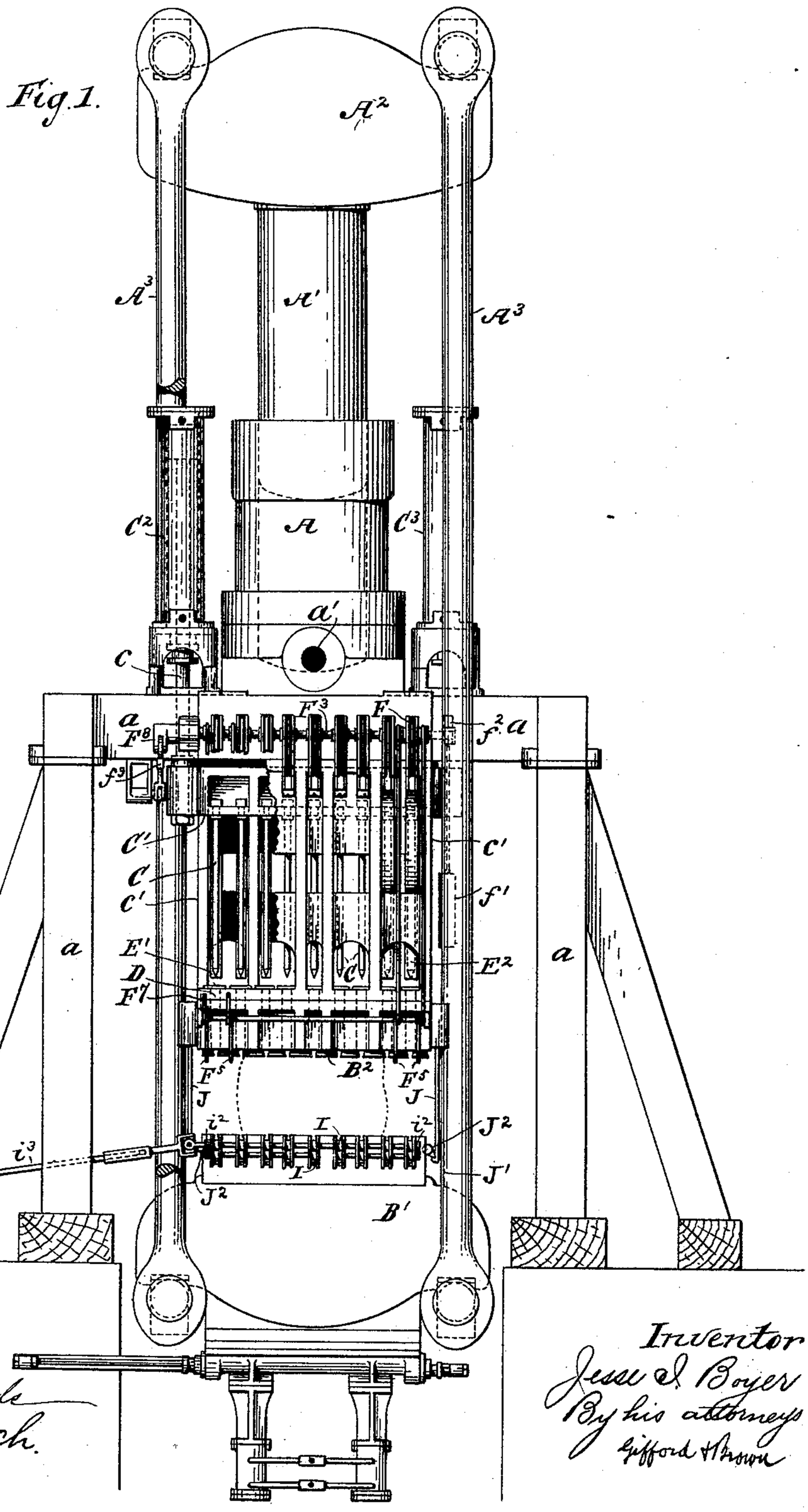
(No Model.) 6 Sheets.—Sheet 1.

J. I. BOYER.

MACHINE FOR BALING COTTON.

No. 415,288. Patented Nov. 19, 1889.

Fig. 1.



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By his attorneys
Gifford & Brown

N. PETERS, Photo-Lithographer, Washington, D. C.

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J. I. BOYER.

MACHINE FOR BALING COTTON.

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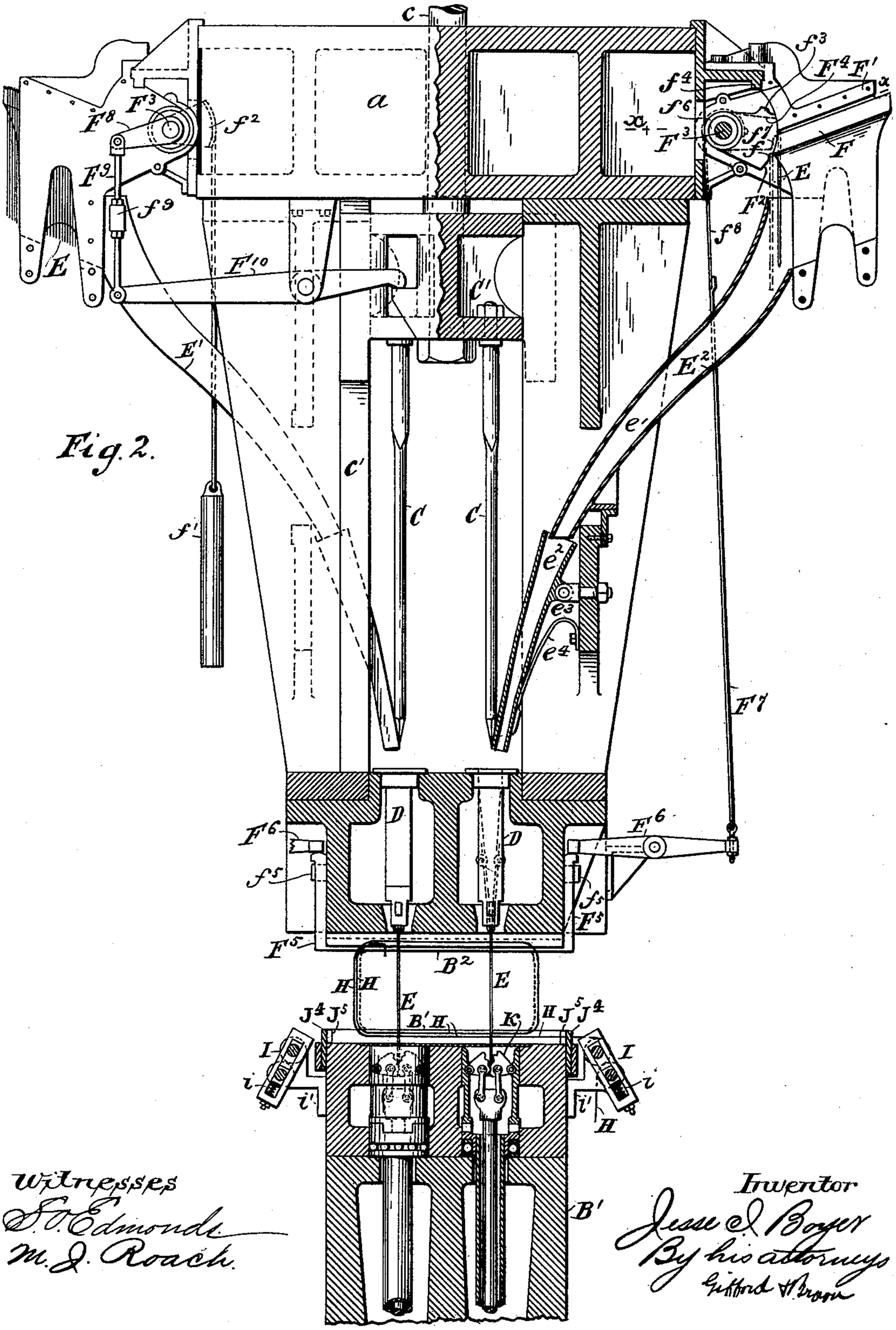

Fig. 2.

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(No Model.) 6 Sheets—Sheet 3.

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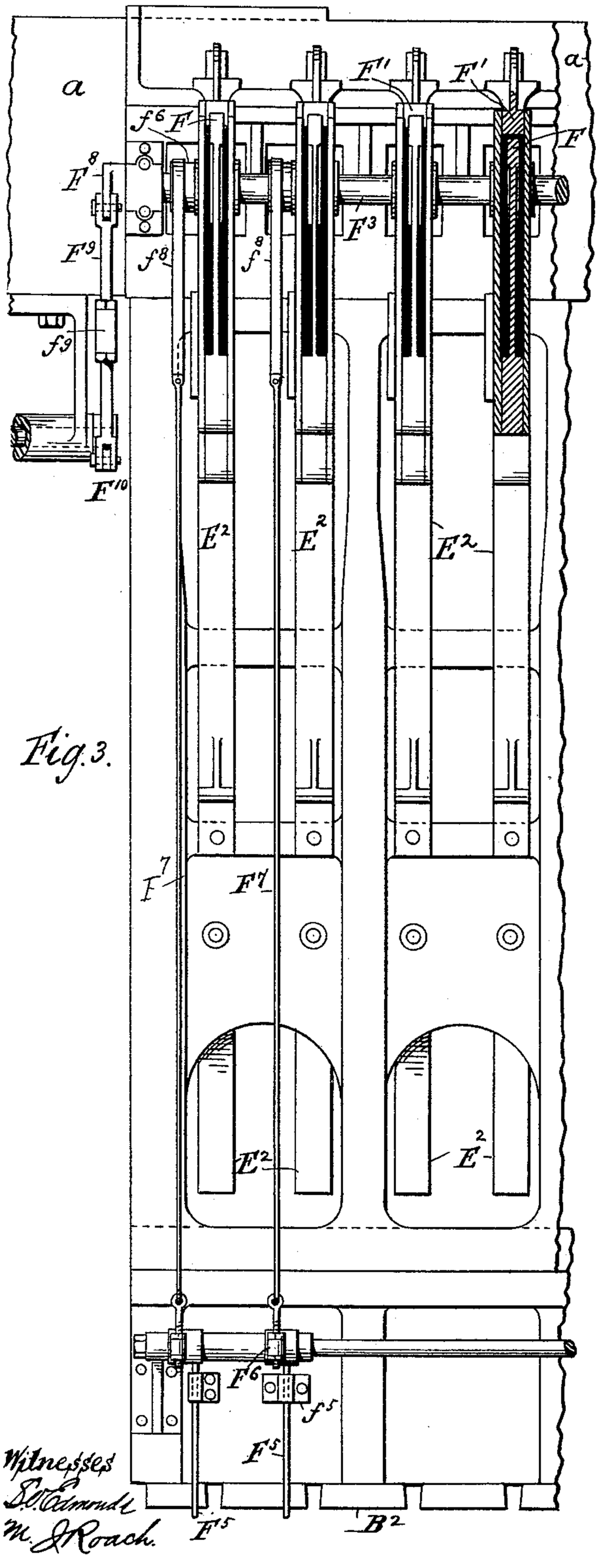
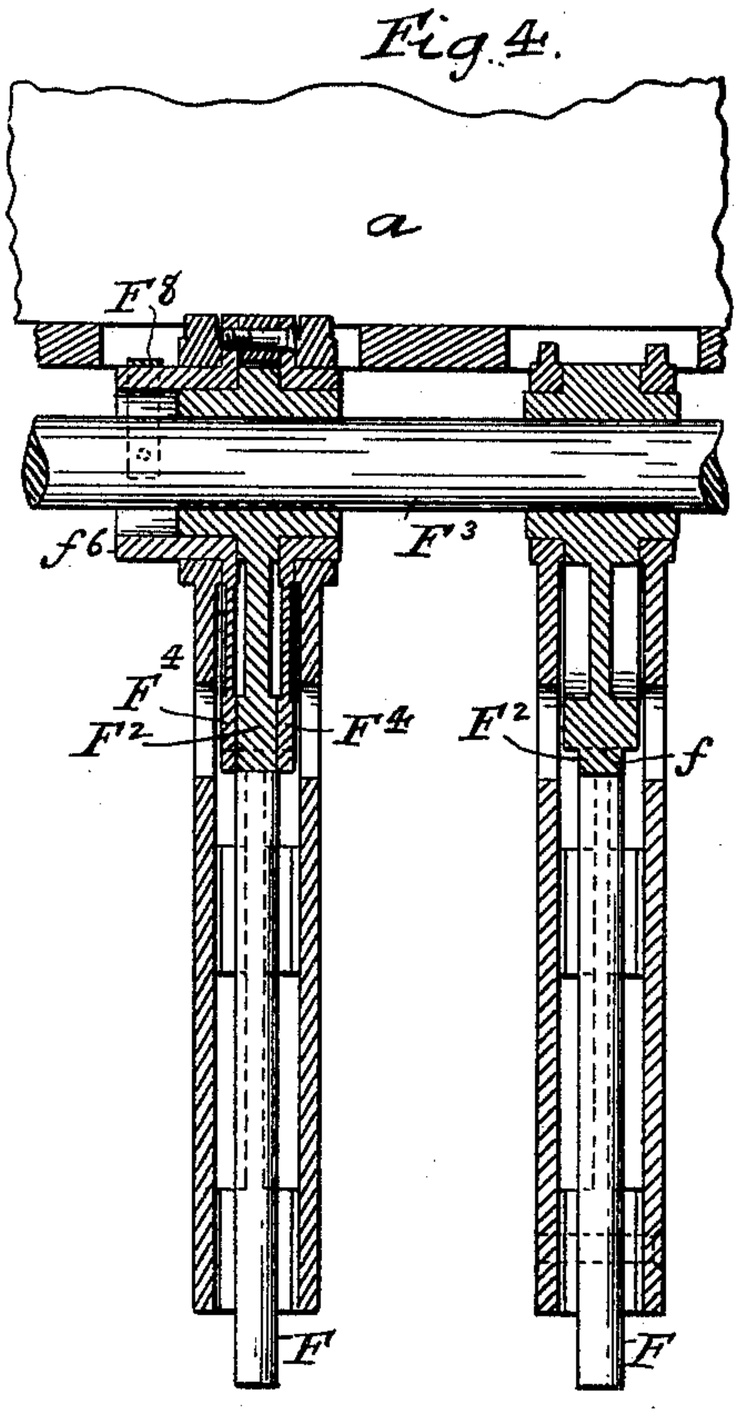


Fig. 3.

Fig. 4.



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J. I. BOYER.

MACHINE FOR BALING COTTON.

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Fig. 5.

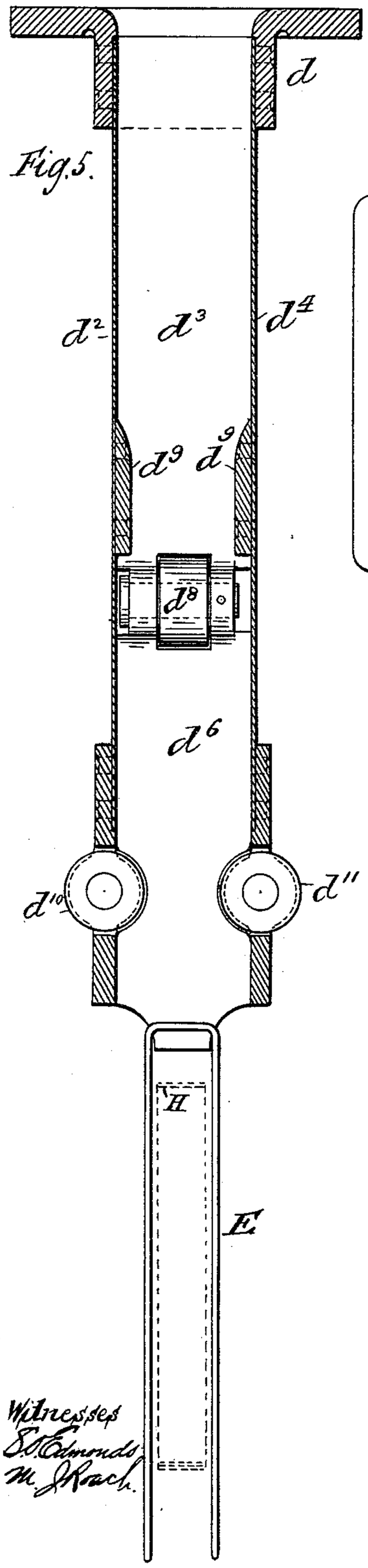


Fig. 7.

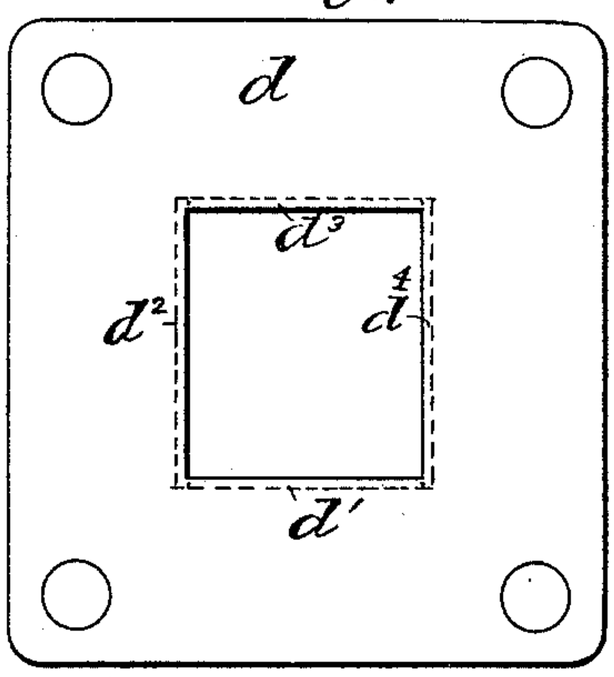


Fig. 8.

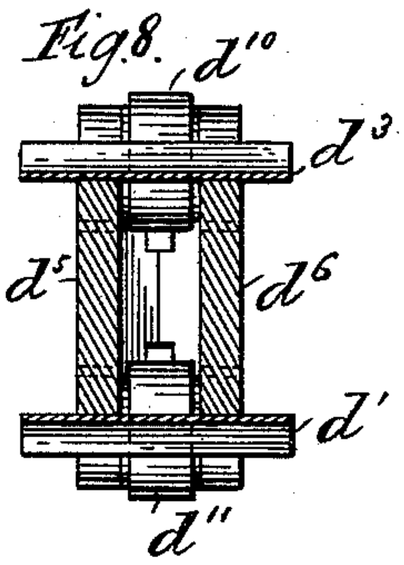
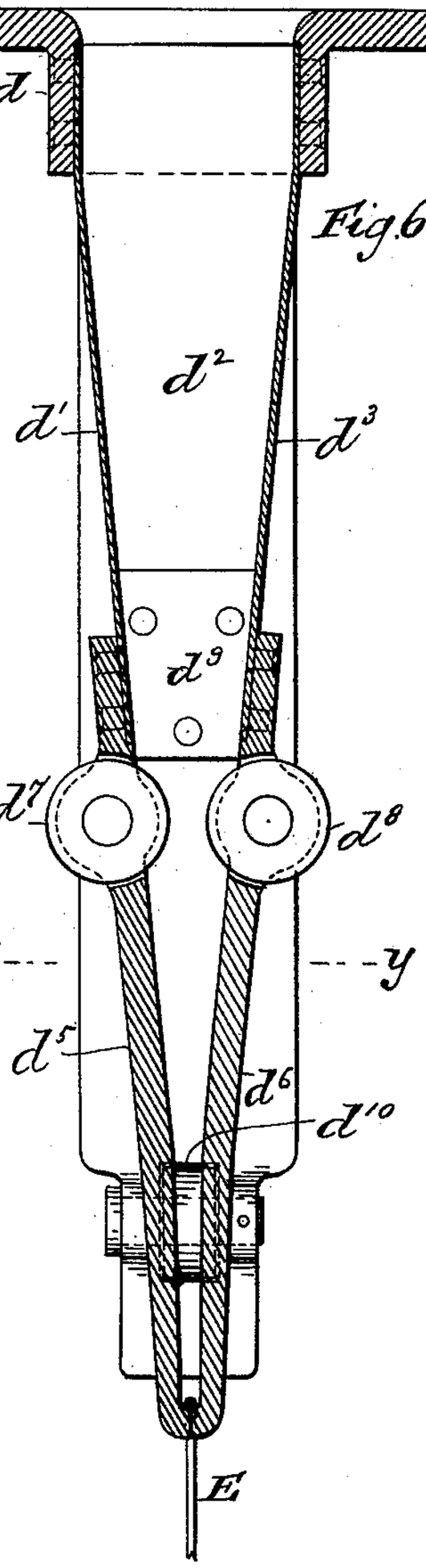


Fig. 6.



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MACHINE FOR BALING COTTON.

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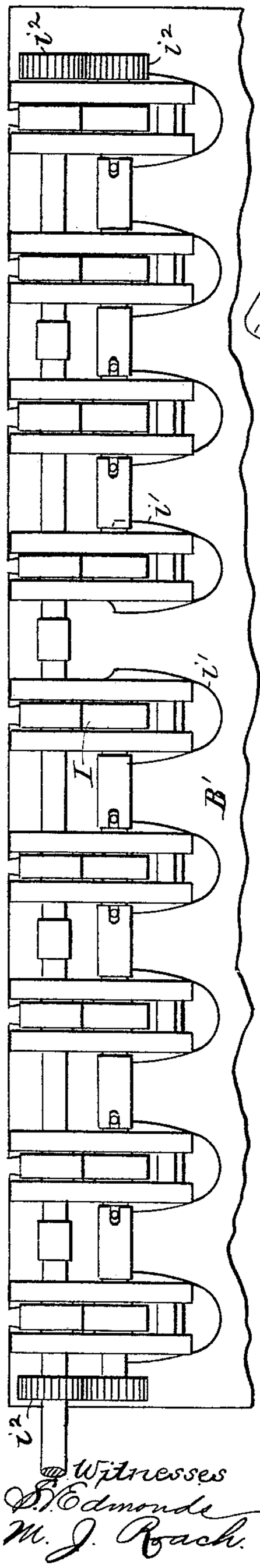

Fig 9

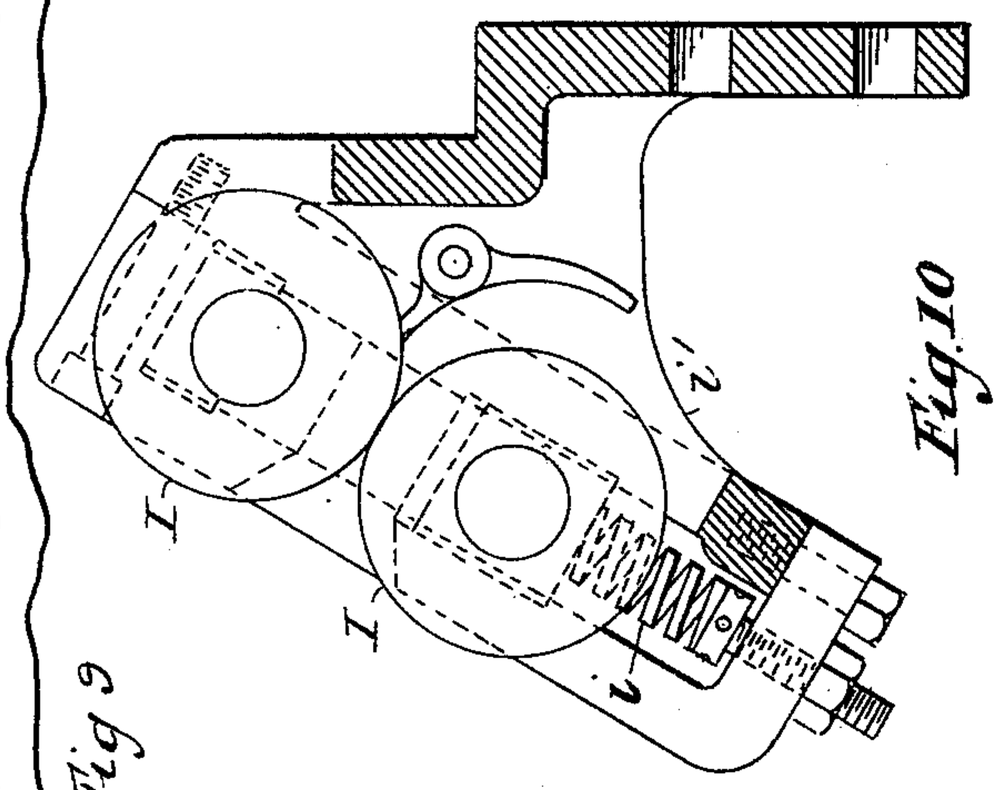

Fig. 10

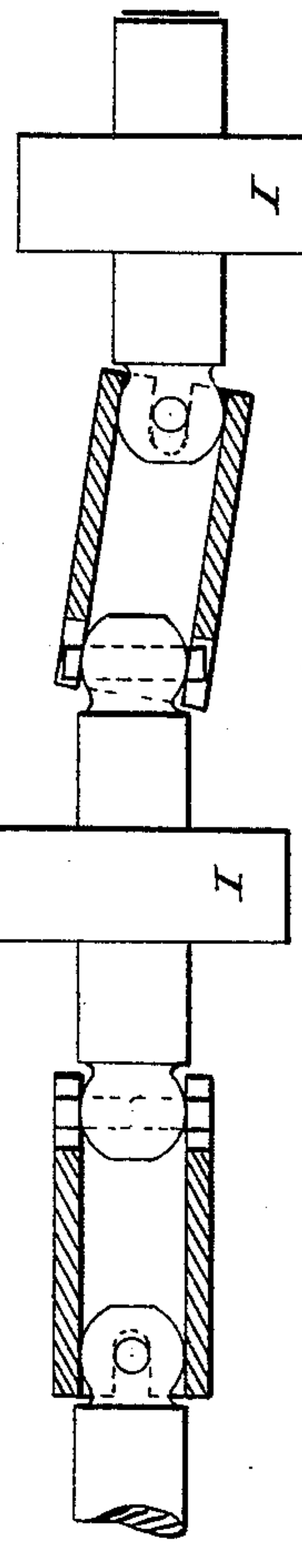

Fig. 11.

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J. I. BOYER.

MACHINE FOR BALING COTTON.

No. 415,288. Patented Nov. 19, 1889.

Fig. 12.

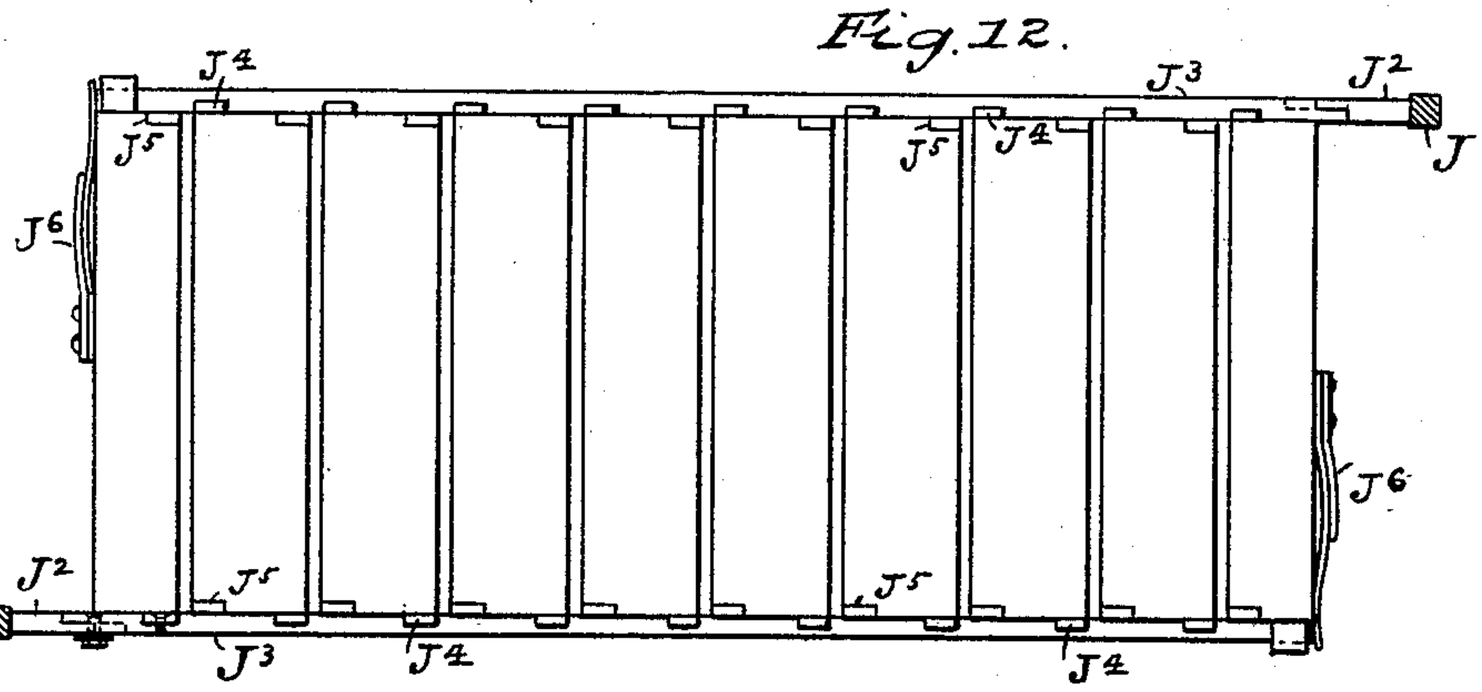


Fig. 13.

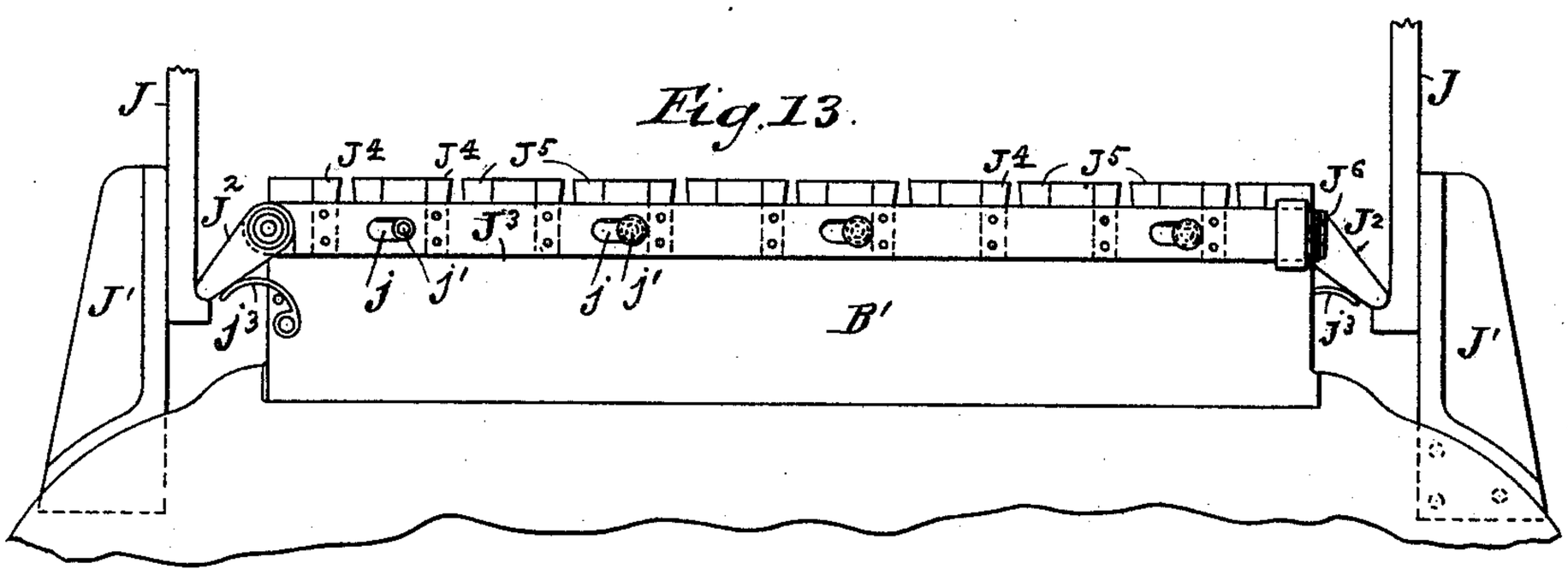
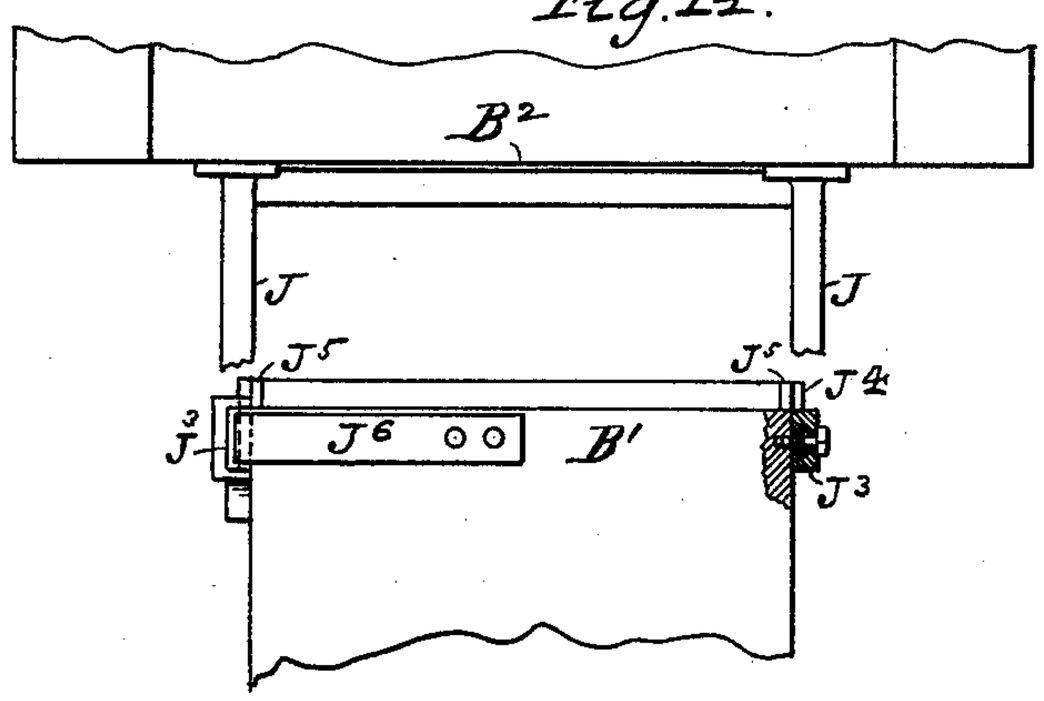


Fig. 14.



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UNITED STATES PATENT OFFICE.

JESSE I. BOYER, OF READING, PENNSYLVANIA, ASSIGNOR TO AARON F. CHURCHILL, OF SAVANNAH, GEORGIA.

MACHINE FOR BALING COTTON.

SPECIFICATION forming part of Letters Patent No. 415,288, dated November 19, 1889.

Application filed September 14, 1888. Serial No. 285,361. (No model.)

To all whom it may concern:

Be it known that I, JESSE I. BOYER, of Reading, in the county of Berks and State of Pennsylvania, have invented a certain new and useful Improvement in Machines for Baling Cotton, of which the following is a specification.

My improvement is embodied in a machine designed to compress bales of cotton to very small size, to puncture the bales when compressed, to insert in the punctured holes stays preferably made U-shaped or similar to ordinary staples, to wind a band or bands around the bales, and to fasten the ends of the staple-like stays together outside the bale and around the band or bands.

In the accompanying drawings, Figure 1 is a front elevation of a machine embodying my improvement. Fig. 2 is a side elevation, partly in section, made on a larger scale and including certain parts of the machine shown in Fig. 1. To be more explicit, this side elevation is taken in a vertical plane at right angles to the vertical plane of Fig. 1. Fig. 3 is a front elevation showing the tubes through which the stays are fed down to the bales after the puncturing of the bales. This view also shows magazines which supply the said tubes with stays, and also includes representations of appurtenant parts of these features in the machine. This figure is on a much larger scale than Fig. 1. Fig. 4 is a horizontal section taken at the plane of the dotted line *x x*, Fig. 2. Fig. 5 is a vertical section in a plane parallel to the plane of Fig. 2, but upon a very much larger scale, showing one of a number of suspender-pockets for holding the stays prior to the introduction of the latter into the bale. Fig. 6 is a vertical section of the suspender-pocket illustrated in Fig. 5; but the section is taken in a vertical plane at right angles to the vertical plane of Fig. 5. Fig. 7 is a top view of the suspender-pocket; but in this view no attempt is made to show the parts of the interior below the top surface. Fig. 8 is a horizontal section taken at the plane of the dotted line *y y*, Fig. 6, and looking downwardly. Fig. 9 is a front view of pulling-rollers for pulling the bands around the bales. These are represented on a much larger scale in this figure than in Fig. 1. Fig. 10 is a vertical section taken through one pair of these rollers. These rollers are also shown in Fig. 2; but in Fig. 10 they are represented upon a much larger scale than in Fig. 2. Fig. 11 is a partly-sectional front view of a portion of the shaft which carries the lower series of these pulling-rollers. Fig. 12 is a top view of the platen or lower plate of the press. Fig. 13 is a front view of this platen. This figure also illustrates shears for cutting the ends of the bands wound upon the bales and parts appurtenant to the shears. Fig. 14 is a side view of the upper plate of the press, rods extending downwardly therefrom, the platen or lower plate, and parts appurtenant thereto.

Similar letters of reference designate corresponding parts in all the figures.

A designates an upright hydraulic cylinder. The plunger or ram A′ extends upwardly through the top of the cylinder and carries at its upper extremity a head A^2. From this head there extend downwardly a number of rods A^3. In the present example there are four of these rods. They extend downwardly past the front and rear of the framing *a*, which supports the hydraulic cylinder. At their lower ends these rods are connected to the lower plate B′ of the press, or, as it may be termed, the "platen." The plunger or ram of the cylinder A, when moved longitudinally by means of water or other liquid forced into or allowed to escape from an inlet-duct *a*′, will raise or lower the lower plate or platen B′ of the press.

B^2 designates the upper plate of the press. It is arranged above the platen B′ and is intended to be stationary.

A bale of cotton to be compressed is placed upon the platen B′ while the latter is lowered. Afterward the platen will be raised in the manner described, and will thereby compress the bale forcibly between it and the upper plate B^2.

C designates puncturing needles or devices. They are carried by a cross-head C′, adapted to reciprocate vertically. These puncturing-needles are normally held above the upper plate B^2 of the press. The plate B^2 is provided with suspender-pockets D, in line with and below the puncturing-needles. These

suspender-pockets are of tubular or hollow form. They will be described in detail hereinafter. It is sufficient for the present to thus briefly refer to them, as all it is necessary at present to show is that they are of such character that the puncturing-needles, when reciprocated downwardly, may pass through them and through the bale after the compression of the latter. It will be seen by reference to Fig. 1 that there are a number of these needles arranged side by side. Reference to Fig. 2 will show that the needles are arranged in two rows, one behind the other.

The cross-head C′, carrying the puncturing-needles, is reciprocated by means of two upright hydraulic rams or engines C^2 C^3. The rods of the pistons or plungers of these rams C^2 C^3 extend downwardly through the bottoms of the cylinders. I have marked them *c*. One may be seen in Fig. 1. One may also be seen in Fig. 2. The latter figure shows that these rods are connected to the cross-head. The hydraulic rams or engines may be of any suitable form, and hence require no further description. The cross-head travels along guideways *c′*, as may be understood by reference to Figs. 1 and 2.

The puncturing-needles are moved downwardly after the compression of a bale to puncture it, and are then elevated out of the way. They are of such size as to leave comparatively large holes through the bale.

E′ E^2 designate tubes or chutes, which direct stays E to the holes produced in the bale by the puncturing-needles. There is one of these tubes or chutes for each of the puncturing-needles. It extends close to its needle and over a suspender-pocket D.

The stays E are shown as of U form, or as made similar in shape to ordinary staples. One is very clearly delineated in Fig. 5. These stays slide down through the tubes or chutes with their ends foremost, and are so directed by the pockets D as that their ends will drop into the two rows of holes punctured in the bale and protrude through the bale. The ends extend through the upper surface of the lower plate or platen, as may be seen in Fig. 2, for a purpose hereinafter to be explained.

It is important for the tubes or chutes to extend well over the pockets D, and in order that they may do so they are severally constructed in two sections *e′* e^2. The section *e′* is rigid and receives the stays from a magazine. The lower section e^2 is pivotally connected by a pin e^3 to a stationary portion of the frame of the machine. A spring e^4, fastened to this portion of the machine-frame below the pin e^3, bears against the lower part of the pivoted section e^2 and tends to throw or swing the same away from the portion of the machine-frame to which the spring is fastened, or, in other words, toward the corresponding section e^2 of the opposite tube or chute. When the puncturing-needle which coacts with any particular tube or chute E′ E^2 descends, it swings aside the pivoted section e^2 of that tube or chute and passes by the same into and through the corresponding pocket D. When this needle ascends above the lower part of the pivoted section e^2 of the corresponding tube or chute E′ E^2, the said pivoted section swings into its normal position, so as to project over the pocket. Then it can accurately deliver the stays into the pocket.

I have before alluded to magazines for feeding the tubes or chutes. I will now explain them.

F designates a bar, which extends outwardly at an upward incline from the fixed framing of the machine. It is of such a size that it may be straddled by the stays, the two limbs of each staple-like stay extending downwardly at the sides of the bar. There is one of these bars F for each tube or chute E′ E^2. One row of these bars F extends forwardly from the front of the fixed framing of the machine. Another row extends in the same manner rearwardly from the back of the machine. Each bar F has arranged above it an inclined bar F′. The bar F′ is sufficiently elevated above the bar F to allow of the transverse portion of the stays passing between the two bars. The inclination of each pair of bars is such that the staple-like stays will slide down the same by gravity. The spaces between the pairs of bars F F′ are at the inner or lower ends closed by gates F^2.

The gates are intermittingly opened to allow of the passage of the stays, one at a time, into the tubes or chutes. The gates F^2 are sector-shaped and are affixed to rock-shafts F^3. The rock-shafts may be oscillated to swing the gates across the spaces between the several pairs of bars F F′, or to swing them sufficiently far to bring notches *f*, with which their peripheral faces are provided, opposite the spaces between the pairs of bars. Normally the gates occupy such positions that their notches will be opposite these spaces. They are maintained normally in such position by weights *f′*, suspended from arms f^2, affixed to the rock-shafts. These weights rock the shafts, so as to elevate the gates until projections f^3 on the gates come into contact with stops f^4 on the fixed framing of the machine. But one stay can pass at a time from the space between the bars F F′ into the notch *f* of the opposite gate, because the surface of the bar F adjacent to the periphery of each gate fits so closely against the gate as to preclude a stay within the notch of the gate from passing out of the same until the gate shall have been oscillated downwardly far enough to bring its notch below the bar F. When this happens, the stay can drop out of the notch into the corresponding tube or chute.

The pairs of bars F F′ belonging to the several chutes E′ E^2, excepting only those for the two pairs of chutes E′ E^2 which are at the extreme right of the machine and for the two pairs of chutes E′ E^2 which are at the

extreme left of the machine, are provided only with gates F^2. Those two pairs of bars F F′ which are at the extreme sides of the machine are, however, provided additionally with gates F^4. The gates F^4 are affixed to sleeves f^6, mounted upon the rock-shafts F^3, so as to be capable of remaining at rest while the rock-shafts oscillate or of oscillating with or independently of the rock-shafts. These gates have arc-shaped faces abutting against the inner ends of the opposite bars F F′. While they remain opposite the spaces between the opposite bars F F′ none of the stays can pass into the notch of the adjacent gates F^2.

The purpose of the additional gates F^4 is to prevent the passage of any stays down through the tubes or chutes which are at the extreme sides of the two rows whenever a bale being treated is too narrow to require the use of stays supplied by these tubes or chutes. When the bale being treated is so wide as to require stays from the tubes or chutes at the extreme sides of the rows, it will automatically cause the additional gates F^4 to be oscillated, so as not to interfere with the feeding of the stays. I will describe means for accomplishing this automatic operation.

F^5 designates a U-shaped bar or yoke extended around the sides and lower surface of the upper plate B^2 of the press. It may be understood by reference to Fig. 2, where it will be seen that the upturned arms or ends of this bar extend upwardly adjacent to the front and back of the upper plate B^2. One of these bars is arranged opposite the pair of chutes $E' E^2$ at the extreme right. A second and similar bar is arranged opposite the next adjacent pair of chutes $E' E^2$. A third bar of the same kind is arranged opposite the pair of chutes $E' E^2$ which are at the extreme left of the machine. A fourth bar of this style is located opposite the next adjacent pair of chutes. Each bar F^5 is capable of a vertical movement, its upturned ends being guided by straps f^5 on the front and back of the upper plate B^2 of the press. The upper extremities of each bar F^5 coact with one end of a lever F^6, fulcrumed between the ends to a fixed portion of the machine and having fastened to the other end a rod F^7. Each of the additional gates F^4 has a sleeve f^6, which is independent of the sleeve of the other gates F^4; hence each gate F^4 can operate independently of every other gate. Each rod F^7 is connected to one of the sleeves f^6 of one of the gates F^4. The peripheral face of each gate F^4 has the lower portion f^7 cut away, so as not to touch the opposite bars F F′. A very short or slight oscillating movement of any gate F^4 will therefore be sufficient to cause it to permit the passage of the stays from the space between the bars.

The rods F^7 are connected to the sleeves f^6 on the gates F^4 by means of straps f^8, which extend from the upper ends of the rods, pass around a portion of the sleeves, and at the extremity are secured to the sleeves.

The gates F^4 are sufficiently heavy to descend into a position to block the spaces between the opposite bars F F′ whenever the corresponding bars F^5 are inoperative, by reason of the bale undergoing treatment being too narrow to affect them.

From the description which I have given of the gates F^4, the bars F^5, and the intermediate parts it will be obvious that whenever a bale is wide enough to extend under one of the bars F^5 the latter will be raised by the bale, will thereby effect the oscillation of the corresponding levers F^6, and, through the rods F^7, effect the oscillation of the corresponding gates F^4, so as to cause the latter to permit the escape of the stays from the opposite bars F F′. Whenever the gates F^2 coact with such opposite bars they will be oscillated to bring their notches *f* opposite the spaces between the bars.

I will now describe the means whereby the gates F^2 are oscillated to bring their notches opposite the spaces between the opposite pairs of bars F F′. This may be best understood by reference to Figs. 2 and 3. The rock-shafts F^3 have affixed to one end arms F^8, which, at the outer ends, are connected by rods F^9 with levers F^{10}, that extend over into such positions that the cross-head C′, carrying the puncturing-needles C, will, just before it finishes its ascent, oscillate the levers, and through the latter the rock-shafts F^3, in such direction as to cause the proper movement of the said gates F^2. It will be obvious, therefore, that the gates F^2 are operated each time the cross-head ascends, and hence after each puncturing of a bale, so as to cause them to permit the passage of a stay down through the chutes $E' E^2$, and thence through the pockets D into the holes punctured through the bale. I have represented the rods F^9 as severally made in two sections coupled together by a coupling-piece f^9. I thus provide a means for compensating for lost motion.

I will now recur to the pockets D. Their position may be well understood by reference to Figs. 1 and 2. Their construction, however, can be best appreciated by reference to Figs. 5, 6, 7, and 8. Each pocket has a head-piece *d*, made in the form of a rectangular tube flanged at the upper end. Its flange extends over the top of the upper plate B^2 of the press, and is thereby supported. Four plates of resilient metal $d' d^2 d^3 d^4$ are secured at their upper ends to the head-piece. The plates $d' d^3$ are opposite and the plates $d^2 d^4$ are opposite and intermediate the plates $d' d^2$ in the sense of extending between or across the side edges thereof. The plates $d' d^3$ are so arranged that one is substantially parallel with the front and the other substantially parallel with the back of the machine. These plates $d' d^3$ converge downwardly. At the lower extremities they have fastened to them plates $d^5 d^6$, which at their lower ends termi-

nate in hooks extending toward and meeting one another while these plates occupy their normal positions. These plates d^5 d^6 have journaled in them rollers d^7 d^8. These rollers are opposite one another and extend well into the pockets. These rollers facilitate the opening of the plates d^5 d^6 to permit the passage of the puncturing-needles C downwardly through the pockets. As the puncturing-needles descend they pass between the rollers d^7 d^8, and, being too large to pass through the space normally existing between these rollers, they force the rollers apart, and thereby separate the hooked lower extremities of the plates d^5 d^6. The rollers d^7 d^8 also serve to guide the stays as the latter descend through the pockets. When a stay drops into a pocket, its legs or limbs pass at the sides of the hooked lower extremities of the plates d^5 d^6, and its transverse portion hangs upon the hooks, as may be readily understood by reference to Figs. 5 and 6. The stays are released or drawn from between the jaws by grippers K, hereinafter mentioned.

The plates d^2 d^4 are shown as parallel while occupying their normal positions. They are provided above the rollers d^7 d^8 with guides d^9, serving to properly direct the descending stays. Near the lower extremity they are provided with rollers d^{10} d^{11}. These rollers, on the descent of a puncturing-needle through the pocket, will be forced apart, so as to make room for the needle. After the ascent of the needle the plates by resuming their normal positions bring the rollers d^{10} d^{11} into such close proximity that they will be able to properly guide a descending stay E onto the hooked lower extremities of the plates d^5 d^6.

The bale after compression will have one or more bands or metal straps H wound around it. The faces of the two plates B′ B² of the press are provided with opposite grooves which permit of the introduction of these bands while the bale is held compressed, and the hooked jaws within the pockets serve to hold the stays away from the bale or suspended till the metal strap is run through them. These bands are preferably applied by having one end inserted in the bale at one side. Then the band will be wound around the bale to the desired extent and the free end inserted between a pair of pulling or gripping rollers I. There are several pairs of these gripping-rollers. One pair is supplied for each band which is to be wound upon the bale. It will be seen that some of the gripping-rollers are at the front and some at the back of the lower plate or platen B′ of the press. After the insertion of the free end of a band between two rollers of a pair the rollers will grip it and draw it between them, thus drawing up the band tightly upon the bale. One of the rollers of each pair is adapted to yield away from the other, as may be best understood by reference to Fig. 10. It is held toward the other roller by means of springs i acting upon the bearings, which are fitted in housings. The means shown for supporting the pairs of rollers are brackets i', supporting bearing-pieces. The lower rollers of the several pairs are the ones which have provision for yielding. All these lower rollers which are at the front of the machine are supported upon two shafts in line. This is equally true of all the lower rollers which are arranged at the rear of the machine. Each of the shafts supporting the lower rollers is composed of a number of sections. These sections are connected by universal joints, as may be best understood by reference to Fig. 11. The several rollers carried by and driven through the same shaft may therefore yield at different parts to permit of the independent yielding of any particular roller. The upper rollers are supported upon rigid shafts. These rigid shafts are at the ends provided with gear-wheels i^2, meshing with corresponding gear-wheels on the adjacent ends of the sectional shafts carrying the lower rollers. The upper shaft has motion transmitted to it by a shaft i^3, which is connected by universal couplings with said shaft and also with a driving-shaft i^4, so that regardless of the position of the platen the shaft i^3 may transmit motion as desired. The driving-shaft i^4 is shown as driven by a belt i^5 from another shaft i^6. After the pairs of rollers I have drawn up the bands tightly upon the bale the ends of the bands are cut off.

J designates two rods depending from the upper plate B². As the upper plate B² is stationary, these rods, when arranged as shown, will be stationary. They extend down between two guide-brackets J′, carried by the lower plate or platen B′. As the latter travels up and down, its brackets J′ sustain the rods J against outward movement.

J² designates toes or arms pivotally connected to bars J³. One of the bars J³ is at the front and the other at the rear of the platen. Each bar J³ is capable of longitudinal movement. It is secured to the platen by screws or pins j', passing through slots j. These pins or screws will preferably have friction-rollers fitted to them within the slots. The toes J² impinge against the adjacent faces of the rods J. They are held in contact with the rods by springs j^3. The rods J have inwardly-turned lower ends. On the descent of the platen the toes J² come in contact with the inwardly-turned lower ends of the rods J. After they engage therewith the continued downward movement of the platen causes the toes to be forced bodily in a horizontal direction. The toes then impart a reciprocating or horizontal movement to the bars J³. The bars J³ carry cutters J⁴. When the bars J³ are reciprocated in the manner described, the cutters J⁴ are made to coact with cutters J⁵, which are not capable of any movement independently of the platen. The ends of the bands will thus be cut off or

sheared. There is a spring J^6 for moving each bar J^3 in the reverse direction when the platen rises.

I have before explained that the stays E, after their introduction into a compressed and punctured bale, will extend through the bale and below the top surface of the lower plate or platen B′ of the press.

K designates grippers, which take hold of the lower ends of the stays. These grippers are located in the platen. They are capable of moving downwardly and turning after gripping the ends of the stays, in order that they may pull down the stays from the hooked jaws, and, after pulling them tight, twist their ends to secure them. This gripping and twisting mechanism is no part of my invention, and hence I will not further describe it, as it, with other parts of the machine which I have described, will be made the subject of another application by the inventor thereof.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with reciprocating needles and a chute, a magazine consisting of an inclined slideway comprising bars placed one above the other and an oscillating gate, substantially as specified.

2. A magazine comprising an inclined slideway and an oscillating gate, combined with a chute and a reciprocating cross-head connected to the gate and carrying needles, substantially as specified.

3. The combination of an inclined slideway comprising two bars arranged one above the other, a gate oscillating across the ends of the bars, a stop for limiting the oscillation of the gate in one direction, a weight for oscillating the gate as far as permitted by the stop, and a reciprocating cross-head connected to oscillate the gate in the reverse direction, substantially as specified.

4. A magazine comprising an inclined slideway, an oscillating gate, a bar arranged to be moved by a bale, connections between the bar and the gate, and compressing-platens, substantially as specified.

5. The combination, with a magazine, of a tube or chute provided with a pivoted section, and a suspender-pocket below the pivoted section having flexible sides, substantially as specified.

6. The combination, with a magazine, of a tube composed of two sections, the lower of which is pivoted to the frame, a spring for moving the pivoted section, and a suspender-pocket below the pivoted section having flexible sides, substantially as specified.

7. The combination, with a magazine, of a tube or chute having a pivoted section, a reciprocating puncturing-needle traveling in the line of the lower end of the said section, and a suspender-pocket having flexible sides below the pivoted section, substantially as specified.

8. The combination, with a reciprocating puncturing-needle and a tube or chute, of a suspender-pocket having flexible sides, rollers in said flexible sides, and hook-shaped lower extremities, substantially as specified.

9. The combination, in a press, of a fixed upper plate, a reciprocating lower plate or platen, a reciprocating puncturing-needle, a tube or chute for feeding a stay, and a suspender-pocket having flexible sides, substantially as specified.

10. The combination, with a pocket having flexible sides, of rollers arranged upon the flexible sides and a reciprocating puncturing-needle, substantially as specified.

11. In a press, the combination, with the platen, of pairs of rollers, the lower of which are mounted upon a jointed shaft, so as to be capable of yielding independently, substantially as specified.

12. In a press, the combination, with the platen, of band-pulling rollers carried by the platen, a stationary driving-shaft for the rollers, and a shaft connected to the pulling-rollers and to the driving-shaft by universal joints, so as to compensate for the rising and falling of the platen, substantially as specified.

13. In a press, the combination, with the platen, of band-pulling rollers and shears on a reciprocating bar, substantially as specified.

14. In a press, the combination, with the platen, of a fixed bar having laterally-turned ends, toes bearing against the said bar, stationary shear-blades, and a reciprocating bar attached to the toes and carrying shears, substantially as specified.

JESSE I. BOYER.

Witnesses:
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