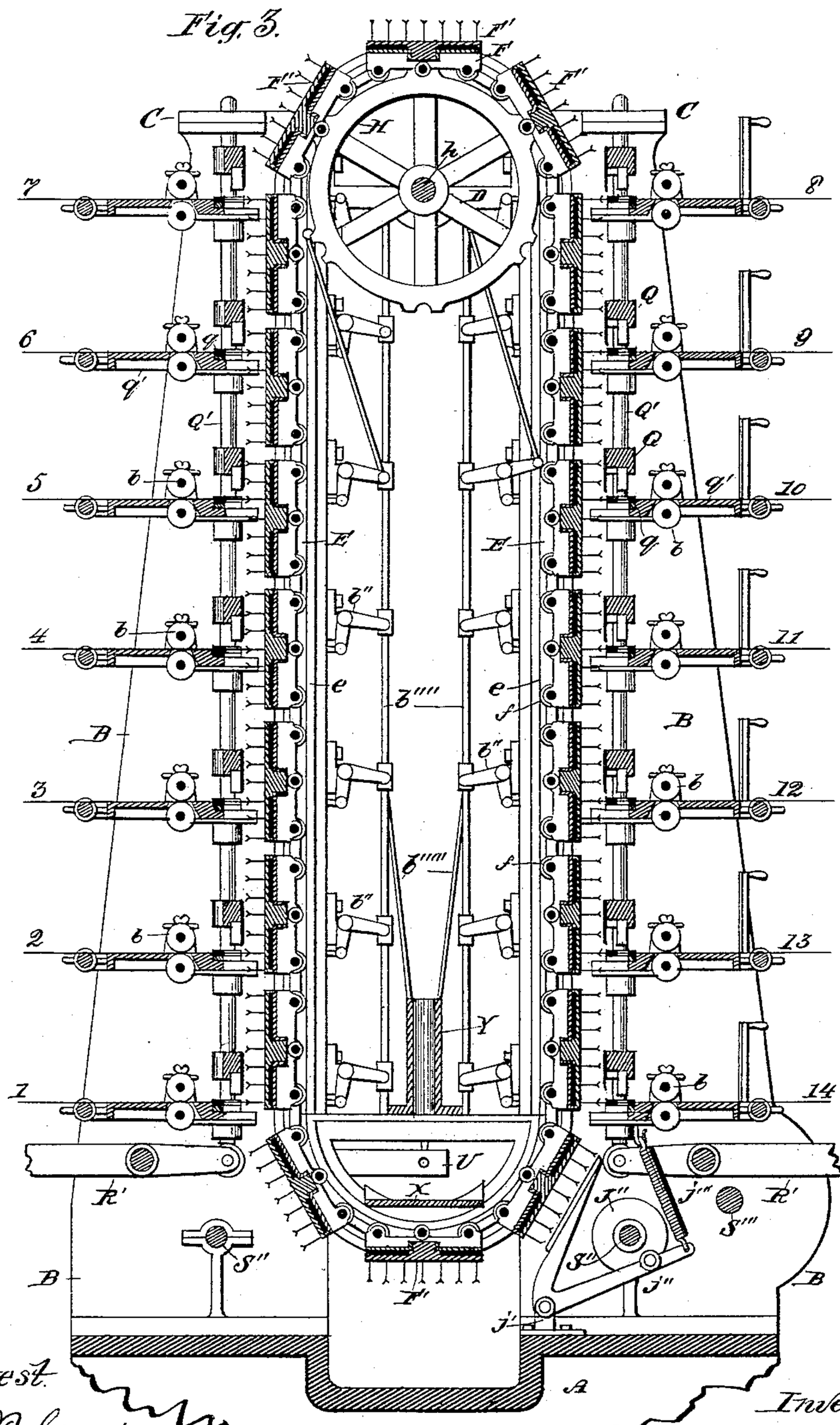
Fig. 3.



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(No Model.) 7 Sheets—Sheet 4.

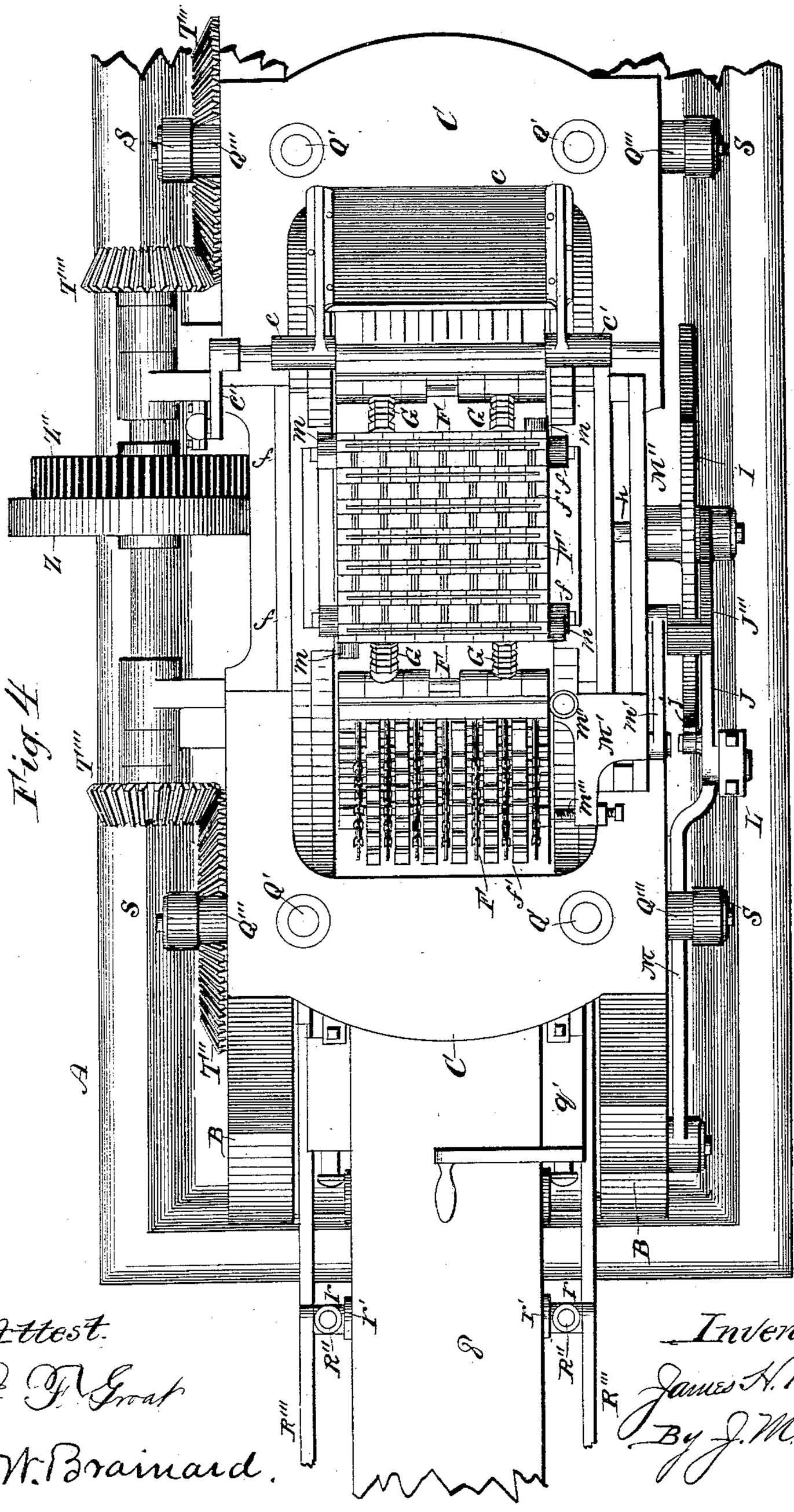

Fig. 4.

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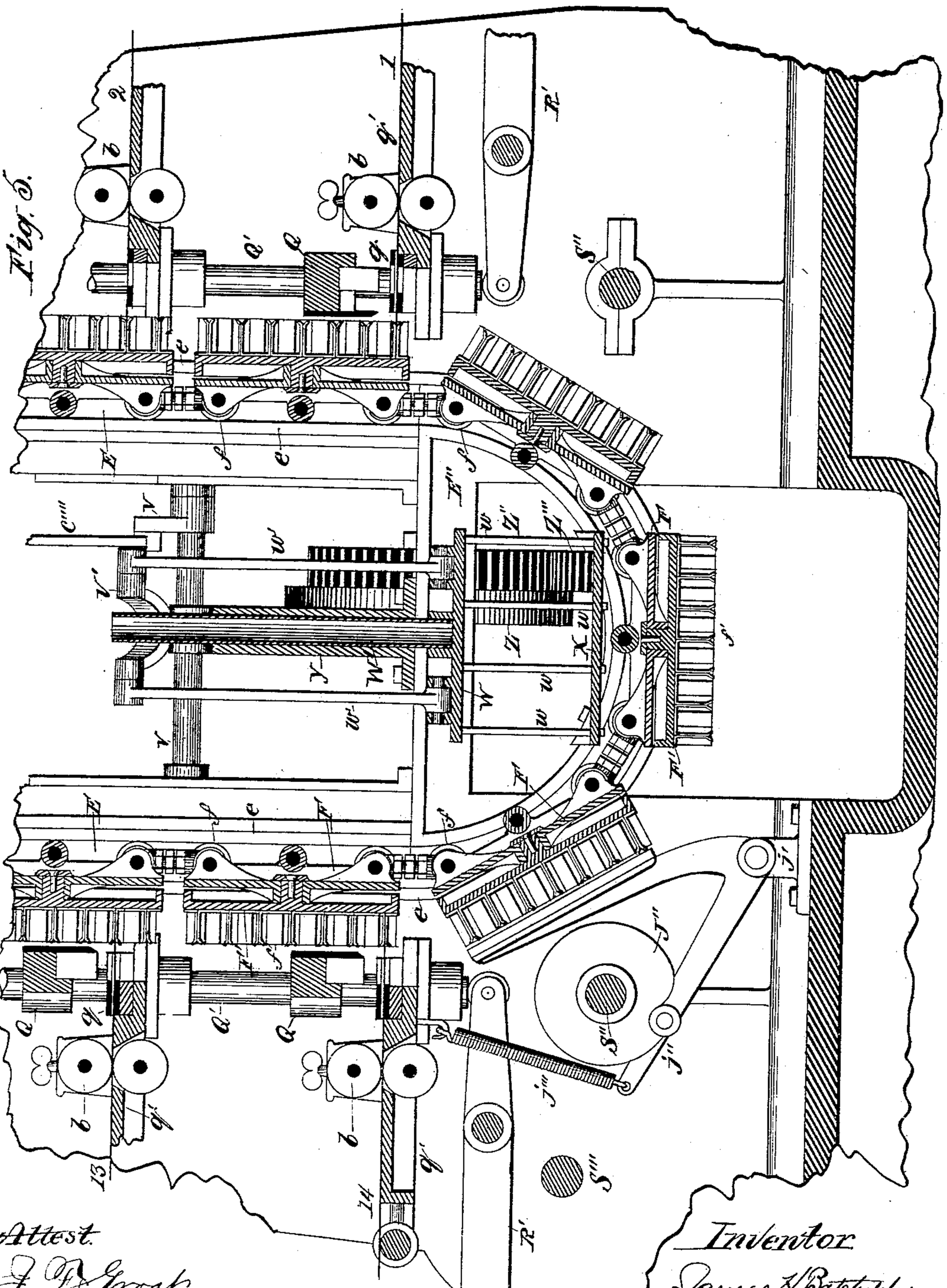
Fig. 9.



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(No Model.)

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Fig. 6.

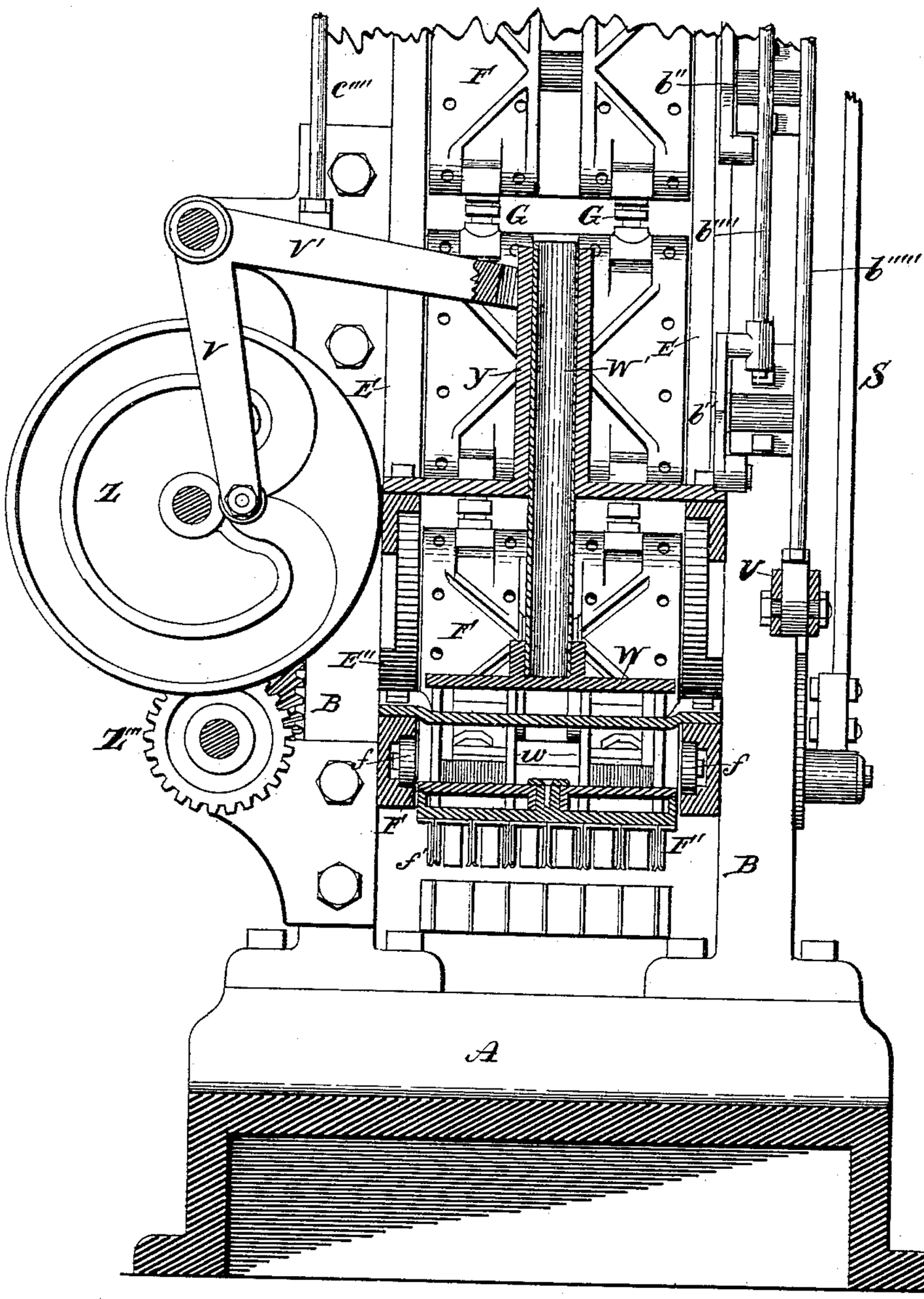
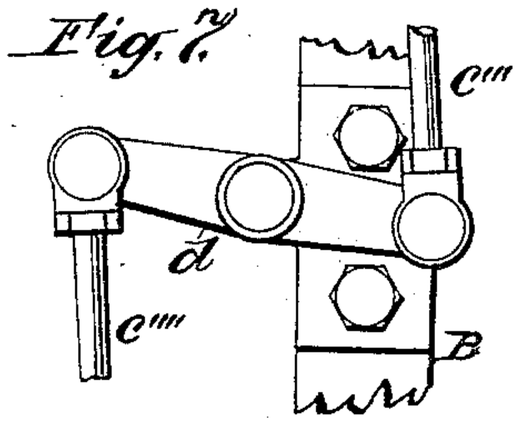


Fig. 7.



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(No Model.) 7 Sheets—Sheet 7.

Fig. 8.

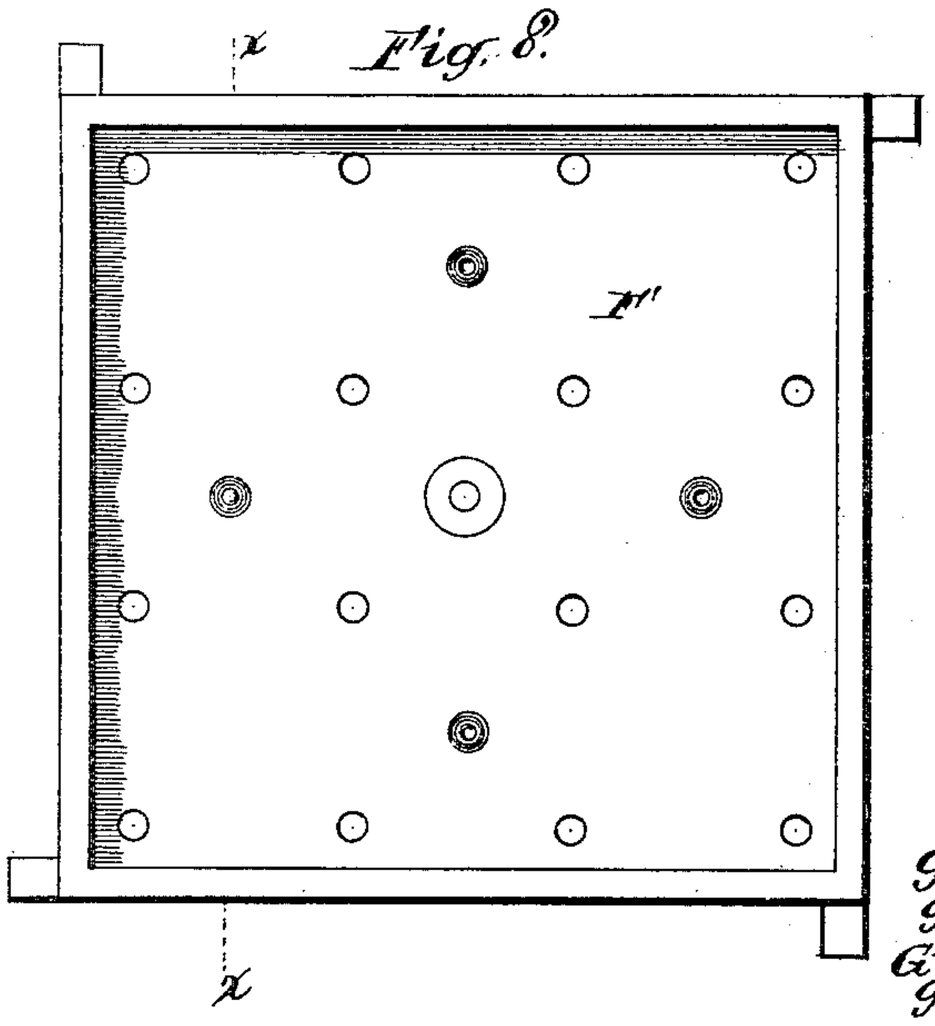


Fig. 9.

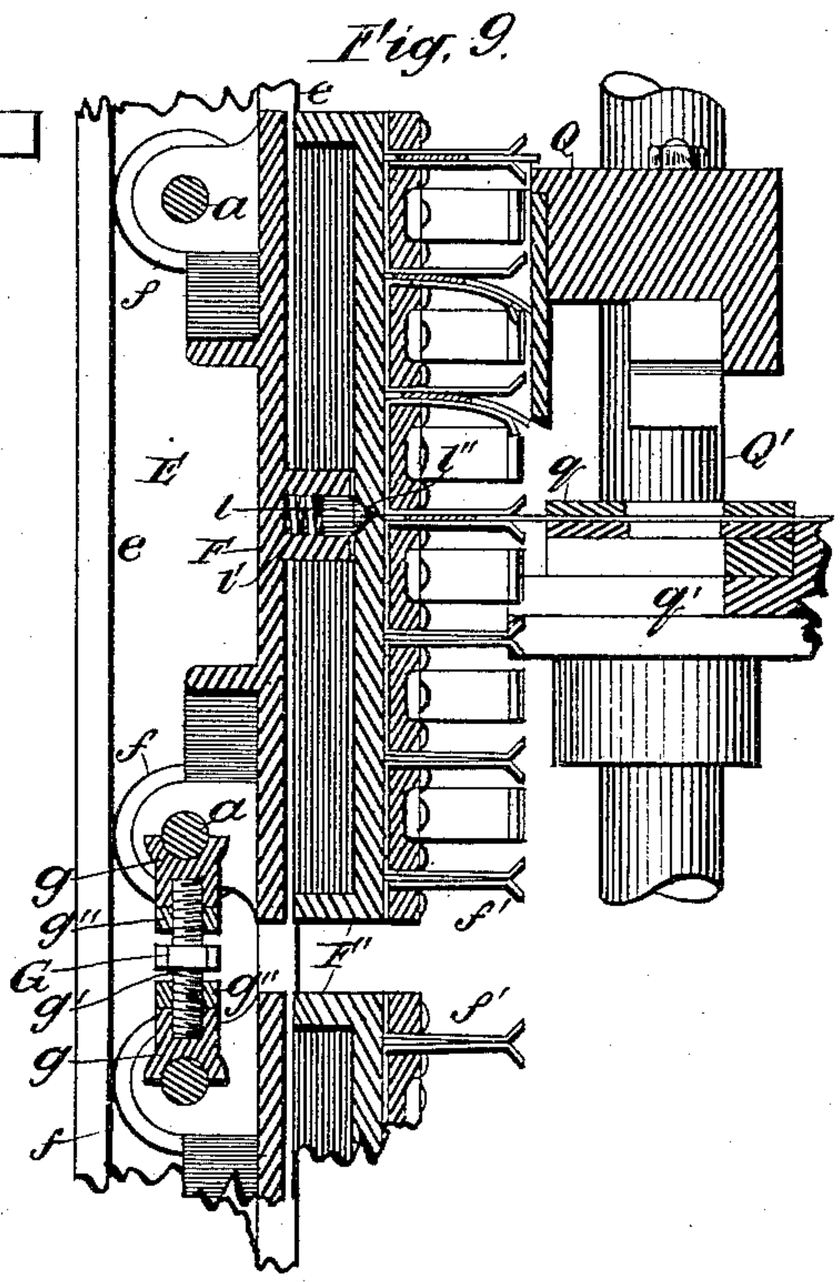


Fig. 10.

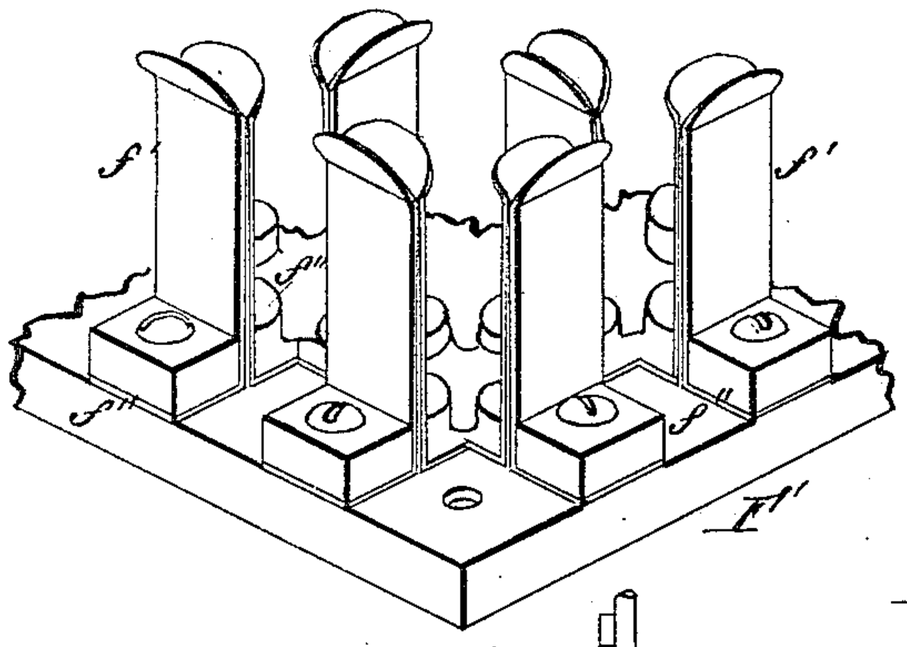
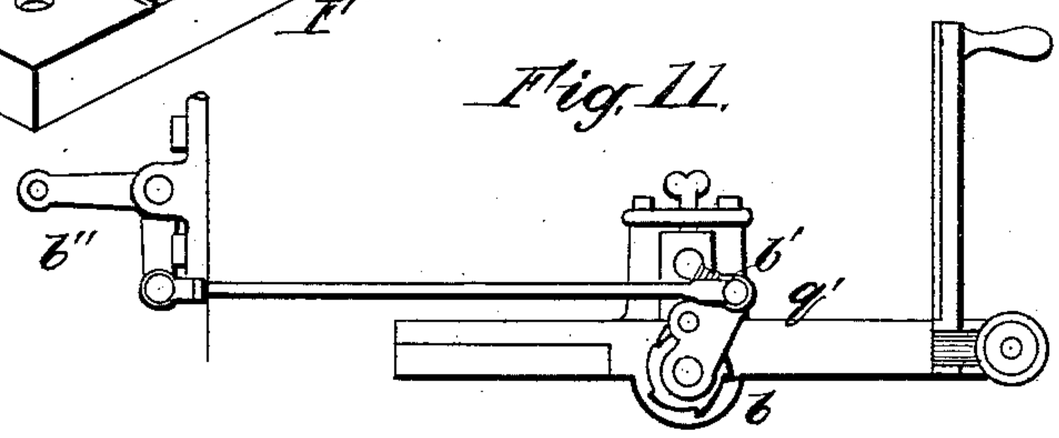


Fig. 11.



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UNITED STATES PATENT OFFICE.

JAMES H. BATCHELDER, OF TAMA, IOWA.

EGG-CASE MACHINE.

SPECIFICATION forming part of Letters Patent No. 616,520, dated December 27, 1898.

Application filed April 9, 1897. Serial No. 631,409. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. BATCHELDER, a citizen of the United States, residing at Tama, in the county of Tama and State of Iowa, have invented certain new and useful Improvements in Egg-Case 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.

This invention relates to automatic machines for the manufacture of strawboard cell-cases, commonly known as "egg-case fillers," used in the transportation of eggs, and involves certain improvements in a machine for this purpose patented to me on the 12th day of January, 1897, and numbered 575,096.

The full nature of these improvements will appear in the following description and claims, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of what may for convenience be called the "rear" of the machine. Fig. 2, Sheet 2, is a similar view of the front of the machine, but without the stairways and reels. Fig. 3, Sheet 3, is a central vertical section of the machine in the plane of the front and rear. Fig. 4, Sheet 4, is a fragmentary plan view of the machine. Fig. 5, Sheet 5, is a fragmentary sectional view of the lower end of the machine in the same plane as Fig. 3, but on an enlarged scale and as seen from the opposite direction —viz., from the rear. Fig. 6, Sheet 6, is a transverse section of the lower portion of the machine in the plane of a line vertical and central to Fig. 5. Fig. 7 is a fragmentary view showing a lever and its connections for transmitting motion to the strip-bottomer illustrated in other figures of the drawings. Fig. 8, Sheet 7, is a view of the back or inner side of the table or form which holds the cut-off and punched strips. Fig. 9 is a vertical section of the strip-carrier and adjacent punch and shear in the line *x x*, which is central to one of a pair of open-ended links connecting each pair of carriers. Fig. 10 is a view in perspective of one corner of the strip-holder form, showing the arrangement and construction of the clamping-fingers. Fig. 11 is a side elevation showing one of the feed-tables and the mechanism for feeding forward the sheet of strawboard.

Similar letters and numerals of reference indicate corresponding parts.

In the main the machine corresponds to that described in the Letters Patent above referred to, and therefore a particular description of all the parts will not be necessary.

The machine is adapted to form a complete set of cell-cases—that is to say, three dozen cells—at each stroke of the punch-heads. This operation is performed by cutting and punching seven strips from as many rolls of strawboard on one side of the machine, fed into suitable strip-holding forms, and in the same manner duplicating the operation on the other side of the machine, the form having in the meantime been turned one-quarter of a revolution, so that the second series of strips cross and match into the first series. The set is completed only on completing the circuit of the machine; but after a complete filler is made each punch-head stroke of the machine finishes one of said fillers, which are finally ejected at the bottom of the machine.

The machine may be briefly described as follows:

On a suitable base A are mounted four lofty uprights B B B B, connected at the upper ends in pairs by top plates C C and near the top in the other direction by bridges D D. Near the inner parallel edges of these frame-standards are secured parallel tracks E E, which coincide with semicircular continuations thereof E′ and E″ at the top and bottom, respectively. The lower semicircular track is full throughout its whole extent; but the upper one is cut away at the top, so as to allow both for the admission of the carrier-trucks F F and to permit the strip-holding forms F′ F′ to turn thereon when at the top of the machine. These carrier-trucks are provided at each side with a pair of travelers *f f*, running freely between the rails *e e* of the track. They are coupled, but not connected, by open-ended links G G, engaging the axles *a a*, on which the travelers turn. In practice each pair of carriers is coupled by a pair of links, separated some distance, as shown in Fig. 6, this tending better to keep the carrier parallel than a single link would do. In the

machine as shown there are twenty of these carriers, and the whole train of them, separated some little distance by the links, is just sufficient to fill the whole circuit of the track. For the sake of accuracy of adjustment the semicircular heads *g g* of the links are connected by a right-and-left screw *g'*, provided with suitable jam-nuts *g' g''*. This train of carriers is impelled forward step by step by a sprocket-wheel H at the middle of the upper end of the machine and affixed to a shaft *h*, mounted in suitable bearings on the bridges D D. At the outer ends of the shaft are mounted two similar ratchets I I', the former of which drives the sprocket, being itself impelled by a pawl *j* on an oscillating arm J, pivoted on the same shaft, to which arm a reciprocating movement is given by a crank K and suitable connecting-rods L L' and arm M. The ratchet I is used only for a positive stop to the forward movement of the sprocket and is reversed relatively to the sprocket I. The stops I'' and I''' are attached to two pivoted arms N N', connected by a rod *n* and receiving motion in and out of engagement with the teeth of the sprocket from a cam O, attached to the shaft S''', (shown in Fig. 3,) lever O', and connecting-rod O''. The construction is clearly shown in Figs. 1, 2, and 4, but in Fig. 4 the ratchet I' and its connections have been omitted, the better to show the parts below it. It is to be noted, furthermore, that the positive stop may be dispensed with if the carrier is to run at a low rate of speed, but is essential if the machine runs at a moderately-fast speed, as the momentum of the carriers would otherwise tend to carry them past the exact line where the strawboard strip is to be fed into the receiving-fingers of the form.

A pivoted back-stop P, provided with a suitable spring P', prevents the possibility of the carriers moving backward. In practice there is little liability of this taking place; but the stop is useful for the purpose of preventing accident in case any such recoil should occur.

A double series of punches and cutters Q Q, attached to vertically-reciprocating guide-rods Q' Q, punch and cut the strips from continuous sheets of strawboard in rolls (numbered from 1 to 14) mounted on suitable reel-frames R R. The punches and cutters coact with suitable dies *q q* on fixed tables *q' q'*. Through the medium of cross-heads Q''' Q''' and connecting-rods S S the punches receive motion from cranks S' S' S' S' at the ends of transverse shafts S'' S'' near the base of the machine. These shafts are driven by a suitable belt-wheel T on a horizontal shaft T' and suitable gearing T'' T'''.

The strawboard is fed forward into the clamping-fingers of the forms by suitable feed-rolls *b b*, actuated by a pawl and ratchet *b'*. (See Figs. 3 and 11.) A system of bell-crank levers *b'' b''* communicate movement to the pawl-arms through the medium of suitable connecting-rods, as shown. The bell-cranks are oscillated intermittently by connecting-rods *b'''' b''''* and *b''''' b'''''*, coupled to an arm U, actuated by a cam U' at one end of one of the transverse shafts S''. An improvement in this part of the machine consists in dispensing with an auxiliary feed device for the purpose of pushing the severed strip forward against the face of the form. In practice much trouble was experienced from the clogging of these auxiliary feeds. In Fig. 10 is shown a construction which admits of the extra feed device being discarded. It will be understood that the strip is fed between the clamping-fingers of the forms, which run close to the cutter-blades, before it is cut off, and it is not at that time pushed clear to the face of the form, as shown, but stops short thereof about the thickness of the cutter. In order to escape the cutter above, the strip was pushed home after being severed; but this is found not to be necessary, provision being made for holding the strip firmly in place and allowing it to drag over the face of the cutter in its forward movement, as indicated. This is done by holding the inner edge of the strip so firmly in the fingers that the bending of it and the adjacent finger in passing the cutter does not draw it out of place or break the strip. In practice this is accomplished in a simple manner and as shown in Figs. 9 and 10. The fingers *f' f'* are made of thin spring-brass, with diverging lips at the outer ends, and are attached to the form-plate F' by suitable screws passing through retaining-blocks *f'' f''*. These blocks hold the spring-fingers firmly at the lower ends and for some distance up therefrom and prevent their spreading apart, so as to let the strip slip, even though considerably bent in passing the cutter.

The strips are bottomed all at once—that is to say, all of those on either side of the machine—by a single blow of a driver. One of these, *c*, is mounted on a shaft oscillating intermittently in suitable bearings *c' c'* at the top of the machine. To an arm *c''* is coupled a connecting-rod *c'''*, which at the lower end connects with a lever *d*, pivoted about midway up the main frame. A similar rod *c''''* connects with the other end of the lever, and at its other end with a crank-arm *v* on the shaft *v'*, which forms a part of the ejector, as will be hereinafter set forth. The other driver is located near the bottom of the machine and is clearly shown in Fig. 5. A supporting-arm *j* is pivoted on suitable supports *j'*, attached to the base. The driver is moved out of contact with the series of strips by a cam J' acting on a diagonal arm *j''*, provided with a suitable antifriction-roller. A spring *j'''* throws the driver forcibly against the series of projecting strips when the cam reaches the point indicated in the drawings.

An improved ejector for the finished filler is best illustrated in Figs. 5 and 6. It consists chiefly of a head W, provided with a suitable guide-stem W', which for the sake of reducing weight is made tubular, and a

series of plunger-rods *w w w w*, adapted to pass through holes in the carrier and form and engage the filler at the intersections of the strips. In practice sixteen of these plunger-rods are provided. These are guided by a plate X, suitably perforated therefor and fastened to the semicircle at the lower end of the machine. To the transverse bar of the semicircle is secured the guide-bearing Y, through which the stem of the plunger-head passes. Links *w' w'* connect the plunger-head with the bifurcated arm V' of a bell-crank lever V, attached to the shaft *v'*. The other arm of the bell-crank engages by a suitable traveler with a cam-wheel Z, secured to a shaft Z' and receiving motion from the main shaft T' by gearing Z'' and Z'''. During the time that the carriers are at rest after each forward movement the cam Z assumes the position shown in Fig. 6, when the filler is forcibly driven down and out, as indicated.

One of the serious practical difficulties met with in the operating of a machine employing such a large number of movable forms has been to attain the desired speed, owing to the weight and inertia of the train of carriers. This has been overcome by the improved carrier-feed illustrated in the drawings, particular reference being had to Figs. 1 and 3.

In connection with the ratchet mechanism already described, which is adapted to start the train of carriers from a state of rest with a comparatively easy movement and gradual increase of speed from the start to the middle of the stroke of the crank which actuates the bell-crank lever J, I provide means for imparting a slow forward movement to said bell-crank and a quick return thereof. This consists of a pair of elliptical gears H' and H'', the former of which is attached to one of the main cross-shafts S'' and the other to a similar shaft S'''. The crank which drives the main ratchet and sprocket wheel is attached to the gear H'' and has the irregular motion indicated. The forward movement of the train of carriers is thus effected with a comparatively slow motion, but without loss of time, owing to the quick return stroke. This admits of a considerable increase in the speed and capacity of the machine.

It is to be noted that the sprocket H does not have to support the weight of the train of carriers, which is all borne by the oblong track; but one such sprocket is required furthermore, and this only for the propulsion of the carriers. This admits of all the parts being made light and easily movable, which is a matter of great importance in a machine of this type.

The tracks, as will be evident, serve always to keep the carrier-trucks in proper position. The position of the forms with respect to the trucks is controlled, however, by a sort of latch. (Illustrated in Figs. 8 and 9.) This is simply a short plug *l* with a rounded outer end and a spring *l'* to hold it into conical holes *l''* in the back of the form-plate and ninety degrees apart. The plug and spring are set in a boss on the outer face of the carrier-platform F. The construction is such as to admit of the form being turned one-quarter of a revolution when at the top of the machine, but prevents accidental displacement at all times.

At each corner the forms are provided with lateral studs *m m*. Referring to Fig. 4, it will be seen that a slide M' is mounted on suitable ways M'' and connects with the arm J''' of the bell-crank J by a link *m'*. In its forward movement an antifriction-roller *m''* engages one of these studs, one side of which is just flush with one side of the form, and thus turns the form one-fourth of a revolution. An adjustable stop *m'''* prevents its being carried farther by its own momentum by abutting on one side of the form, a little back of the center, as the form makes the quarter-turn.

The tracks for the carrier-trucks make it unnecessary to make any drawing connection between the trucks. All that is required is something to keep them the proper distance apart at all times, and this is effected by the open-ended links above described. These admit of the carriers being very easily and quickly put in place or detached without disturbing any others of the train, it being understood that the outer rail of the track is cut away for some distance at the top both for this purpose and to permit the form to turn as described.

The strawboard is fed forward the width of a strip with a quick intermittent motion. If applied directly to a large roll of strawboard, considerable power is necessarily required to overcome the inertia of the roll, and the feed-rolls are either inclined to slip or tear the strawboard. To obviate this difficulty, an auxiliary feed is provided to give a little slack to the sheet of strawboard for the direct feed to take up. The apparatus is best illustrated in Figs. 1, 4, and 5. The weight of the punch-heads and guide-rods to which they are secured is compensated for by pivoted and weighted levers R' R', on the inner ends of which the guide-rods rest. To the outer and longer arms of the levers are connected vertical rods R'' R'', with hinged connecting-arms R''' R''' at the upper end pivoted to some part of the reel-frame or other suitable support. In bearings *r r* small rolls *r' r'* are mounted and over these the strawboard passes from the roll to the feed. It will be seen that the upward movement of these rolls as the punch-heads move downwardly will deflect the sheet of strawboard and draw out sufficient material for the next strip. When the feed acts to project the strip into its place between the clamping-fingers of the form, the sheet is slack and the feed is effected with ease and certainty.

The operation of the machine in general, except as herein already set forth, is so fully

described in my said previous patent as to be clearly understood on reference thereto.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an egg-case machine, the combination of a continuous track, a train of carrier-trucks mounted to run therein, means substantially as described for imparting intermittent motion to the train, and strip-holding forms mounted revolubly on said trucks, substantially as and for the purpose set forth.

2. In an egg-case machine, the combination of a pair of continuous tracks, a train of carrier-trucks mounted to run therein, a sprocket engaging successively with each truck, and strip-holding forms mounted revolubly on said trucks.

3. In an egg-case machine, the combination of endless tracks, a train of strip-carrying trucks mounted to run therein, a sprocket engaging successively with each truck, a ratchet and pawl adapted to impart intermittent motion to said sprocket, and a continuously-revolving crank to give reciprocating movement to said pawl, with suitable connecting mechanism, substantially as described.

4. In an egg-case machine, the combination of endless tracks, a train of strip-carrying trucks mounted to run therein, a sprocket engaging successively with each truck, a ratchet and pawl adapted to impart intermittent motion to said sprocket, and a continuously-revolving crank attached to one of a pair of elliptical gears, connecting mechanism communicating the motion of said crank to a reciprocating pawl, and suitable mechanism adapted to drive said gears, substantially as described.

5. In an egg-case machine, the combination of a continuous track, a train of carriers mounted to run therein, and open-ended links adapted to keep said carriers at a uniform distance apart.

6. In an egg-case, the combination with reciprocating punch-heads, oscillating, counterbalance-arms therefor, strip-holding forms provided with suitable clamping-fingers and feed apparatus adapted to project the strawboard strip between the clamping-fingers of said strip-holding forms, of a series of auxiliary feed-rolls and supports therefor connecting with the reciprocating outer ends of said counterbalance-arms, substantially as and for the purpose set forth.

7. In an egg-case machine, the combination with feed apparatus and cutting and punching mechanism, substantially as described, of forms adapted to hold the severed strips as partially inserted by the initial feed, and a driver adapted, through suitable actuating mechanism, to drive all of a similarly-arranged series of strips home at a single blow.

8. In an egg-case machine, the combination of a train of carrier-trucks, revoluble forms mounted on said trucks, a continuous track for the train, a reciprocating slide adapted to engage each form while at rest, successively, and a projection on each side of said form, with which said slide engages.

9. In an egg-case machine, the combination of a train of strip-carrying trucks, forms pivoted thereto and adapted to hold the severed strawboard strips parallel with either side of the form, means substantially as described for turning said forms one-quarter of a revolution, and a stop on the carrier engaging with the form at four-points ninety degrees apart, to hold the same true while receiving said strips.

10. In an egg-case machine, the combination of a train of strip-holding carriers, suitable punching and cutting mechanism, a sprocket adapted to engage each truck of the carrier-train successively, a ratchet and suitable engaging mechanism to impart intermittent forward movement to said sprocket, and another ratchet and engaging stops to prevent the train being carried too far by its own momentum.

11. In an egg-case machine, the combination with suitable cutting and punching mechanism, substantially as described, of a train of strip-carriers and tracks therefor, a sprocket adapted to engage with each carrier, successively, a ratchet and suitable engaging mechanism to impart intermittent forward movement to the sprocket, and a stop to engage said ratchet and prevent any backward movement thereof.

12. In an egg-case machine, the combination with a suitably-perforated strip-holding form, of an ejector composed essentially of a plurality of plungers adapted to pass through said form from the back side and engage the completed filler at several of its intersections, and mechanism to impart a reciprocating movement to said ejector.

13. In an egg-case machine, the combination with a suitably-perforated strip-holding form, of an ejector having a plurality of plunger-rods adapted to pass through the holes in said form from the back side thereof, a guide for said ejector, a cam, and connecting mechanism to impart an intermittent movement to said ejector.

14. In an egg-case machine, the combination of a strip-holding form, a carrier-truck on which it is pivotally mounted, both perforated, and the holes in the one registering with the other in any desired position, an ejector having a plurality of plunger-rods registering with said holes and connected with a suitable head, a guide therefor, and a revolving cam and connecting mechanism to impart intermittent, reciprocating movement to the ejector.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES H. BATCHELDER.

Witnesses:
WM. J. FORBES,
CHARLES A. ISE.