

No. 607,471.

Patented July 19, 1898.

F. H. RICHARDS.

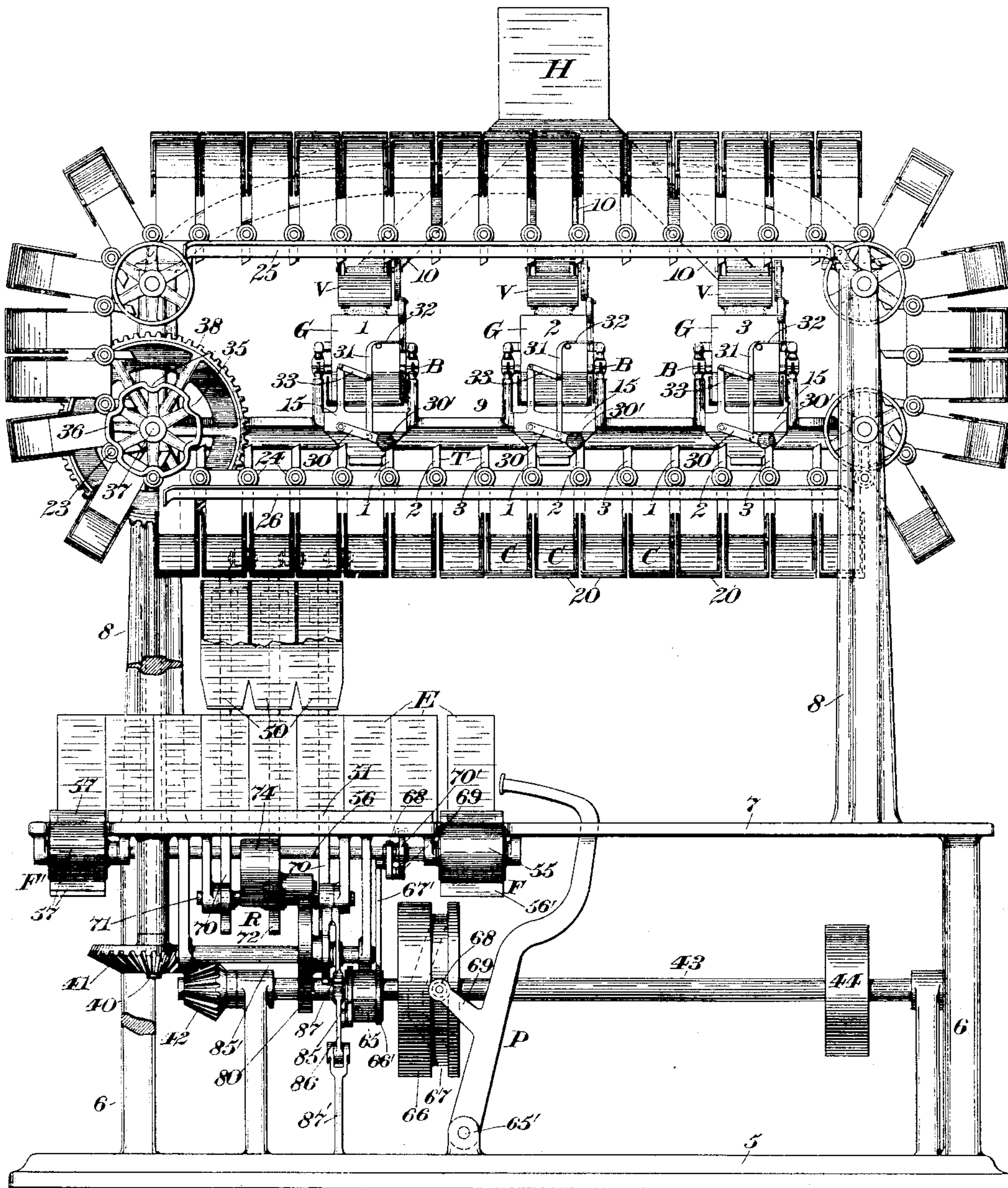
BOX FILLING AND TRANSFERRING APPARATUS.

(Application filed Nov. 29, 1897.)

(No Model.)

5 Sheets--Sheet 1.

Fig. 1.



Witnesses:

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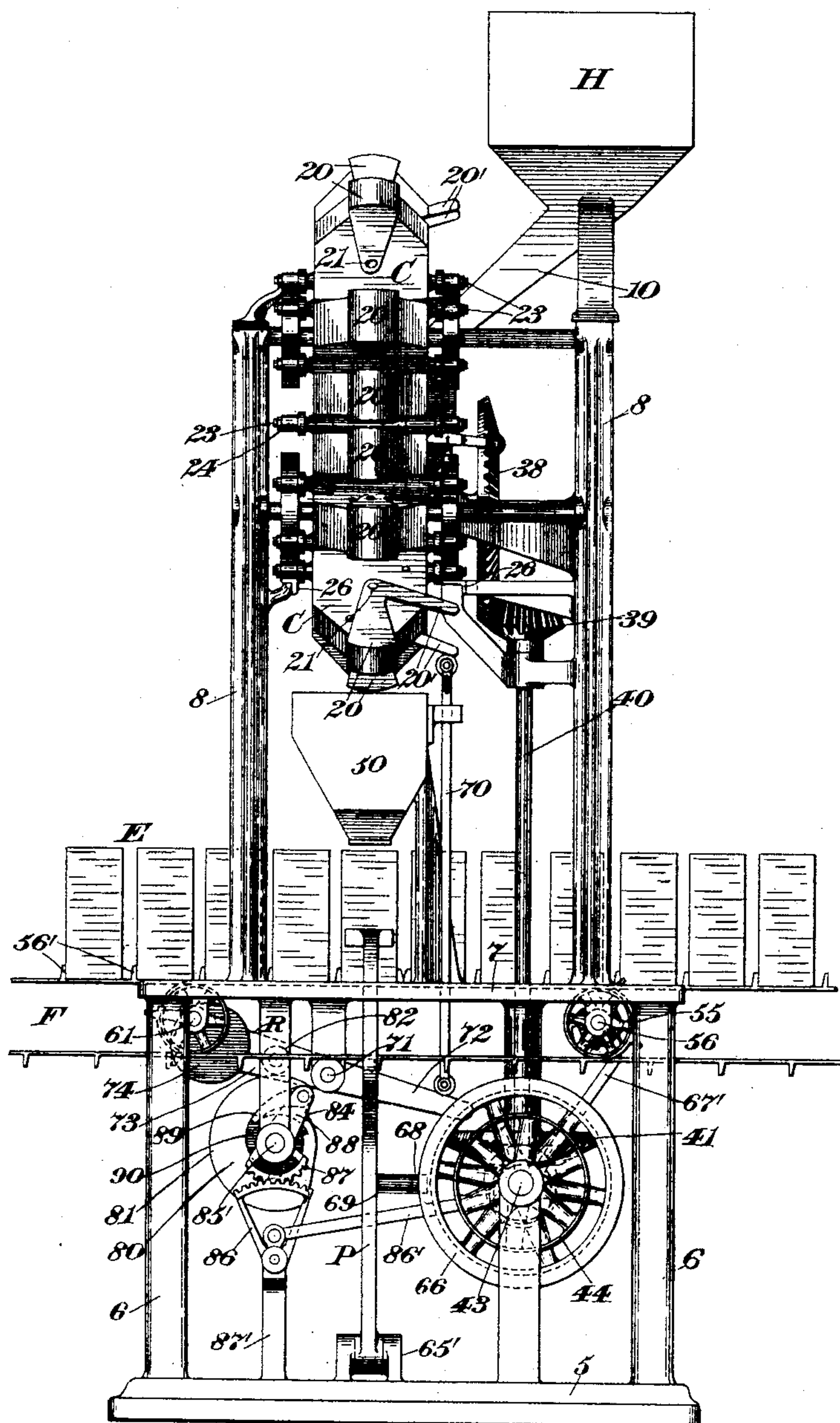
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5 Sheets—Sheet 2.

Fig. 2.



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Fig. 4.

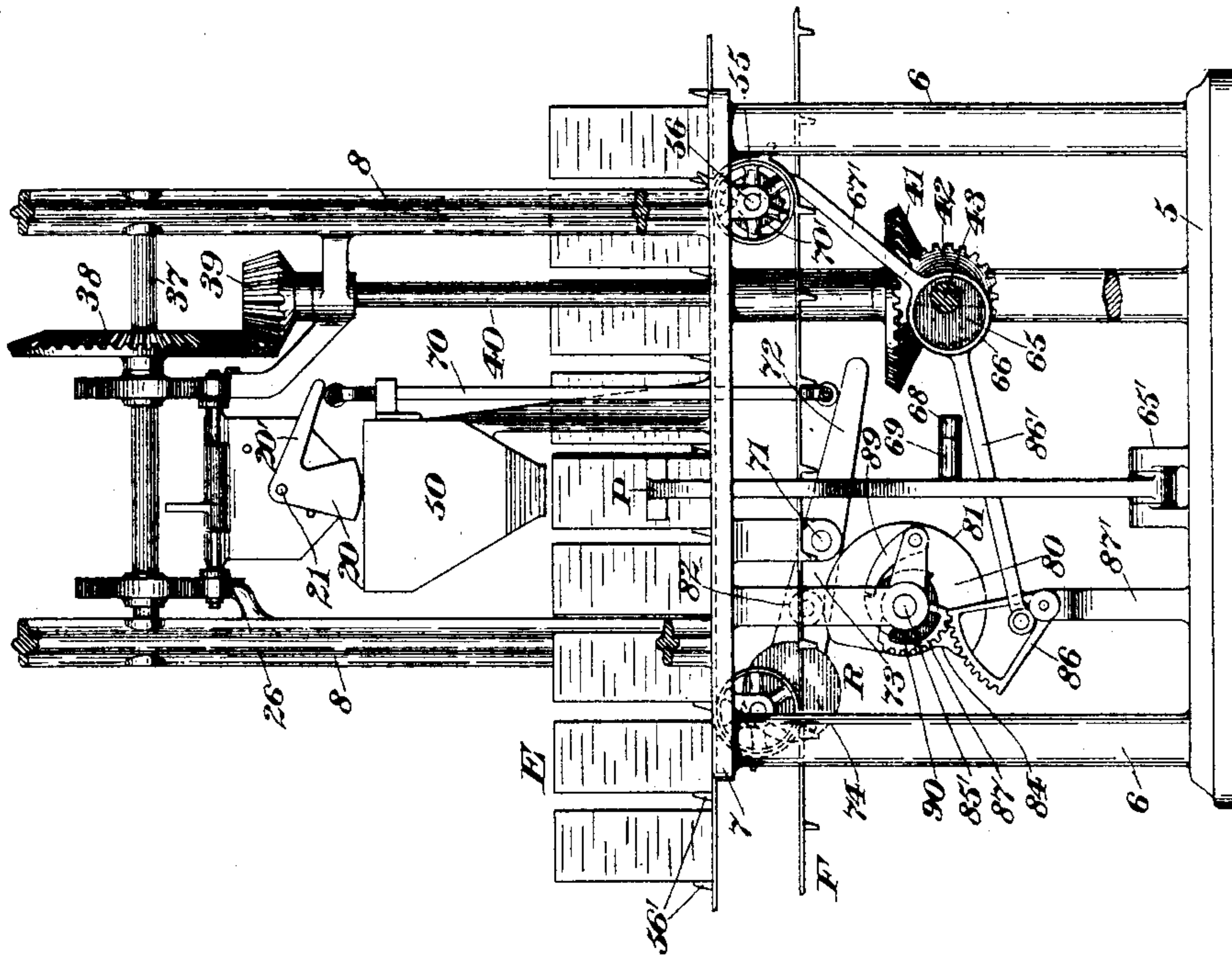
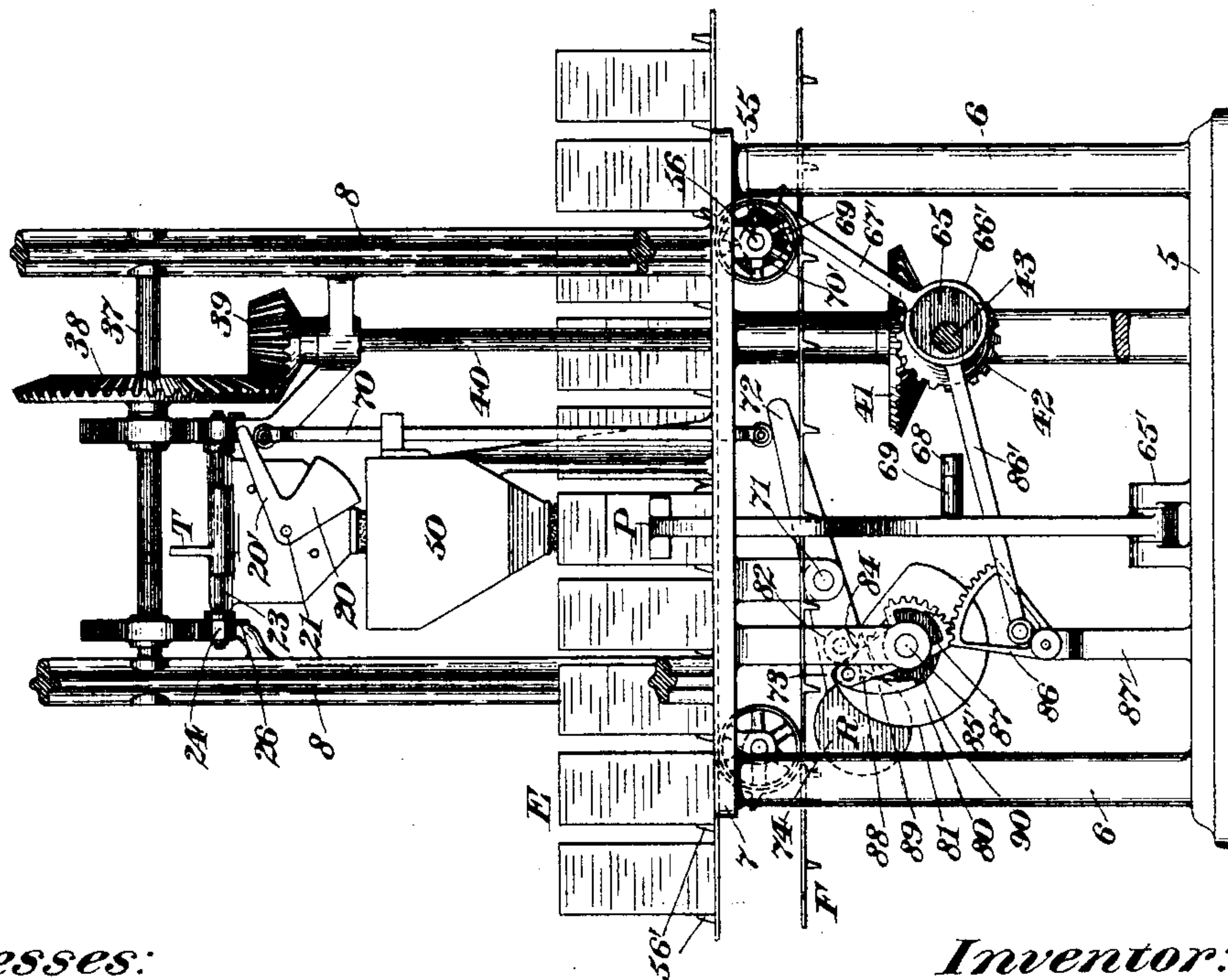


Fig. 3.



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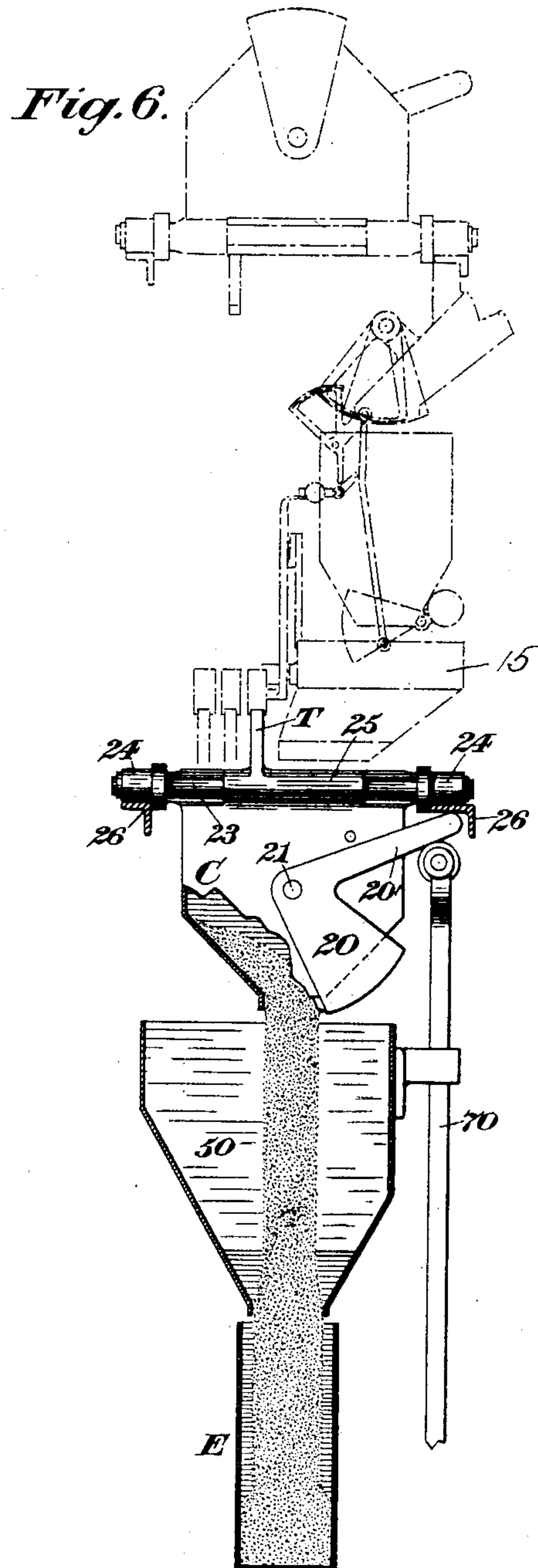
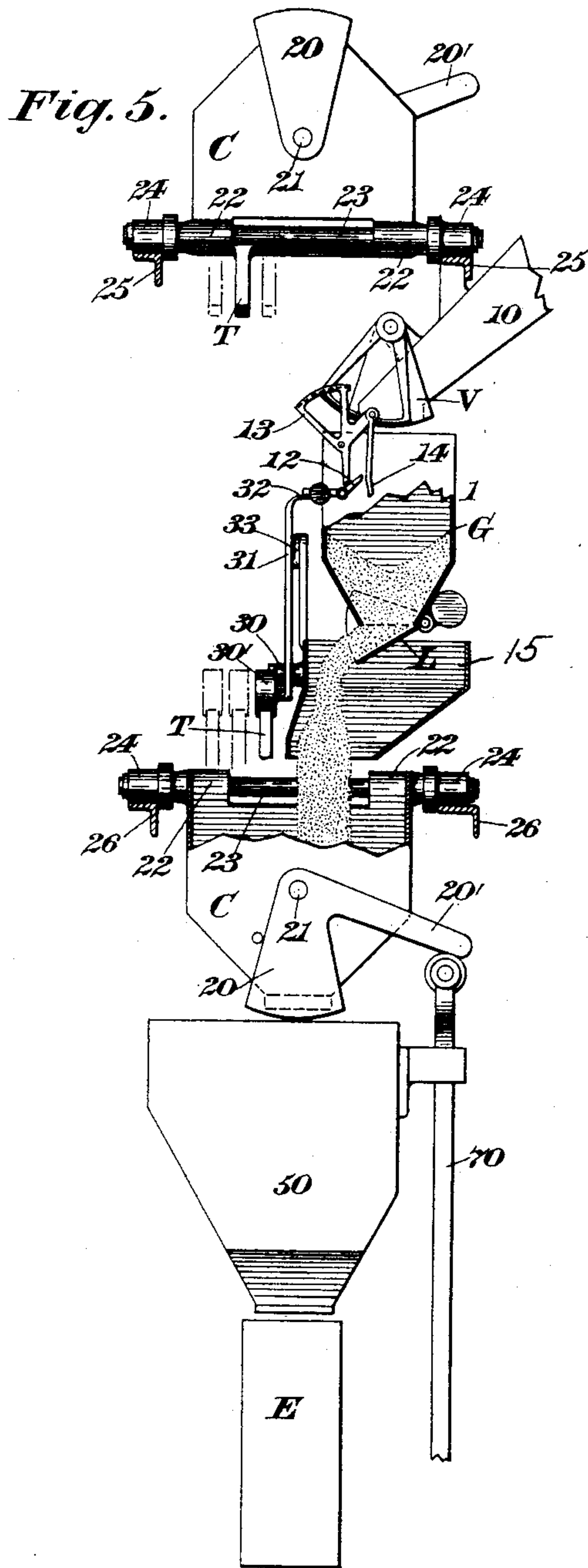
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5 Sheets—Sheet 4.



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Fig. 7.

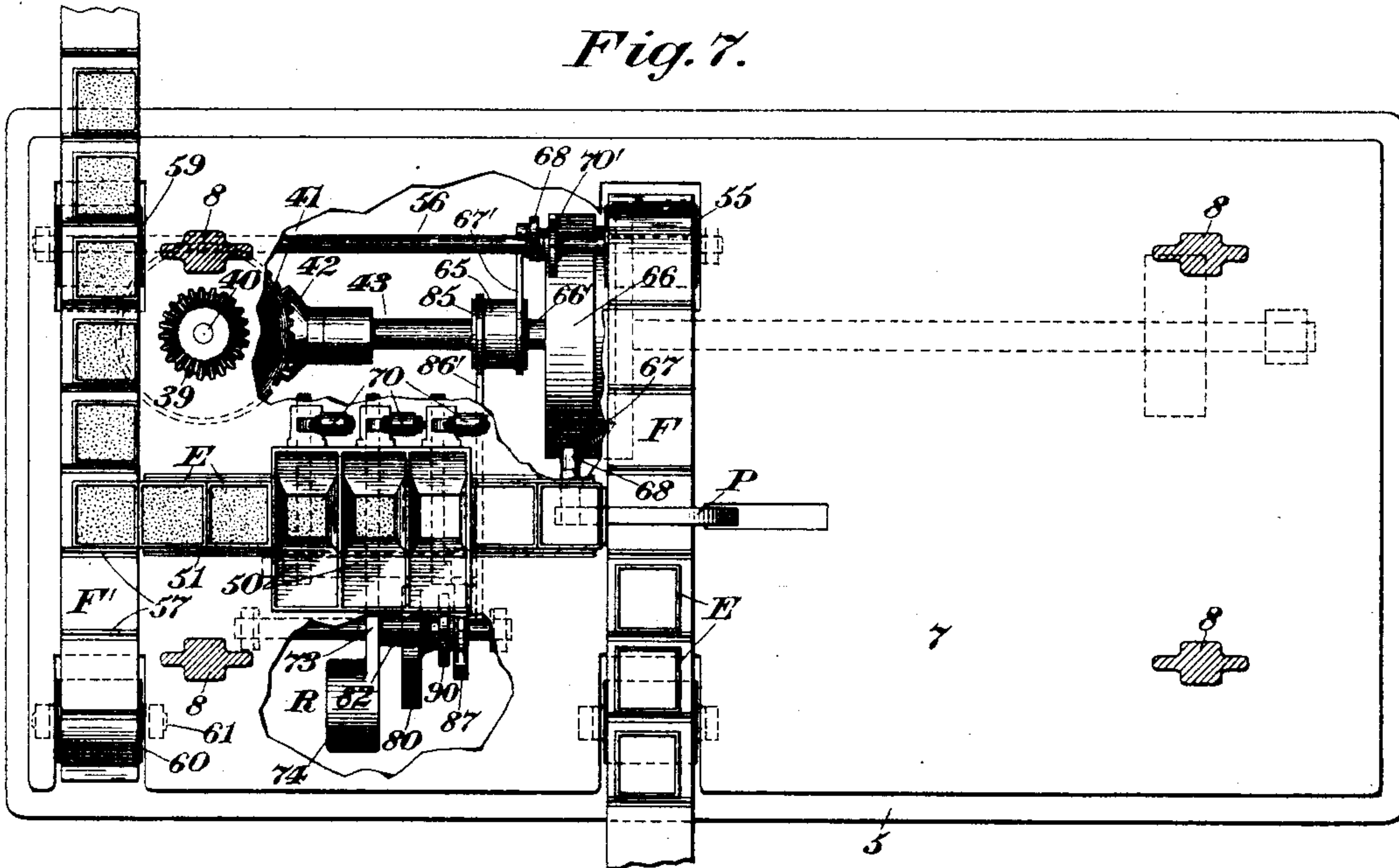
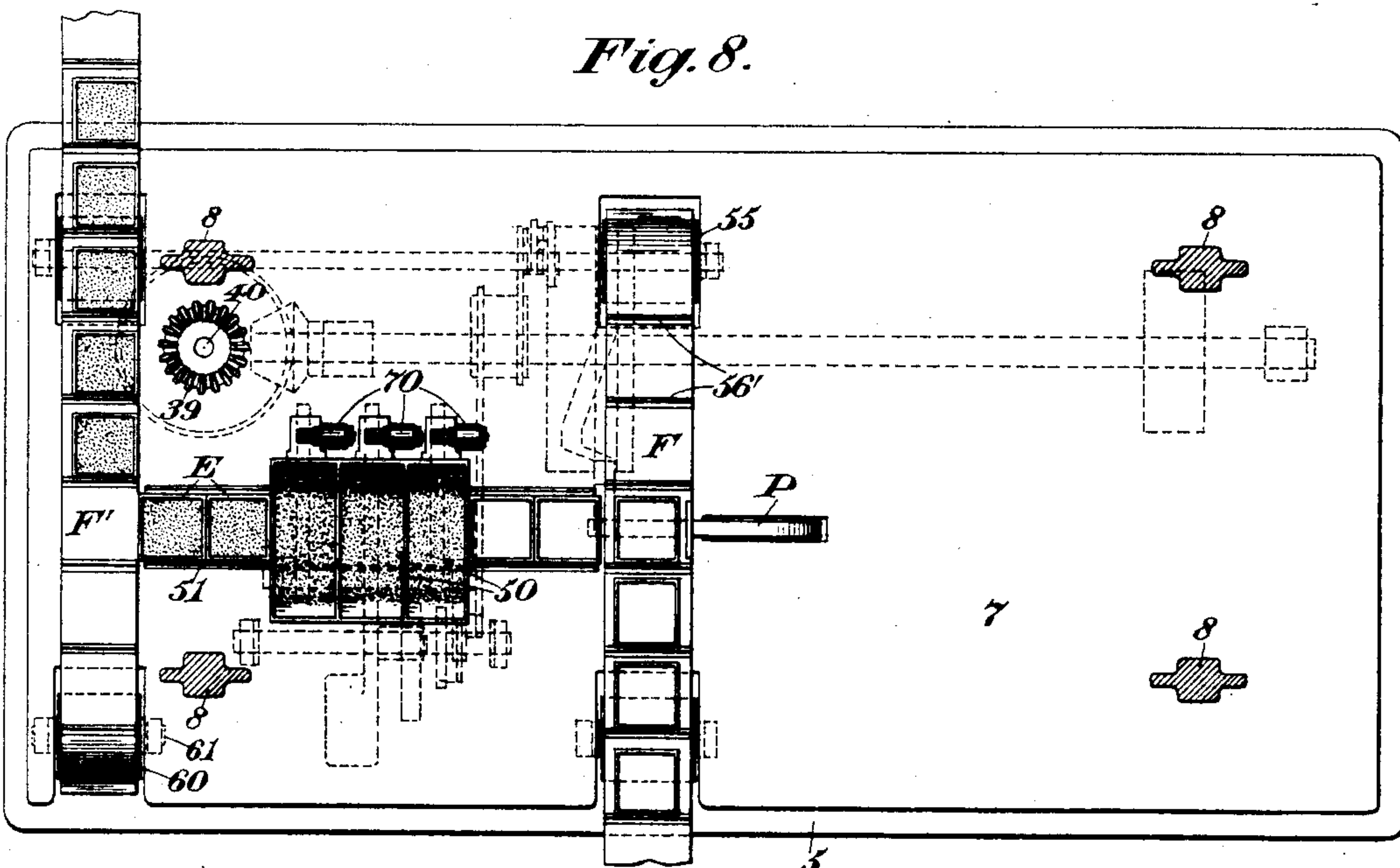


Fig. 8.



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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

BOX FILLING AND TRANSFERRING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 607,471, dated July 19, 1898.

Application filed November 29, 1897. Serial No. 660,117. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Box Filling and Transferring Apparatus, of which the following is a specification.

This invention relates to box filling and transferring apparatus, and it is in the nature of an improvement upon the apparatus covered by my contemporaneously-pending application, Serial No. 655,736, filed October 19, 1897.

My improved apparatus involves as one of its features a series of load-receivers, which may be buckets of weighing mechanisms and a series of load-holders disposed in sets corresponding in number with the load-receivers, one of said series of devices being preferably mounted for movement relatively to the other, and means controlled by each load-receiver to effect the discharge of a corresponding load-receiver, but not to cause the discharge of the loads from the load-receivers of the series.

As before stated, the load-receivers may consist of buckets forming part of some convenient weighing apparatus, and these load-receivers or buckets are supplied with material, weigh independently of each other, and discharge their loads automatically and preferably simultaneously into the proper load-holders, the latter, in turn, delivering the loads automatically to a series of empty boxes placed in proper position by feeding mechanism of suitable construction.

The load-holders consist, preferably, of a series of receptacles disposed in a circuit, and for the purpose of illustrating the nature of the invention I have shown, in connection with said load-holders, three weighing mechanisms, each including a load-receiver, the load-holders being arranged in sets of three, the first load-holder of each set being adapted to operate the first weighing mechanism, the second the second, the third the third, and so on with each set; but the first load-holder of each set cannot discharge either the second or the third load-receiver, and the same is true with respect to the second and third load-holders.

Another feature of the invention resides in one or a series of load-holders preferably mounted for traveling movement relatively to the filling or discharging mechanism, an actuator for effecting the discharge of one or more of said load-holders, a stop or locking device for normally holding the actuator ineffective, so that the contents of a load-holder may be retained, and power-actuated means for effecting the release of the actuator, whereby the load-holders may be caused to deliver their contents into a corresponding number of empty boxes. The load-holders consist, preferably, of valved receptacles disposed in sets, the valves when closed serving to hold the material, and the valves are preferably simultaneously opened in sets or series by bars or rods mounted for reciprocation on the framework and in position to receive a valve-opening thrust from a counterweighted or gravitative actuator held in its effective position by a stop, such as a cam, and said cam is preferably continuously driven and is constructed normally to maintain the actuator in its primary position and is adapted on its operation also successively to release and reset the actuator.

In the drawings accompanying and forming part of this specification, Figure 1 is a front elevation of my improved box filling and transferring apparatus. Fig. 2 is a side elevation of the same as seen from the right in Fig. 1, showing the positions assumed by the parts at the commencement of operations. Figs. 3 and 4 are similar views of the lower half of the machine, showing the position occupied by the parts at two succeeding stages. Figs. 5 and 6 are side elevations of the box-filling mechanism, portions being shown by dotted lines in Fig. 6; and Figs. 7 and 8 are plan views of the box-transferring mechanism.

Similar characters designate like parts in all the figures of the drawings.

For convenience in setting forth the nature of the invention I employ the term "box" and intend to include thereby all forms of vessels or receptacles capable of containing charges of material.

The framework for supporting the different parts of the apparatus consists in the present case of a bed or base, having the vertical

posts 6, the table or platform 7, secured to the posts, and the uprights 8, mounted on the table, the uprights supporting the filling or charging mechanism and the table the empty boxes to be filled.

The box-filling apparatus involves, preferably, a series of weighing mechanisms, each including a load-receiver, and a series of load-holders disposed in sets corresponding in number with the weighing mechanisms, one of the said series of devices being mounted for movement relatively to the other, the series of load-holders being thus mounted in the present instance.

For the purpose of illustrating the operation of the machine I have represented three weighing mechanisms; but it is apparent that this number may be varied to any extent, and they are denoted, respectively, 1, 2, and 3, and the corresponding load-holders in each set will be similarly marked.

The weighing mechanisms may be of the same type as that shown and described in Letters Patent No. 548,840, granted to me October 29, 1895, and they are mounted upon the bracket 9 on the framework, (see Fig. 1,) and each of them includes a load-receiver or bucket, as G, and a supporting counter-weighted scale-beam, as B. The three weighing mechanisms may be supplied with material from a hopper or bin H, mounted on the framework above said weighing mechanisms and having a series of spouts, as 10, leading to the respective load-receivers, as shown in Fig. 1, the supply of material from said spouts being regulated by valves, as V, which may be operated in the manner described in the aforesaid Letters Patent, although the valve-operating means are not shown.

Each of the load-receivers includes a closer or flap pivoted thereto and normally covering the outlet, said closers being designated by L, and each being held shut by a latch, as 12, mounted upon the load-receiver, adapted to engage a rocker, as 13, also on the load-receiver and connected with the closer by a rod 14, the said latches being operable, preferably, by power derived from the traveling load-holders as the respective ones in each set are brought into alignment with the proper load-receivers.

While I have briefly described a common form of weighing mechanism, yet, as is obvious, another type could be substituted therefor or different box-filling mechanism might be employed without departing from the scope of the invention.

The loads from the three load-receivers are discharged into the hoppers 15, from whence they flow simultaneously into a corresponding number of load-holders which are mounted for traveling movement and which advance the charges of material for delivery into a set of empty boxes placed in position by suitable feeding mechanism hereinafter more particularly described.

The load-holders are designated by C, and

they are disposed in sets corresponding in number with the load-receiver G—that is to say, there are three load-holders in each set—and for convenience the load-holders in the respective sets are numbered 1, 2, and 3, the load-holder 1 of each set receiving a load from the weighing mechanism 1, and so on throughout the entire series. These load-holders are arranged in a circuit, it being in the present case in the form of an endless chain, those load-holders on the under run being adapted to receive the loads from the several weighing mechanisms, and each consists of a bucket the outlet of which is covered by a gravity-valve pivoted thereto, as at 21, (see Fig. 5,) the valve of each load-holder or bucket C being normally closed to permit the loads from the receiver G to fall therein and be retained until the valves are opened, this latter operation being accomplished simultaneously with three load-holders when they have reached a point in advance of weighing mechanism 1.

The load-holders C have upon their upper sides the ears 22, adapted to receive the shaft or pivot 23, loosely carrying at its opposite ends the antifriction-rolls 24, running along the upper and lower tracks 25 and 26, secured at different points on the framework and upon which the rolls travel when the chain is on its upper and lower runs, respectively.

The devices for effecting the discharge of the loads from the load-receiver G consist of trippers, as T, operative with the respective load-holders, the trippers being located in different planes, so that the tripper of the load-holder 1 in each set cannot effect the discharge of the load-receivers of the weighing mechanisms 2 and 3, nor can the trippers of the load-holders 2 effect the operation of any other than the proper latches. These trippers consist of upright fingers secured to the sleeves 25 on the several load-holders, (see Figs. 5 and 6,) and as indicated in said figures they are shown in different vertical planes and adapted to transmit their effect to the respective latches through intermediate actuating connections involving in each case a lever, as 30, and a reciprocatory bar, as 31, having the transverse latch-engaging portions 32. The tripper-bar 31 in each case is pivoted to an actuating-lever 30, counterweighted, as at 30', and pivoted to the framework at its non-counterweighted end, the several tripper-bars being connected to the framework by a series of guide-links, as 33. The several weights are disposed in the paths of the respective trippers, so as to be actuated thereby, the weight 30' of the weighing mechanism 1 being in the same plane as the tripper T on the first load-holder of each set, and so on with the others.

The load-holders when on the lower run of the circuit will, as they are brought opposite the proper load-receivers, cause the simultaneous discharge of the latter by operating the latches 12 from the three trippers, and the series of load-holders are advanced at a com-

paratively slow speed in the direction of the arrow in Fig. 1.

The shafts 23, sustaining the respective load-holders, are adapted to enter the sockets 35 of the driving-wheel 36 on the shaft 37, said shaft carrying a large bevel-gear 38, meshing with a similar gear 39 on the vertical shaft 40 on the framework, and said shaft having at its lower end a bevel-gear 41, meshing with the bevel-gear 42 on the main or driving shaft 43. The main shaft 43 may be driven by a pulley 44, connected by belting with a suitable motor, (not shown,) the trippers T in each case, as the working run of the circuit of load-holders is advanced, simultaneously engaging and lifting the weights 30' on each of the actuating-levers 30, thereby elevating the bars 31 and causing the transverse heads 32 thereof to impinge against the closer-holding latches 12, as shown in Fig. 2, so as to release the closers L, and the loads having been completed in the several load-receivers the weight of said loads will force the closers open and said loads will gravitate into the three hoppers 15, and from thence into the proper load-holders 1, 2, and 3, which at this time have reached the load-receiving positions. The filled load-holders will then be advanced beyond the primary weighing mechanism and will be discharged in sets of three into empty boxes, as will hereinafter appear. When the trippers T pass out of contact with the weights 30, the latter immediately resume their normal positions, so that the latches 12 are released and can reengage the rockers 13 to repeat the weighing operation in each weighing mechanism.

The filled load-holders C are advanced, as hereinbefore stated, and when they reach a position beyond the weighing mechanism 1 three of them are simultaneously discharged and deliver their contents into a series of spouts or hoppers, as 50, from which the material runs into a set of empty boxes, as E, fed beneath the outlets of the several spouts by a suitable mechanism involving, preferably, a supply-feeder F and a conveyer F', communicating by a transverse trough or runway 51.

The supply-feeder F consists of an endless belt, one of the supporting-pulleys of which, 55, is secured to the shaft 56, mounted on the framing of the machine, the feeder-belt having a series of blades, as 56', in the spaces between which the series of empty boxes may be supplied, (by means not shown,) the blades serving to advance the empty boxes until they are met by a pusher, as P, which ejects them successively into the trough 51 and subsequently into the spaces between the blades 57 on the conveyer F', which consists also of a belt passed around the supporting-pulleys 59 and 60 on the shafts 56 and 61, the pulley 60 serving to drive the feed-belt F' in the direction of the arrow in Figs. 7 and 8.

The pusher P consists in the present case

of a reciprocatory bar pivoted, as at 65', and operated in any convenient manner to slide the boxes from the feeder F into the transverse trough 51. It is operated in the present case by the cam-wheel 66, secured to the main shaft 43 and having the cam-groove 67 to receive the antifriction-roll 68 on the pusher-arm 69, the cam-wheel 66 making a complete rotation to feed forward a box from the feeder F into the trough 51.

The operation of the pusher P is so timed as to agree with the movement of the load-holders C—that is to say, as the load-holders are successively brought over the first spout 50 of the three an empty box is fed under the first spout along the trough or runway 51 from the supply-feeder F, and by reason of this action in unison of the two mechanisms a series of empty boxes is constantly maintained under the three spouts, and the filled boxes will also be slid along the trough and upon the delivery-feeder F'.

The feed-belts may be driven in the direction indicated by the arrows in Figs. 7 and 8 by the following means, connected, preferably, with the main shaft 43. Said shaft is provided with an eccentric 65, embraced by the ring 66' of the pitman 67', the latter being connected at its opposite end with the crank 68, loosely carried by the shaft 56, the crank 68 being provided with a pawl 69, co-operating with the ratchet 70', fixed to said shaft 56, by reason of which construction the feeder F, when the shaft 43 is driven, will be operated through the intermediate described devices to convey on its upper run a series of empty boxes until they are successively engaged by the pusher and slid transversely therefrom into the trough 51 and along said trough under the spouts, each box being in contact with and being adapted to feed a succeeding box when in the trough.

I provide an actuator, such as R, for effecting the discharge of one or more of the load-holders C, three of them being simultaneously emptied in the present case. The discharge of a set of three load-holders is caused by the actuator R, consisting, preferably, of a gravitative device transmitting its force to three of the valves 20 through a series of vertically-reciprocatory rods or bars 70, mounted for vertical reciprocation in suitable guides on the framework, and the upper ends of said bars are adapted to engage the crank-arms 20', fixed to the several valves. When an upward thrust is applied to the series of rods 70 by the actuator R, the three valves operated will swing open, as indicated in Figs. 3 and 6, to permit the contents of the load-holders to pass into the spouts 50, and from thence into three empty boxes in the trough 51 under said spouts. The actuator R consists of a series of oppositely-disposed arms fixed to the shaft 71, carried by suitable hangers on the platform 7, the arms 72 being adapted to engage the lower ends of the three

rods 70, while the oppositely-disposed arm 73 carries an operating-weight 74, which constitutes the power for actuating the three valves.

A stop or blocking device of suitable construction is provided normally to hold the actuator ineffective to permit the placing of a series of three empty boxes under the complementary spouts 50, said stop being operated by power-controlled means to effect the release of the actuator, whereby the discharge simultaneously of three filled load-holders into the spouts can be obtained. The stop for thus holding the actuator ineffective consists of a cam 80 on the shaft 85, the face 81 of which is constructed to engage a projection or antifriction-roll 82 on the operating-arm 73, thereby to hold said operating-arm in its elevated position. (See Fig. 2.) The stop or cam 80 is driven at a comparatively slow speed, and it has in addition to the actuator or holding-face 81 a second face 83, having near its entering end a socket or face 84, into which the projection 82 can drop when the socket is in line therewith, as represented in Fig. 3. The operating-arm 73 of the actuator will remain in its lower position so long as the face 83 of the cam 80 is in contact with the projection 82, this period being sufficiently long to hold the valves 20 open to permit the complete emptying of the load-holders. On the rotation of the cam 80 it serves to reset the actuator when the face 81 thereof comes in contact with the projection 82, the cam, when it rotates, lifting the operating-arm 73 of the actuator and thereby lowering the arms 71 thereof to permit the thrust rods or bars 70 to drop, so that the latter can operate three succeeding valves when the actuator-release face 83 of the cam is opposite the projection 82.

The cam 80 is preferably operated by power derived from the shaft 43, intermediate gearing and pawl-and-ratchet mechanism being preferably employed to effect the rotation of the said arm.

The eccentric 65, hereinbefore described, is embraced by a ring 85, to which the pitman 86' is fixed, the opposite end of the pitman being pivoted to the sector 86, carried by the bearing 87' on the base 5, whereby when the shaft is rotated the sector-gear 86 will be reciprocated. The sector-gear 86 meshes with the smaller sector-gear 87 onto the cam-shaft 85', and it is connected to the crank-arm 88, to which the pawl 89 is pivoted, said pawl operating the ratchet 90, fixed to the cam. On the rotation of the shaft 43 the pawl 88 will be reciprocated, and it being in engagement with the teeth of the ratchet 90, as represented in Figs. 2, 3, and 4, said ratchet, and consequently the cam 80, will be rotated, the latter turning in the direction of the arrow, said cam serving normally to hold the actuator R against operation and then successively to release and to reset the same.

The operation of the hereinbefore-described apparatus is as follows: A series of

empty boxes are first placed by an attendant upon the feed-belt up to the transfer-trough 51, and two will be placed in the latter, and the three weighing mechanisms being loaded the power-shaft 43 will be started, the parts at this time being in the positions shown in Fig. 1, except, of course, that the loads, as stated, are completed and all the load-holders are empty. In said figure the load-holders 1, 2, and 3 are shown under or in vertical alinement with the weighing mechanisms 1, 2, and 3, respectively. As the lower run of the load-holders is advanced the attendant will by hand prevent the operation of weighing mechanisms Nos. 1 and 2, but weighing mechanism No. 3 will be automatically discharged into the load-holder 3 in the manner hereinbefore specified, and on the continued movement of the series of load-holders load-holders 2, 3, and 1 will be brought, respectively, under the weighing mechanisms 1, 2, and 3, but the discharge of the loads, for the reason hereinbefore set forth, will not follow. Continuing, the load-holders will be advanced until 3, 1, and 2 are fed under the weighing mechanisms 1, 2, and 3, but no loads can be discharged. On the succeeding step of the feed-belt the load-holders 1, 2, and 3 will be brought under the proper weighing mechanisms, and the weighing mechanism 1 will be held out of action, but the load-holders 2 and 3 will be permitted to operate automatically the proper weighing mechanisms. Continuing, the under run of the circuit will be advanced three steps until the empty load-holders 1, 2, and 3 are again under the proper weighing mechanisms, at which time the latter will be automatically discharged, after which the automatic discharge of the weighing mechanisms follows in regular order as long as the circuit of load-holders is in operation. The purpose of holding the two machines out of action is to prevent the inclusion of one or more empty load-holders between filled load-holders. As the lower run of the load-holders is advanced the empty boxes E are fed under the three spouts 50 by the pusher P, and the filled load-holders are discharged in sets of three, as hereinbefore specified, by the actuator R, controlled from the power-shaft 43.

The filled receptacles are fed on to the delivery feed-belt F' by the pusher P and can be disposed of in the usual manner.

Having described my invention, I claim—

1. The combination, with a series of load-receivers, of a series of load-holders disposed in sets corresponding in number with the load-receivers, and means operative with each load-holder to effect the discharge of a cooperating load-receiver but not to cause the discharge of the loads from the other load-receivers.

2. The combination, with a series of load-receivers, of a series of traveling load-holders disposed in sets corresponding in number with the load-receivers, and means operative with

each load-holder to effect the discharge of a cooperating load-receiver but not to cause the discharge of the loads from the other load-receivers.

5 3. The combination, with a series of load-receivers, of a circuit of load-holders mounted for traveling movement and disposed in sets corresponding in number with and adapted to receive loads from the respective load-receivers, and means operative with each load-holder to effect the discharge of a cooperating load-receiver, but not to cause the discharge of the loads from the other load-holders in each set.

15 4. The combination, with a series of load-receivers, of means including a series of latches for controlling the discharge thereof; a series of load-holders disposed in sets corresponding in number with the load-holders; and means operative with each load-holder to effect the operation of one latch but not of the other latches of the series.

25 5. The combination, with a series of weighing mechanisms and with a series of load-receivers disposed in sets corresponding in number with the weighing mechanisms, and one of said series of devices being mounted for traveling movement relatively to the other, of means operative with each load-holder to effect the discharge of the cooperating load-receiver but not to cause the discharge of the loads from the other load-receivers.

35 6. The combination, with a series of weighing mechanisms, each including a load-receiver provided with a closer, of a series of load-holders disposed in sets corresponding in number with the load-receivers; a latch operative with each weighing mechanism for holding the closer thereof shut; and means operative with each load-holder to effect the operation of one latch but not of the other latches.

45 7. The combination, with a series of load-receivers, of a series of load-holders disposed in sets corresponding in number with the load-receivers, and one of said series of devices being mounted for traveling movement relatively to the other; and means operative with the load-holders, and disposed in different planes, for effecting the discharge of the cooperating load-receivers.

55 8. The combination, with a series of load-receivers, of a series of load-holders disposed in sets corresponding in number with the load-receivers, and one of said series of devices being mounted for traveling movement relatively to the other, and means operative with the load-holders, and disposed in different vertical planes, for effecting the discharge of the cooperating load-receivers.

65 9. The combination, with a series of load-receivers, of a series of load-holders disposed in a chain the two runs of which are located, respectively, above and below the load-receivers; mechanism for operating the chain of load-holders; means for simultaneously discharging the load-receivers into the proper

load-holders at a predetermined point; and means operable for discharging the loads from a series of immediately adjacent load-holders when said series has reached a point beyond the primary load-receiver. 70

10. The combination, with a series of load-receivers, of a series of load-holders disposed in a chain and in sets corresponding in number with the load-receivers, the two runs of the chain being disposed above and below the load-receivers; mechanism for operating said chain of load-holders; and means operable with each load-holder for effecting the discharge of the corresponding load-receivers. 75 80

11. The combination, with a series of load-receivers, of a series of load-holders disposed in sets corresponding in number with the load-receivers, and one of said series of devices being mounted for traveling movement relatively to the other; means operative with each load-holder for effecting the discharge of a cooperating load-receiver but not to cause the discharge of the loads from the other load-receivers; and means located in advance of the load-receivers for effecting the discharge thereof. 85 90

12. The combination, with a series of load-receivers, of a series of load-holders disposed in sets corresponding in number with, and adapted to receive the loads from, the respective load-receivers, and one of said series of devices being mounted for traveling movement relatively to the other; valves for the load-holders; means operative with each load-holder for effecting the discharge of a cooperating load-receiver but not causing the discharge of the loads from the other load-receivers; and means located in advance of the load-receivers for opening the valves of the load-holders. 95 100 105

13. The combination, with a series of load-receivers, of a series of load-holders disposed in sets corresponding in number with the load-receivers; means operative with each load-holder for effecting the discharge of a cooperating load-receiver but not to cause the discharge of the loads from the other load-receivers; means located in advance of the load-receivers for effecting the discharge of the load-holders; and means for feeding boxes into position to receive the loads from the load-holders. 110 115

14. The combination, with a series of load-receivers, of means involving a corresponding number of latches for controlling the discharge of the load-receivers; a series of load-holders disposed in sets corresponding in number with the latches; tripper-bars adapted for engaging the respective latches; levers connected with the tripper-bars; and trippers secured to the respective load-holders in each set for engaging the levers to operate the latches simultaneously. 120 125 130

15. The combination, with a series of load-receivers, of means involving a corresponding number of latches for controlling the discharge of the load-receivers; a series of load-

holders disposed in sets corresponding in number with the latches; tripper-bars for engaging the respective latches; and trippers secured to the respective load-holders in each set for engaging the levers to operate the latches simultaneously.

16. The combination, with a series of load-receivers, of means involving a corresponding number of latches for controlling the discharge of the load-receivers; a series of load-holders disposed in sets corresponding in number with the latches; tripper-bars having transverse heads at their upper ends for engaging the latches and connected by links with the framework; counterweighted levers also mounted on the framework and connected, respectively, with the tripper-bars; and trippers secured to the respective load-holders in each set for engaging the weights of the levers to operate the latches simultaneously.

17. The combination, with a series of load-receivers, of a chain of load-holders each of which is carried by a shaft, the load-holders being disposed in sets corresponding in number with the load-receivers; a driving-wheel having pockets on its periphery to receive said shafts; and means operative with each load-holder to effect the discharge of a cooperating load-receiver but not to cause the discharge of the loads from the other load-receivers.

18. The combination, with a series of load-receivers, of a series of load-holders disposed in sets corresponding in number with the load-receivers; devices operable with each load-holder to effect the discharge of a cooperating load-receiver but not to cause the discharge of the other load-receivers; and power-controlled operating means for effecting the discharge of the load-holders in series.

19. The combination, with a load-holder, of a device for effecting the discharge of the load from said load-holder; an actuator for said device; a blocking device constructed to normally hold the actuator ineffective; and means for releasing the actuator.

20. The combination, with a load-holder, of means including an actuator for effecting the discharge of the load-holder; a blocking device for the actuator; and means for operating the blocking device to release the actuator.

21. The combination, with a load-holder, of means including a gravitative actuator for effecting the discharge of the load-holder; a blocking device for the actuator; and means for releasing the actuator.

22. The combination, with a load-holder, of a reciprocatory bar for effecting the discharge of the load-holder; an actuator for engaging the bar; a blocking device adapted normally to hold the actuator ineffective; and means for releasing the actuator.

23. The combination, with a series of valved load-holders each valve having an arm, of a series of bars for engaging the valve-arms; a

shaft provided with arms corresponding in number with the bars and also having an oppositely-disposed weighted arm; and a blocking device adapted normally to engage said arm.

24. The combination, with a load-holder, of means including an actuator for effecting the discharge of the load-holder; a cam constructed normally to hold the actuator ineffective; and means for operating said cam to release the actuator.

25. The combination, with a load-holder, of a device for effecting the discharge of the load from said load-holder; an actuator for engaging said device; a cam constructed normally to hold the actuator ineffective and subsequently to release and then to reset the same; and means for operating said cam.

26. The combination, with a load-holder, of means including an actuator for effecting the discharge of the load-holder; a blocking device normally adapted for holding the actuator ineffective; and means for continuously rotating the actuator.

27. The combination, with a load-holder, of means including an actuator for effecting the discharge of the load-holder; a blocking device adapted normally to hold the actuator ineffective; and means for releasing the actuator.

28. The combination, with a load-holder, of a device for effecting the discharge of a load from said load-holder; an actuator for engaging said device; a blocking device constructed normally to hold the actuator ineffective; pawl-and-ratchet mechanism one of the members being operative with the blocking device; and means for operating the pawl-and-ratchet mechanism.

29. The combination, with a load-holder, of a device for effecting the discharge of a load from said load-holder; an actuator for engaging said device; a blocking device adapted normally to hold the actuator ineffective; a ratchet connected with the blocking device; a pawl for said ratchet; gearing one member of which is connected with the pawl; and means for operating the gearing.

30. The combination, with a load-holder, of a device for effecting the discharge of a load from said load-holder; an actuator for engaging said device; a blocking device adapted normally to hold the actuator ineffective; meshing sector-gears; pawl-and-ratchet mechanism, the ratchet being secured to the blocking device and the pawl being connected with one of the sector-gears; a pitman connected to the other sector-gear and having a ring; and a power-shaft provided with an eccentric embraced by said ring.

31. The combination, with a series of load-receivers, of a series of load-holders disposed in sets corresponding in number with the load-receivers; means operative with each load-holder to effect the discharge of the cooperating load-receiver, but not to cause the discharge of the loads from the other load-re-

ceivers; a supply-feeder; a trough under the load-holders, in position to receive empty boxes from the supply-feeder; a pusher; means for operating the pusher to cause it to
5 eject empty boxes from the supply-feeder into said trough; and mechanism for effecting the discharge of the load-holders in series beyond the primary load-receiver.

32. The combination, with a series of load-
10 receivers, of a series of load-holders disposed in sets corresponding in number with the load-receivers; means operative with each load-holder to effect the discharge of a coöperative
15 load-receiver, but not to cause the discharge of the loads from the other load-receivers; a

trough or runway in position to receive boxes and located under the load-holders; supply and delivery devices adapted to feed to, and receive boxes from, said trough; a pusher adapted to push the empty boxes from the
20 supply device into said trough; mechanism for operating the pusher; and means for effecting the discharge of the load-holders in series at a point beyond the primary load-receiver.

FRANCIS H. RICHARDS.

Witnesses:

FRED. J. DOLE,
HEATH SUTHERLAND.