

(No Model.)

5 Sheets—Sheet 1.

H. A. HOUSE.
PAPER BOX MACHINE.

No. 414,840.

Patented Nov. 12, 1889.

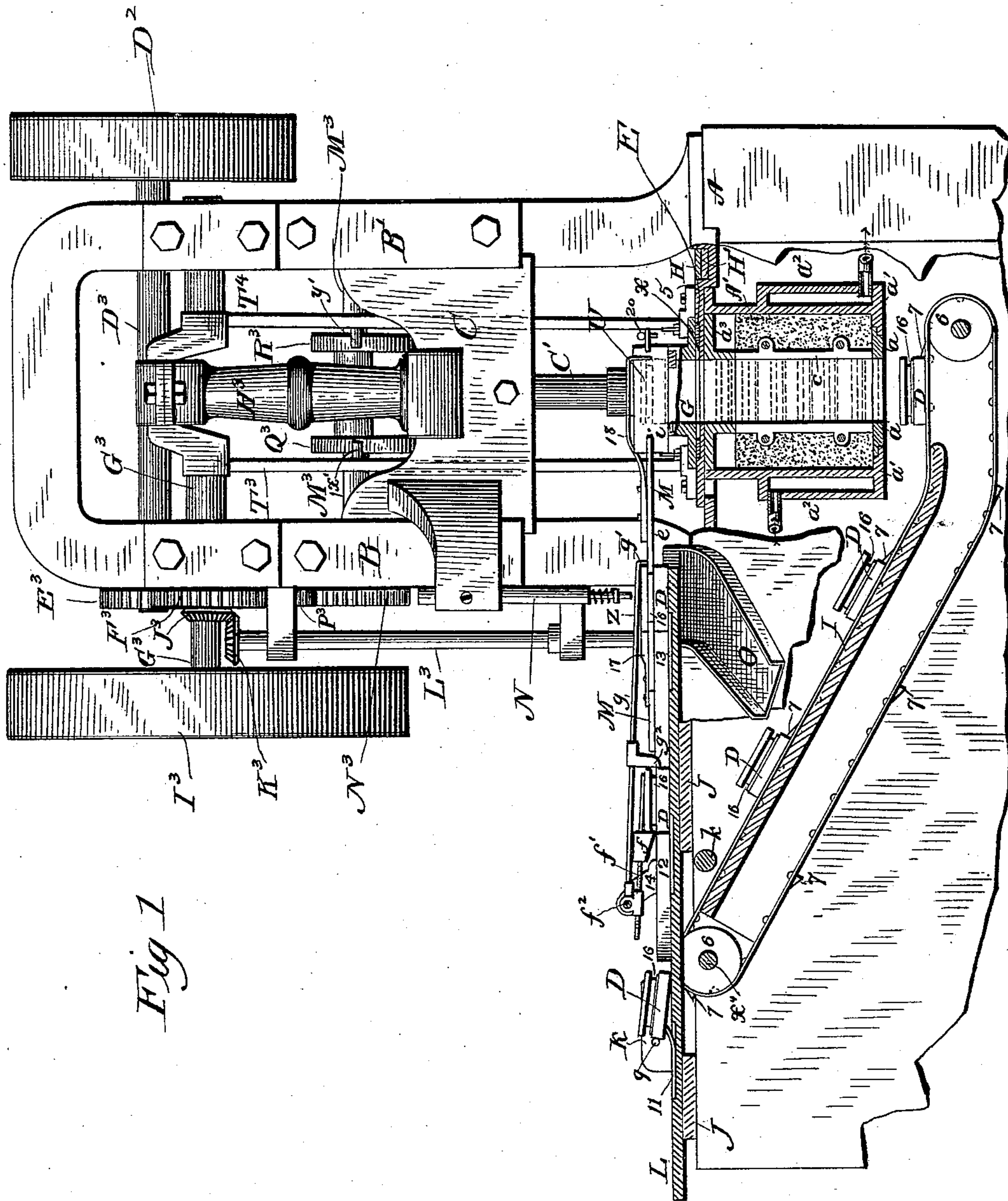


Fig 1

Witnesses:

John S. Finkle
S. Williamson

Inventor,
Henry A. House

By, F. W. Smith Jr.

Atty.

(No Model.)

5 Sheets—Sheet 2.

H. A. HOUSE.
PAPER BOX MACHINE.

No. 414,840.

Patented Nov. 12, 1889.

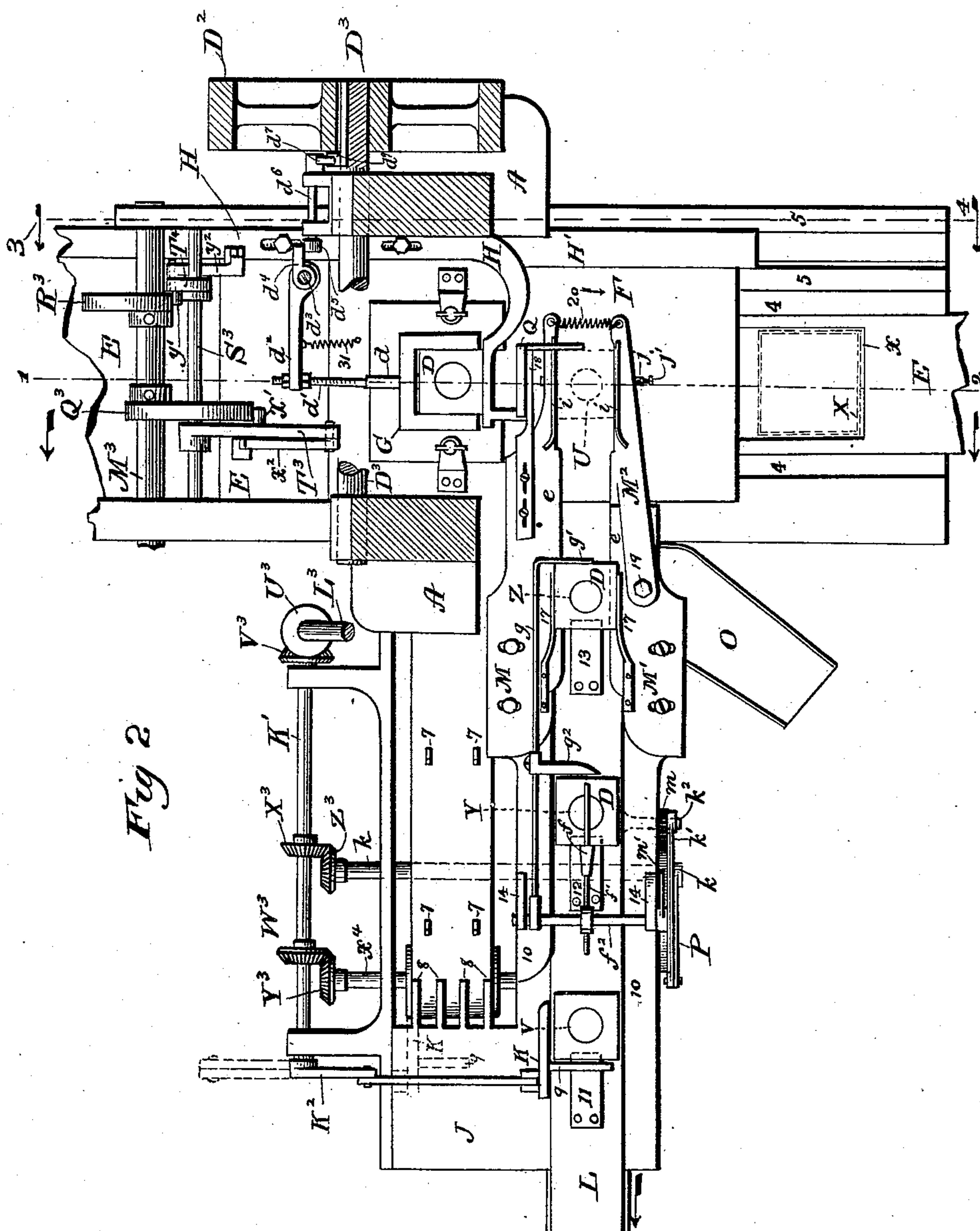


Fig 2

Witnesses:
Geo. S. Finch.
S. Williamson.

Inventor,
Henry A. House.
By *F. O. Smith.*
Atty.

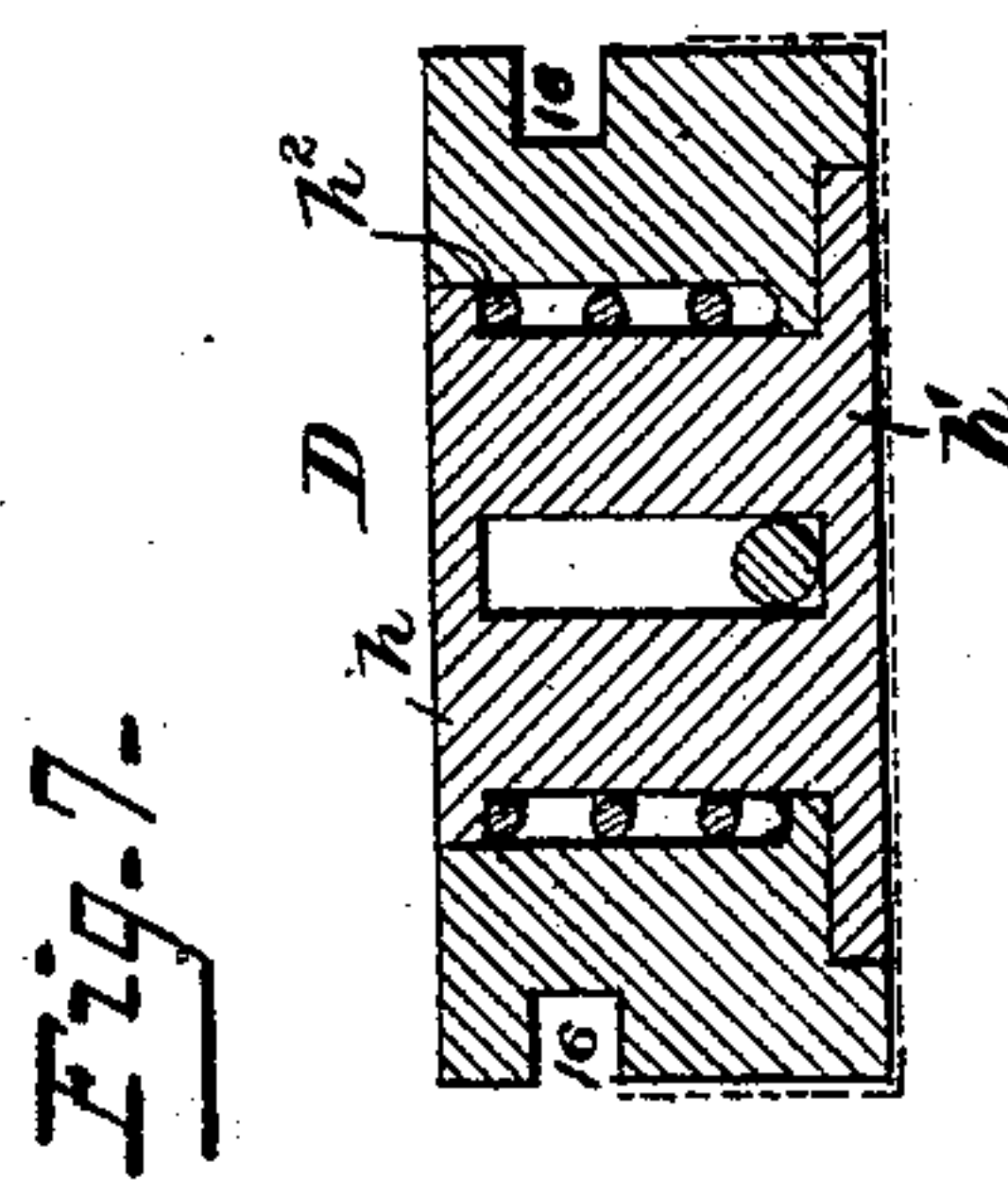
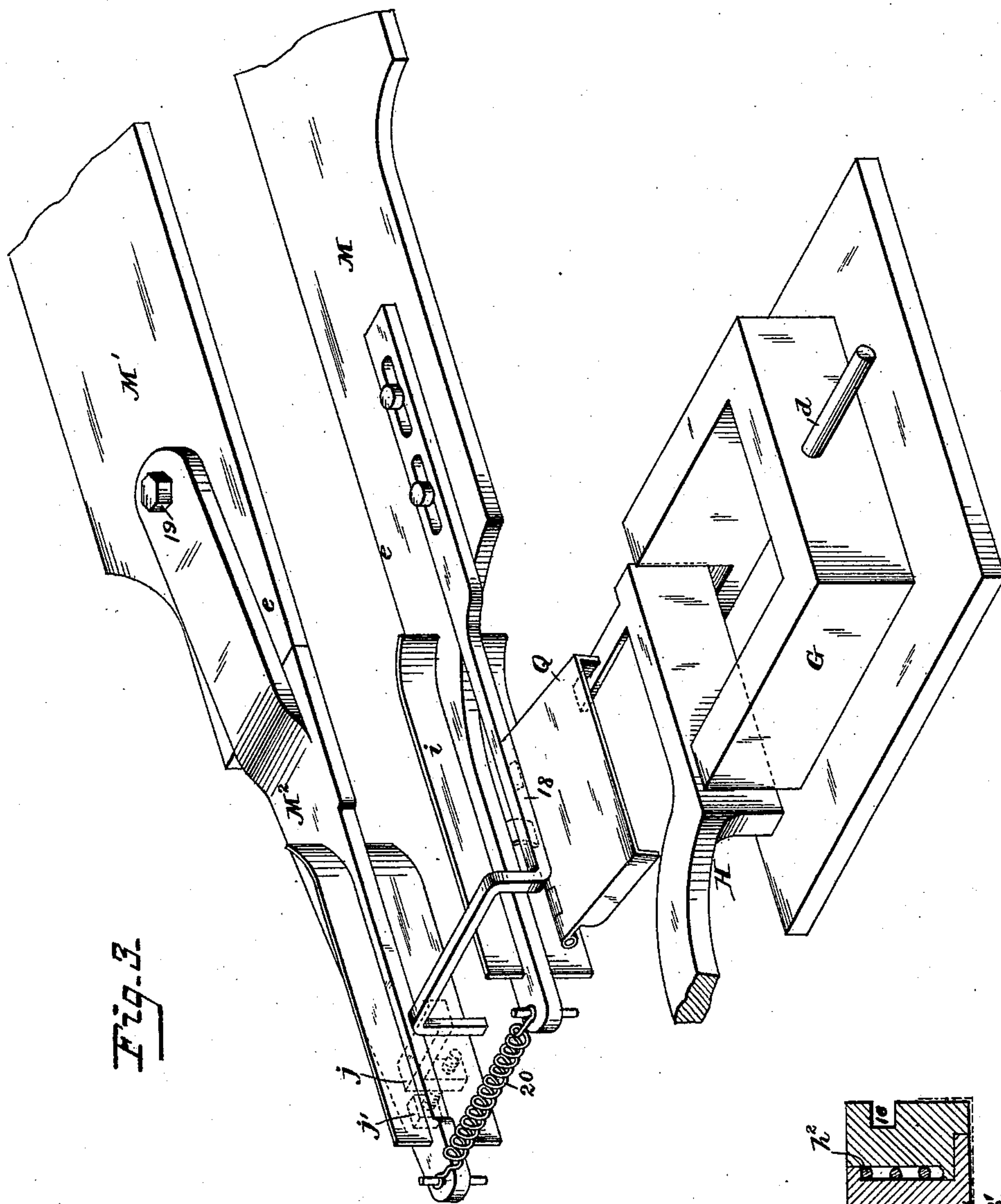
(No Model.)

5 Sheets—Sheet 3.

H. A. HOUSE.
PAPER BOX MACHINE.

No. 414,840.

Patented Nov. 12, 1889.



Attest:-
Court. O. Cooper.
H. E. J. Hansmann.

Inventor:-
H. A. Gause,
By Foster, & Freeman
Attys.

(No Model.)

5 Sheets—Sheet 4.

H. A. HOUSE.
PAPER BOX MACHINE.

No. 414,840.

Patented Nov. 12, 1889.

Fig. 4.

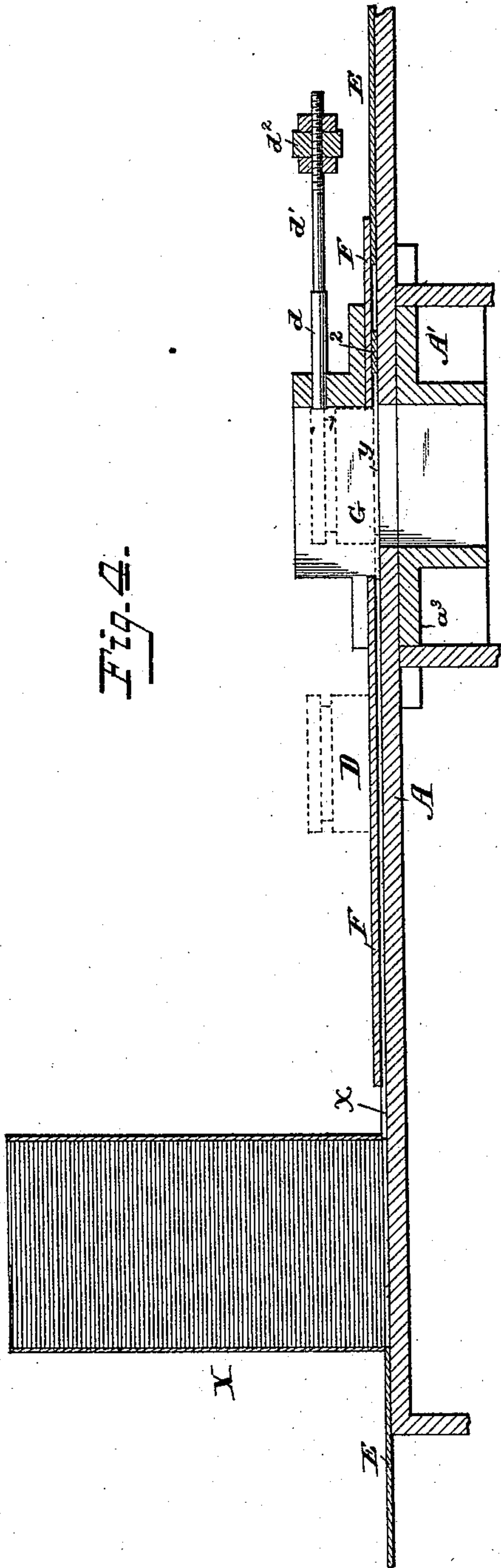


Fig. 6.

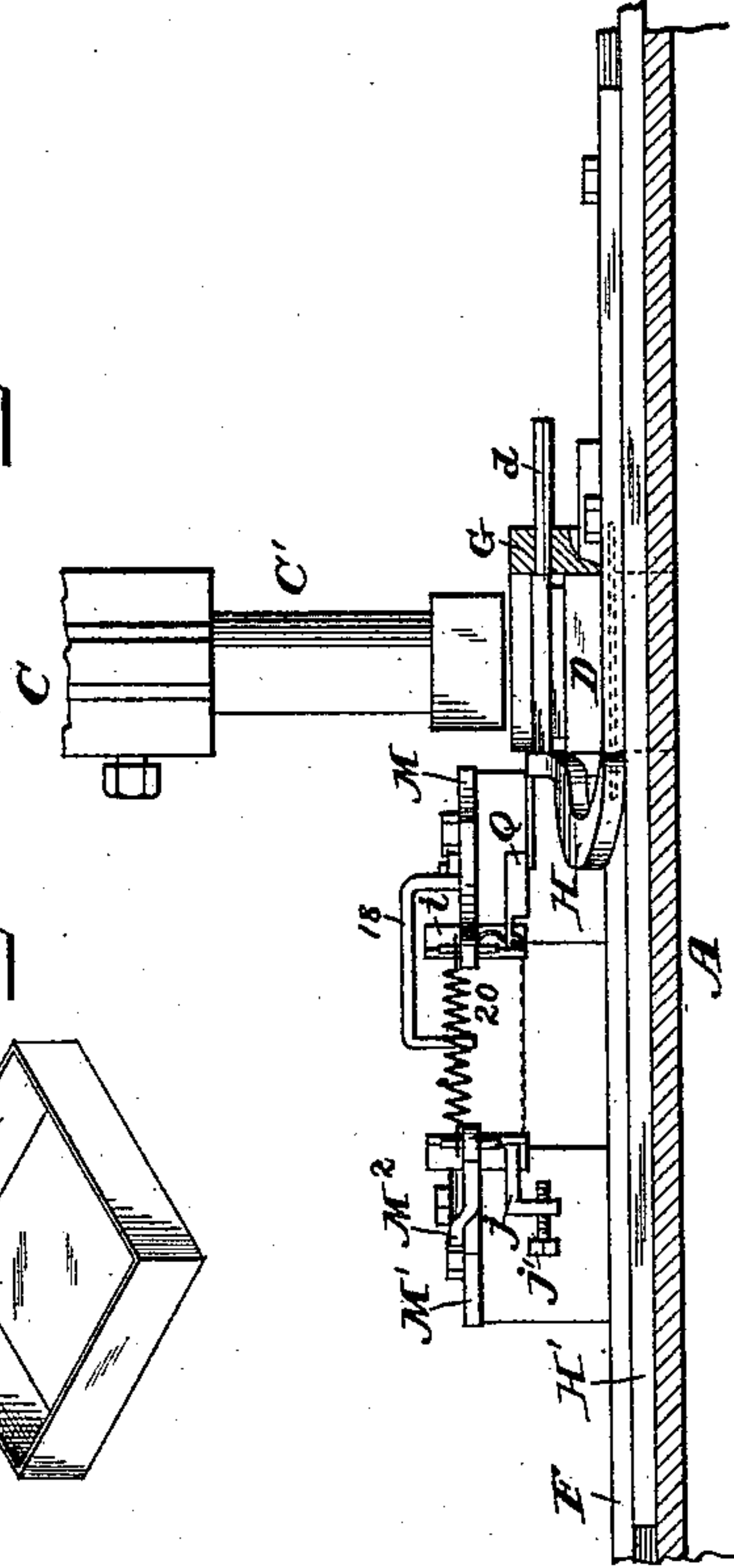


Fig. 8.

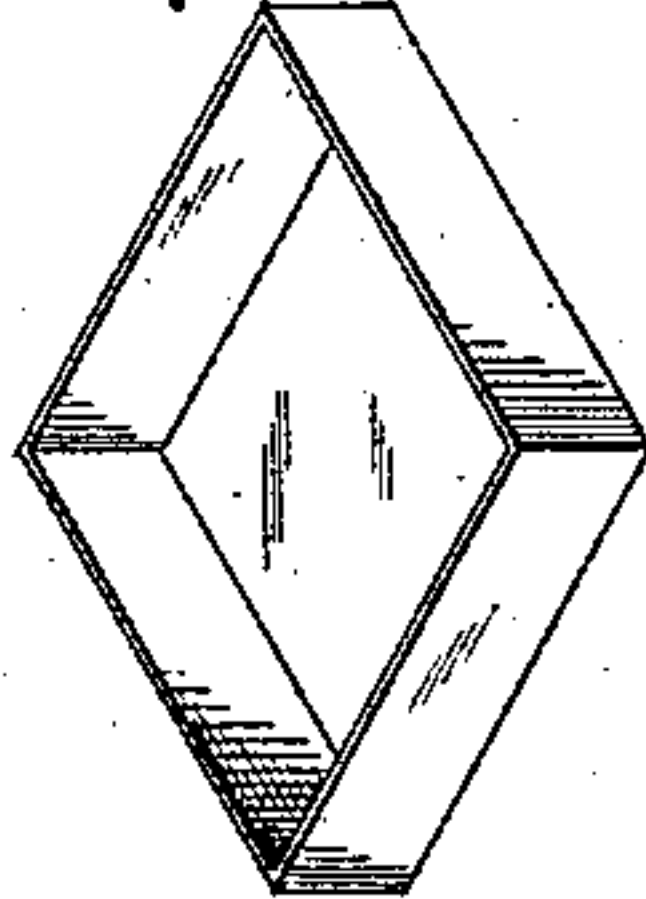
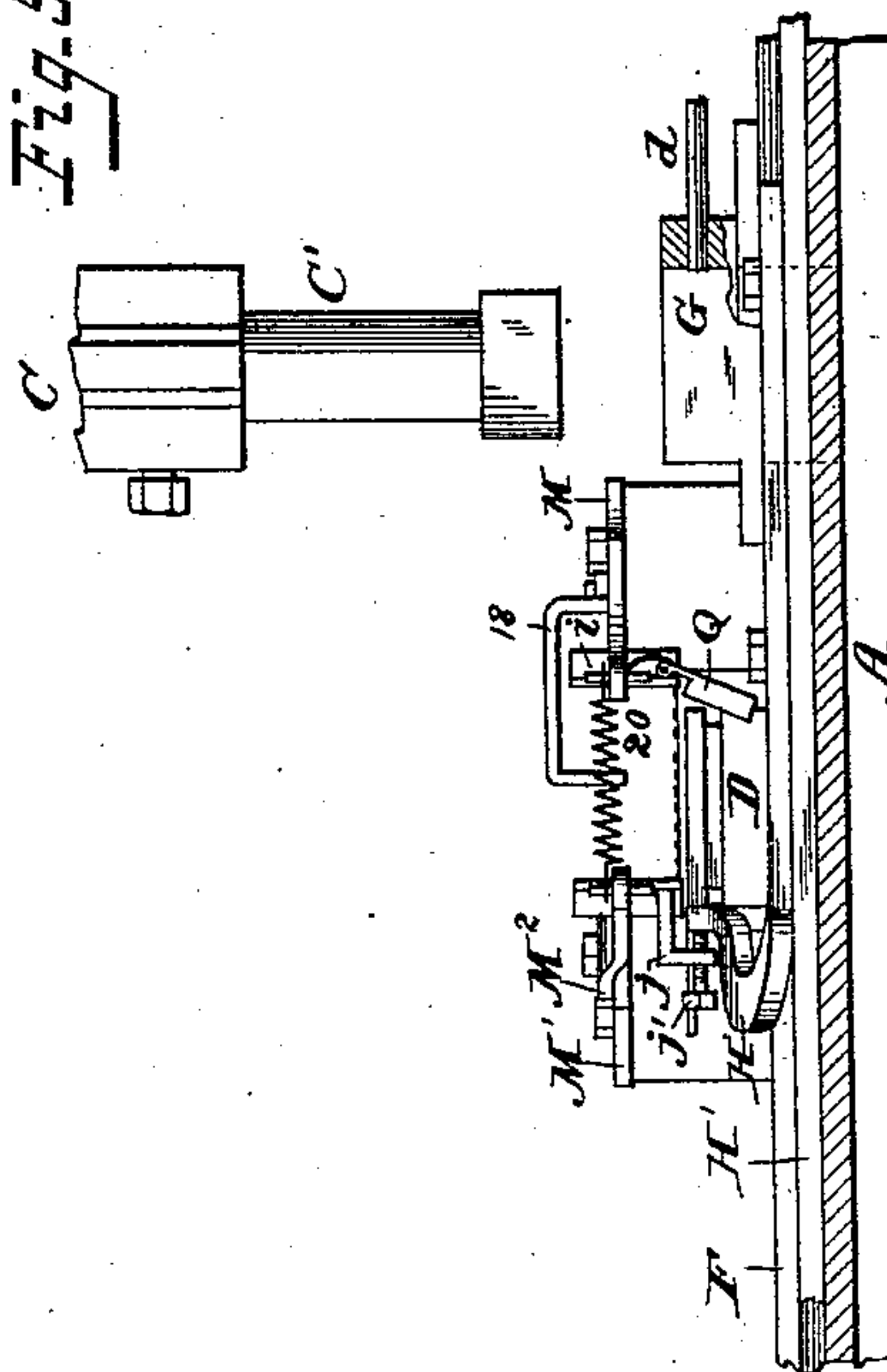


Fig. 5.



Attest:
Court. A. Cooper.
H. E. Tansmann.

Inventor:
H. A. House
By Foster & Freeman
attys.

(No Model.)

5 Sheets—Sheet 5.

H. A. HOUSE.
PAPER BOX MACHINE.

No. 414,840.

Patented Nov. 12, 1889.

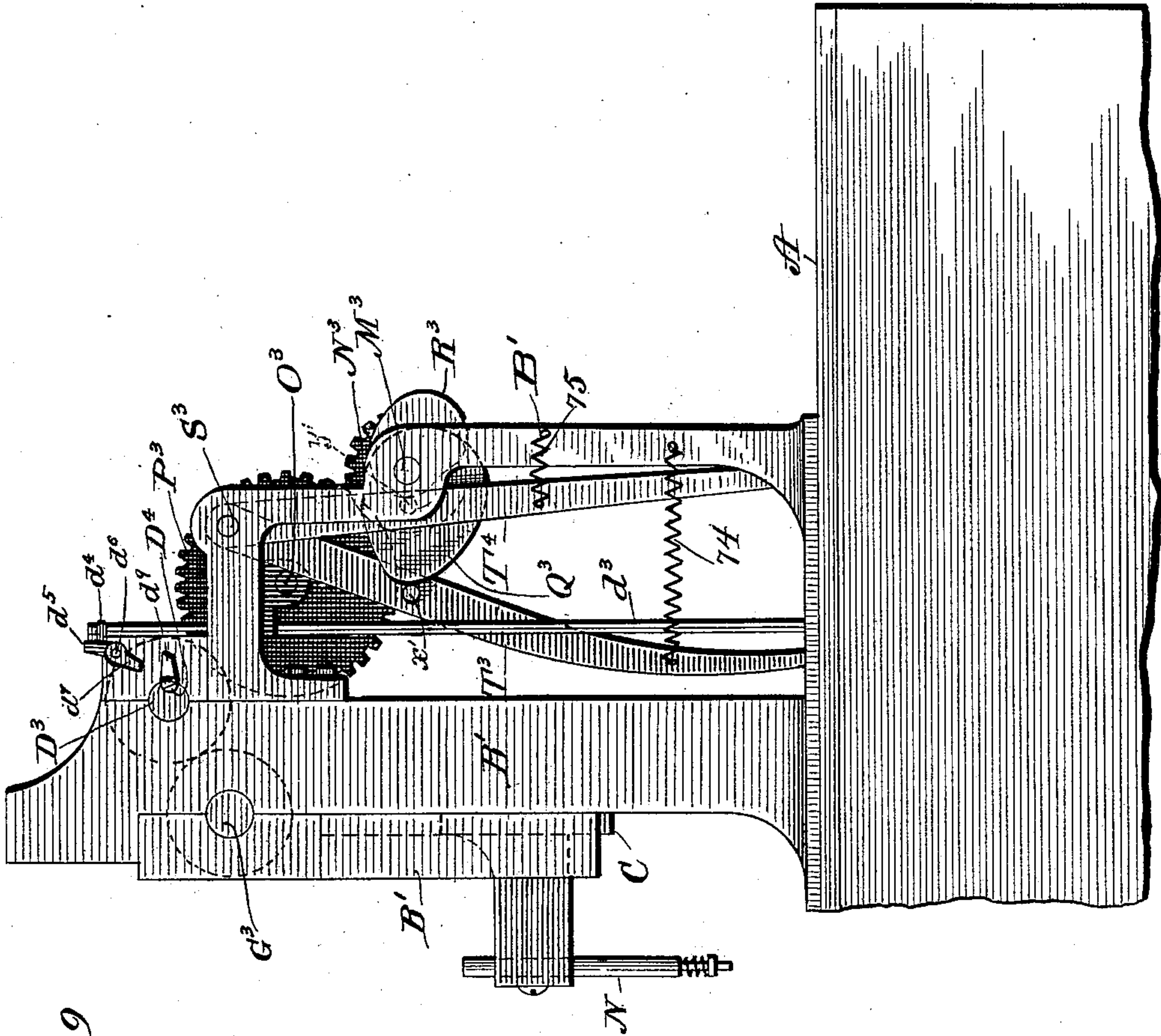


Fig 9

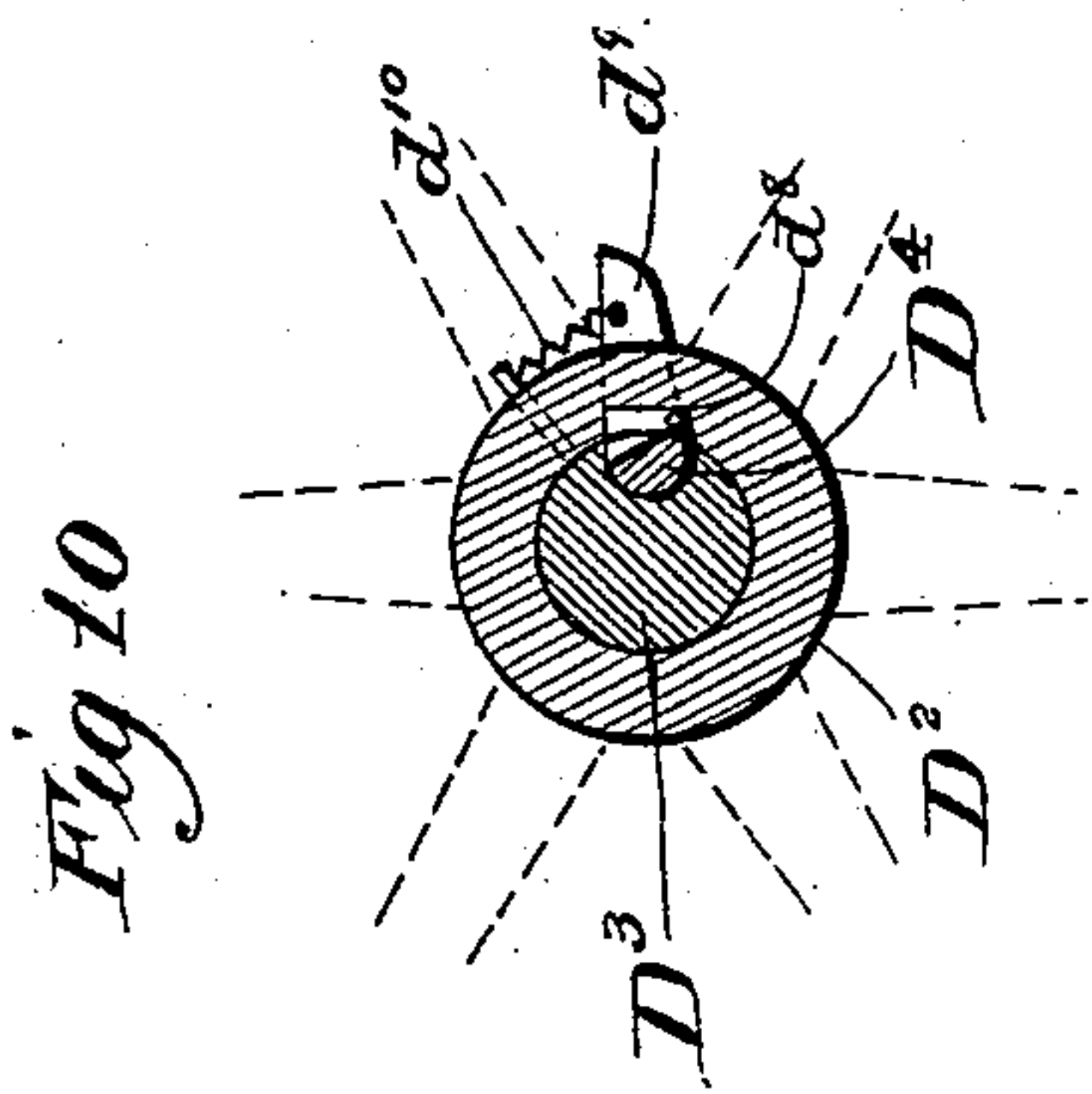


Fig 10

Witnesses:
Jno. S. Finck
S. Williamson.

Inventor:
Henry A. House
By F. W. Smith Jr.
Atty.

UNITED STATES PATENT OFFICE.

HENRY A. HOUSE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE COMPRESSED PAPER BOX COMPANY, OF SAME PLACE.

PAPER-BOX MACHINE.

SPECIFICATION forming part of Letters Patent No. 414,840, dated November 12, 1889.

Application filed December 21, 1883. Serial No. 115,294. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. HOUSE, of Bridgeport, Fairfield county, Connecticut, have invented certain Improvements in Paper-Box Machines, of which the following is the specification.

This invention relates to the manufacture of boxes or parts of boxes from blanks of paper or other suitable material; and it consists of apparatus fully described hereinafter, and then particularly defined by the claims, for drawing the blanks into form, for carrying the blanks, stripping them from the dies, and presenting the latter properly to the blanks.

In the drawings, Figure 1 is an elevation, in part section, of a machine embodying my improvements. Fig. 2 is a plan with the upper portion of the machine—such as the plungers for operating the formers and the guides for said plungers—removed. Fig. 3 is a perspective view showing devices for guiding and delivering the formers. Fig. 4 is a section on the line 1 2, Fig. 2. Fig. 5 is a section elevation taken on the line 3 4, Fig. 2, looking toward the die feeding and guiding appliances. Fig. 6 is the same as Fig. 5, showing the parts in different positions. Fig. 7 is a former in section on an enlarged scale. Fig. 8 is a perspective view, on an enlarged scale, of one form of box made by this machine; Fig. 9, an end elevation, and Fig. 10 a detail, of the driving-hub, showing particularly the stop.

The machine as illustrated in the drawings is designed to draw up or form blanks of paper or other material upon blocks or formers forced through a die of corresponding shape and carrying between them the blanks, the projecting edges of which are turned up against the formers to constitute the flanges as said formers pass through the die. The full description of this operation will be found in Letters Patent No. 206,686, issued to me November 5, 1878, and need not be here repeated.

The main object of the present invention is to deposit the formers properly upon the blanks, and to then move the blanks and formers through the die, rake off the boxes, and again deposit the formers upon other blanks, continuing such operation automati-

cally. For such purpose I employ a machine in which is a blank-carrier, a device for depositing the formers successively upon the blanks, a plunger for forcing the formers through the die, a conveyer for carrying the formers from the die, and a feeder for carrying the formers to the depositor, and a discharger, whereby the flanged boxes are stripped from the formers. I have embodied these several devices and appliances in machines differently constructed, and have used such devices and appliances constructed in different ways, and will now describe in detail one form of machine which I have found most effective.

The frame of the machine is illustrated sufficiently to show the arrangement of essential working parts thereon, and supports a table A, guides B B', between which slides a head C, carrying a plunger C', and a holder or tubular die A', open at both ends, the upper end or mouth being level with the face of the table. The die and plunger conform to the shape of the former D, a series of which are used, said formers corresponding in shape to the boxes to be made. Each former has grooves 16 at the sides, and a central stripping-plug h, terminating in a disk h' at the lower end, both fitting corresponding recesses in the former, and a spring h² serves to keep the parts normally in the position shown in Fig. 7.

To permit ready alteration of parts, as different styles of boxes are to be made, the plunger C' is screwed detachably in the head, the die has a removable center tube c, bearing upon a bottom piece a, which rests upon a flange a' of the outer casing a² of the die; and it may be here stated that the outer casing a² is hollow to permit the passage of a current of steam or hot water. The upper die-plate a³ has a central flanged opening, is removable, and rests upon the tube c, which latter consists of two or more sections bolted together to facilitate construction. The openings in the plates a a³ and in the tube c will correspond to the forms of the former, these parts being of course changed with every change of form or dimensions in the boxes to be made. The space between the tube c and outer casing is filled with shot, pebbles, or

other granulated material, constituting a mass which will retain the heat, while permitting a ready change of the parts.

In making the boxes a blank is brought
5 above the mouth of the die, a former is deposited upon the blank, the plunger then descends and pushes down the former until its upper face is level with the table. Another
10 blank and former are then brought into position and forced downward by the plunger, and so on, one former forcing another through the die. The blanks are rectangular, as shown in Fig. 2 in dotted lines, and are held in a
15 tube X above the face of the table A, (see Fig. 5,) and a plate E slides back and forth in guides 4 4, Fig. 2, upon the face of the table, and has an opening or slot α , which is successively brought beneath the tube X, so
20 as to receive the lowest blanks, and then above the mouth of the die A' a stop 2, arresting the blank γ (dotted lines Fig. 4) in its upper position. A plate F extends between the tube X and the mouth of the die, partly covering the sliding plate E, and serves
25 as a rest for the formers successively deposited thereon, each former being then (as or after the blank is carried above the mouth of the die) slid into position upon the blanks, a rectangular guard G open at the front side
30 receiving the former and guiding and holding it in proper position until the plunger descends. The guard G of course corresponds to the shape of the former, and is therefore detachably secured in its position above the
35 plate F.

The formers are delivered in proper position upon the plate F by devices hereinafter described, and are moved over the plate into the guard by a reciprocating arm H, secured
40 to a slide H', which is reciprocated by hereinafter-described devices between guides 5 5 upon the face of the table, the arm H being carried to a forward position, the former then being deposited upon the plate F, and
45 the arm H then moving back until in contact with the guard G, thereby carrying the former into said guard.

To prevent any injuries should the plunger descend when the former is not in the proper
50 position, I use a stopping device, (see Figs. 2, 9, and 10,) whereby the operation of the machine is suspended, unless the former is carried to such a position as to move outward a pin d to a predetermined extent. As shown,
55 the pin bears upon a rod d' , carried by an arm d^2 upon a shaft d^3 , which has secured to its upper extremity a short arm d^4 . This latter arm bears against a similar short arm d^5 on the shaft d^6 , which carries a trip-dog d^7 on its outer end. The drive-wheel D² is jour-
60 naled loosely upon the shaft D³, and but for the clutch D⁴ would revolve independently of said shaft. The clutch D⁴ is a semicircular rod fitting in a corresponding groove in the shaft D³, and when locking the wheel one of
65 its corners projects within a notch d^8 in the hub of said wheel.

d^9 is an arm extending outward from the clutch-rod and held in its normal position by a spring d^{10} . Now, as the trip-dog d^7 in its
70 normal position is within the field of rotation of the arm d^9 , it is obvious that unless said dog be removed without said field it will trip the clutch, thereby stopping the shaft and consequently all the operating mechanism of
75 the machine, while the driving-wheel is left free to revolve. By the formers D coming to their proper position relatively to the plunger the above-described mechanism is operated and the trip-dog thrown without the field of
80 the clutch-arm during every revolution of the latter just before it reaches said dog. Thus the machine continues to operate. As each former with the box molded thereon drops from the lower end of the die A', it falls upon
85 a belt-carrier I, passing around guide-pulleys 6 and extending in an inclined position, so as to deliver the formers upon the platform J, the carrier being provided with stops or lugs 7, arranged to pass between fingers 8, ex-
90 tending from the platform J, so that the formers will slide over said fingers to the platform as the lugs move between the fingers and descend in passing around the upper pulley. Each former as it passes onto
95 the platform strikes a pin 9, projecting from a slide K, which is reciprocated by a rotary shaft K' and pitman K², so as to carry the former forward as soon as it is delivered by the carrier I to a position designated
100 by the letter V upon a plate L, which slides back and forth between guides 10 10, and is recessed in the upper face to receive spring-tongues 11 12 13. As the plate L is carried
105 to its extreme left position in the direction of the arrows, Fig. 2, it slides beneath the former D, held stationary by the pin 9, until the end of the tongue 11 passes out from beneath the former and bears against the side thereof.
110 The plate L then slides to the right until the former is in the position shown at Y, when the plate again slides back to the left beneath another former deposited thereon in the position V, the former at the point Y being held
115 in position by contact with a stop f upon an arm f' , extending from a shaft f^2 , rocking in bearings 14. As the plate L moves to the left, the tongue 12 springs up, and when the plate is carried to the right the end of the tongue,
120 striking the former at the position Y, carries it farther to the right until it strikes the bent end g' of an arm g , extending from the shaft f^2 , being then in the position Z. As the former approaches the position Z, the grooves
125 receive the guide-edges $e e$ of two plates M M', secured a short distance above and parallel to the platform J and extending forward over the plate F upon the table A. The former is prevented from moving to the left after it
130 reaches the position Z by pressure of spring-clamps 17 17, secured to the plates M M' and receiving the former between them, so that the former remains in place while the plate L passes wholly from beneath it, when a plun-

ger N, carried by the head C, will descend, and, striking the plug *h*, will force the box from the former into a chute O, which will conduct it to a suitable receptacle. When the plate L again moves to the right, there will be three formers in position above it at the points V Y Z, (indicated in the foregoing description,) and each will be moved one stage to the right, the end of the tongue 13 striking the former at Z and carrying it to a position U, over the plate F, in line with the mouth of the die A', a position which is defined by a stop-arm 18, secured to the plate M. The outer section M² of the plate M' is pivoted at 19 to the said plate, and a spring 20 tends to draw the section near the end of the plate M, so as to hold the former in position, the guide-edge *e* being reduced upon the section M² and entirely removed at the opposite point upon the plate M, where a vertical plate *i* serves as a bearing, against which the former is clamped by the action of the spring 20. There is also a vertical blade *i* upon the section M². The section M² is provided with an arm *j*, which extends downward and carries a screw-pin *j'*, so that as the arm H moves to its extreme forward position it will strike the said screw-pin, swing the section M² away from the plate M, and allow the former to drop upon the plate F, over which it will be slid into the guard G as the arm H is carried backward. The plate L is reciprocated by the revolution of a crank P, carried upon a shaft *k* at its lower end, and connected by a pitman *k'* to a stud *k*², extending from the plate L. It will be seen that the operation of the plate L and its tongue results in carrying each former by three successive stages from the position V, in which it is left by the finger 9, to the proper position U above the plate F, another former being carried upon the plate L by the slide K as that previously deposited is moved forward one stage. A stop-finger *g*² may be carried by the arm *g* to define the forward position of the formers at the point Y, and the arm *g* is lifted to carry the stops *g'* *g*² out of the way at the proper intervals by a cam *m*, having lugs which are brought in contact with an arm *m'* upon the shaft *f*².

To prevent the turning or misplacement of the formers after they are placed upon the table, I sometimes use a swinging guide Q with side flanges, which yield as the former passes beneath it, the side flanges directing the former as it moves onward.

I will now describe suitable mechanism for reciprocating the head C, plunger N, slides E and H, and for turning the cam *m* and pulleys 6 6. The shaft D³ is journaled in the uprights B B', and the driving-wheel D² is loosely mounted on said shaft, as before explained. On the other end of this shaft is a cog E³, which meshes with a cog F³ on the shaft G³ of the eccentric plunger-rod H³. This shaft G³ is journaled in the uprights B B', and has on the extreme inner end a balance-wheel I³, and immediately beyond the cog F³ a beveled

gear-wheel J³, which latter meshes with a beveled gear K³, secured at the end of an upright shaft L³, journaled in bearings supported by the upright B.

The construction and operation of the eccentric plunger-rod H³, which is pivotally connected to the sliding head C, is very ordinary, and is the same as in the usual power-press.

M³ is a shaft, journaled between the uprights B B' and having on the inner end a cog N³. Journaled on a short shaft O³, extending from the upright B, is an intermediate cog P³, meshing, respectively, with the cogs F³ N³, so that it will be readily understood that motion is communicated to the shaft M³ from the power-shaft D³.

Mounted on the shaft M³ are two cams Q³ R³, and pivotally hung on a cross-rod S³, extending between the uprights B B', are rods T³ T⁴, which latter have pins *x'* *y'* projecting across and against the edges of said cams. The lower ends of these rods are connected to the slides E H by pitmen *x*² *y*², pivoted, respectively, to said slides and rods, so that it will be clearly seen that the swinging of said rods to and fro will cause the reciprocation of the slides. As the cams Q³ R³ revolve, they will act directly against the pins *x'* *y'*, thereby effecting the swinging of the rods T³ T⁴. The return movement of said rods T³ T⁴ is accomplished by means of coil-springs 74 75, which are secured at their ends, respectively, to the said rods and the upright B'. The proper timing of the reciprocation of the head C and the operation of the slides E H is of course a matter easily effected by the diameters of the several cog-wheels. The lower end of the shaft L³ is provided with a beveled gear U³, which meshes with a similar gear V³ on the end of the shaft K', thereby imparting motion to the latter. On this shaft K' are also beveled gears W³ X³, which mesh, respectively, with similar gears Y³ Z³ on the ends of the shafts *x* and *k*, thus giving rotation to the pulleys 6 and the crank P, for the purpose hereinafter explained. The plunger, being carried by the head C, will reciprocate with the latter and force the plug from the former, as heretofore set forth.

I do not limit myself to the precise construction of parts set forth for carrying the formers, as they may be varied without departing from the main features of my invention. For instance, the formers may be pushed forward from a plate upon which they are successively dropped, the movement of one shoving forward the others in contact with each other, and sliding upon a way inclined and curved to carry them to the proper positions below the discharger N and above the plate F. I have also used other appliances for this purpose. Other appliances may also be used for carrying the blanks successively over the die, or the plunger may carry a knife, which cuts off the blanks successively from a strip fed over the die.

I claim—

1. The combination of a die A', a reciprocating plunger, devices, substantially as described, whereby blanks and formers are brought successively over the die, conveyers
5 whereby the formers are carried from beneath the die to the upper end thereof, and a discharger for stripping the boxes from the formers, as and for the purpose set forth.

2. The combination, in a machine for making flanged articles, of a die open at both
10 ends, a feeder whereby the blanks are fed to one end of the die, and a series of formers and devices, substantially as described, whereby the formers are placed successfully upon the
15 blanks, and a plunger for forcing the blanks into the die, as and for the purpose set forth.

3. The combination, with the die and blank and former feeding devices, substantially as described, of a guard arranged to define the position of the formers, and a pin
20 in said guard connected with the driving mechanism of the machine to arrest the motion of the machine when the former is out of position, as set forth.

4. The combination, with the die and blank and former feeding devices, substantially as described, of a guard G, arranged to define the position of the formers, substantially as set forth.

5. The combination of the table, die, blank-feeder, device, substantially as described, for conveying the formers from the lower end of the die to the top of the table, and reciprocating arm H, whereby the formers are carried from the point where they are deposited
35 to the mouth of the die, substantially as set forth.

6. The combination of the die, its plunger, guard, blank-feed plate, plate F, and former-blocks, substantially as set forth.

7. The combination, with the die and its plunger, of a conveyer, whereby the formers are elevated, and feed devices, substantially as described, whereby they are carried from
45 the conveyer to the top of the die, and stripping-plunger N, substantially as and for the purpose set forth.

8. The combination, with the conveyer I, of a reciprocating plate L, guides for guiding the formers above said plate, and reciprocating slide K, substantially as set forth.

9. The combination of the conveyer, its stops 7, platform J, and fingers 8, substantially as set forth.

10. The combination of the guides, stops, 55 and reciprocating plate L, provided with tongues, substantially as set forth.

11. The combination, with the formers having side grooves, of guides adapted to said grooves, and appliances, substantially as described, for separating the guides to drop
60 the formers at the desired point, as set forth.

12. The combination, with feed guides and formers, of a stripping device, substantially as described, for removing the boxes from the
65 formers, as and for the purpose set forth.

13. The combination, with the table, die, blank and former feeding devices, substantially as described, and guides M M', extending over the table and adapted to direct the
70 formers to their position above the table, as and for the purpose set forth.

14. The die provided with an outer steam-heated casing and inner detachable tube, substantially as described. 75

15. The combination of the outer steam-casing, inner tube, and intermediate filling of granular material, substantially as set forth.

16. The combination of the die having an opening extending through the same, its
80 plunger, platform J, and former-feeding appliances, substantially as described, and conveyer for lifting the formers from the bottom of the die to the platform, substantially as set forth. 85

17. The guides 10 10, reciprocating plate L, provided with tongues, and the stops g' , g^2 , and f , combined with a rock-shaft f^2 , with which said stops are connected, and means, substantially as described, for periodically
90 operating said rock-shaft to displace the stops, as set forth.

18. The guide and delivery plate M and its swinging guide Q, having side flanges, combined with the reciprocating arm H and
95 former guard G, substantially as described.

19. The former D, comprising a plug h , having the end disk h' , and a spring, all arranged within recesses in the former proper, substantially as described. 100

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY A. HOUSE.

Witnesses:

JONATHAN GODFREY,
ALFRED B. BEERS.