No. 649,995. Patented May 22, 1900.

G. H. L. SCHOONMAKER & J. A. CANFIELD.

HAT FORMING MACHINE.

(Application filed Nov. 21, 1899.)

(No Model.) 4 Sheets—Sheet 1.

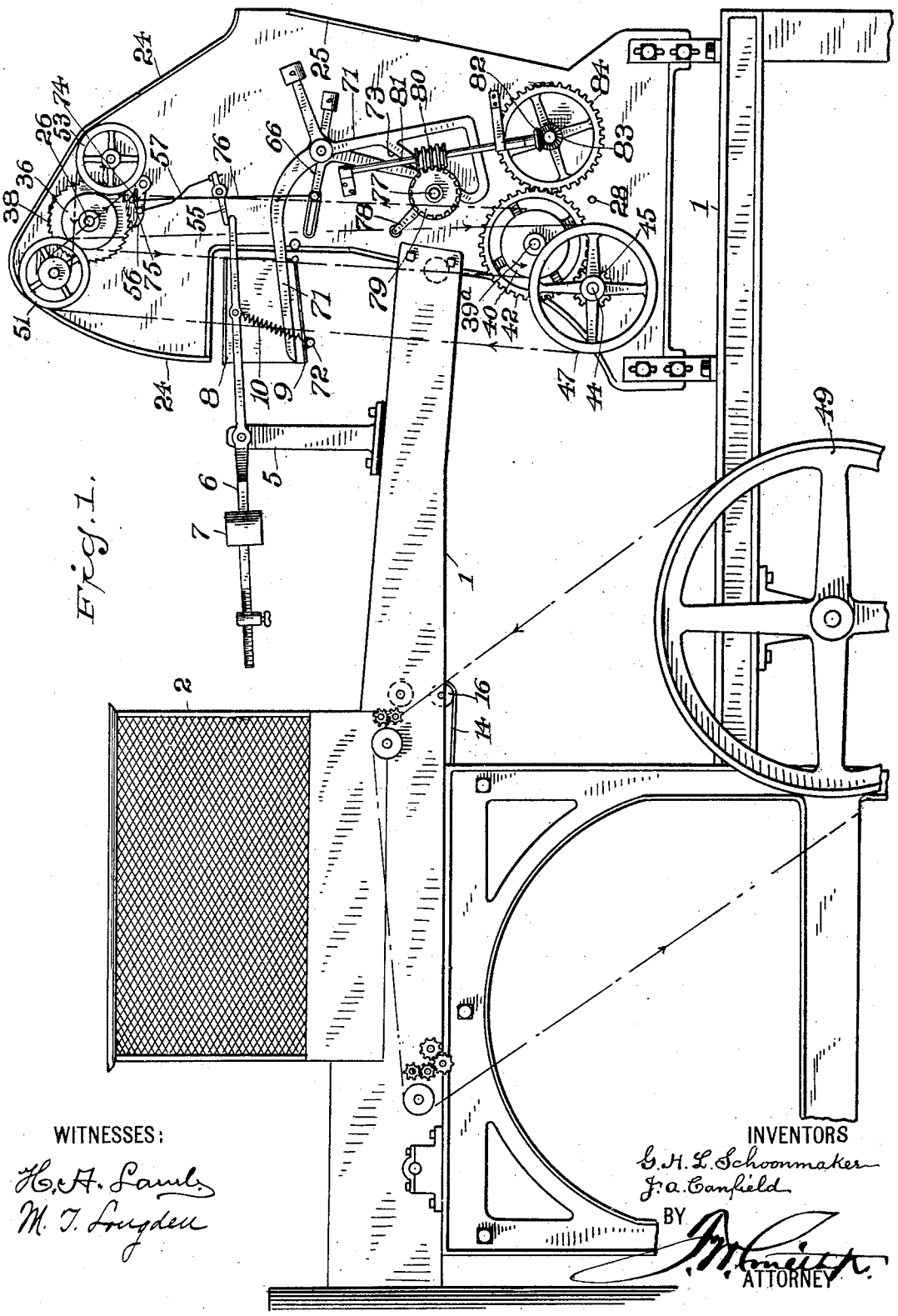

Fig. 1.

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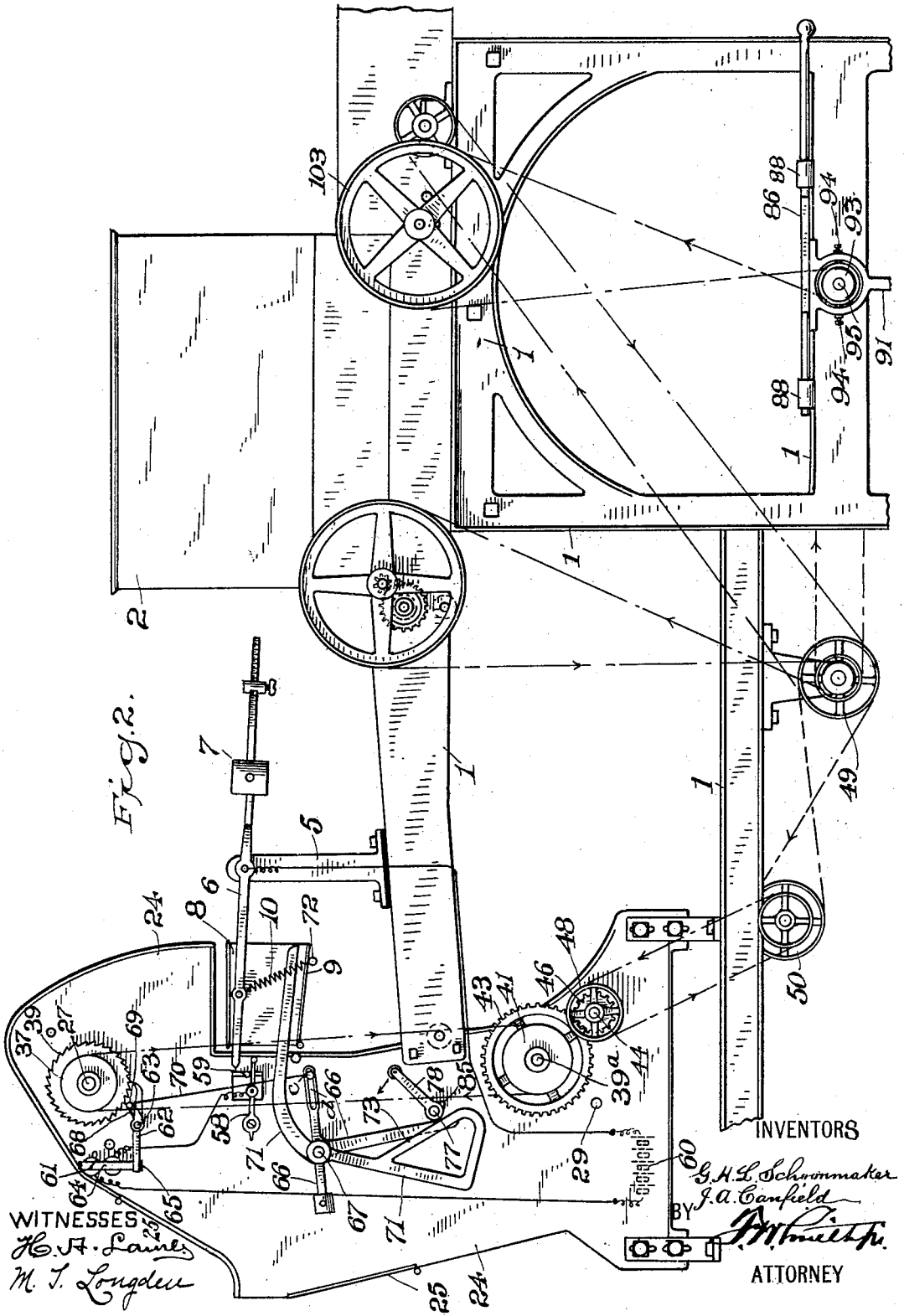

Fig. 2.

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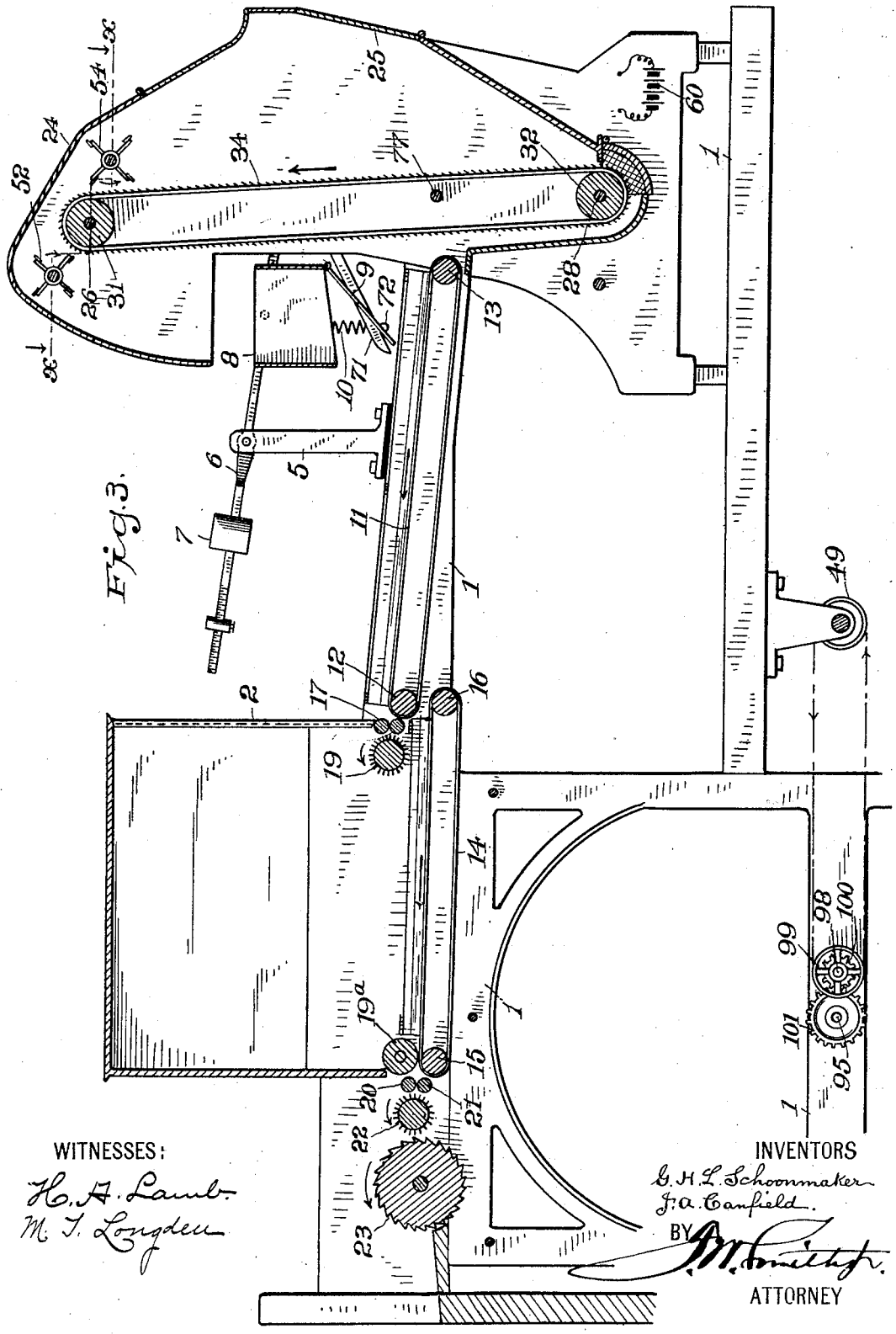

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(No Model.) 4 Sheets—Sheet 4.

Fig. 4.

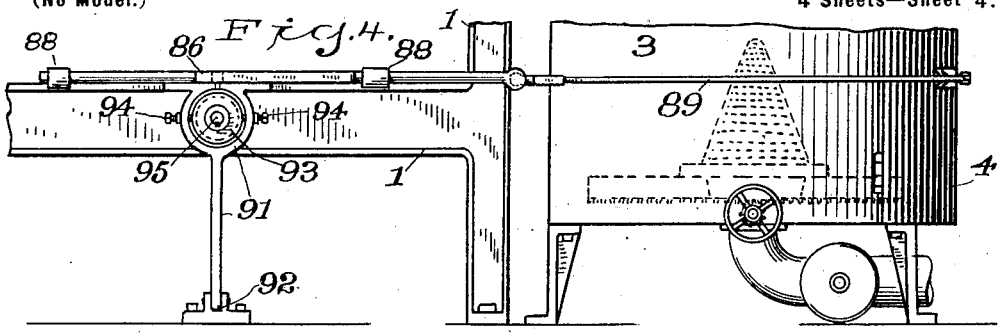


Fig. 5.

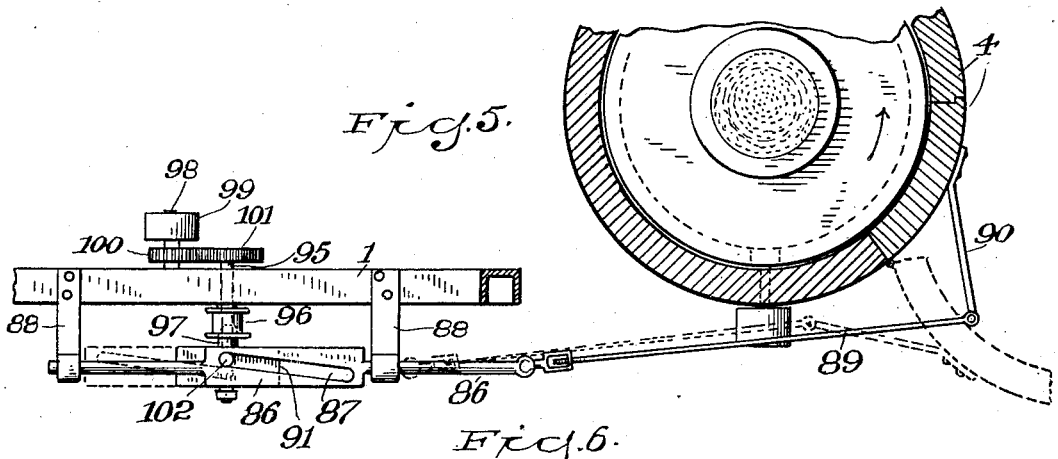


Fig. 6.

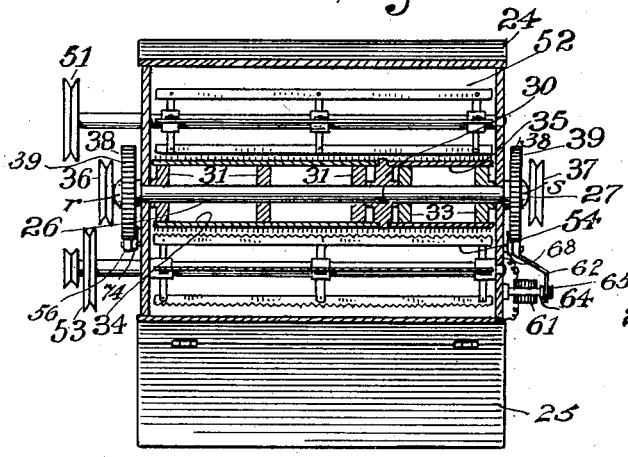


Fig. 7.

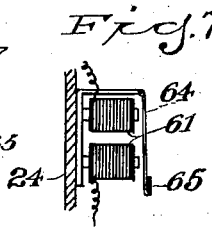
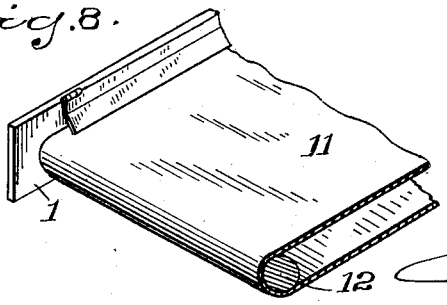


Fig. 8.



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UNITED STATES PATENT OFFICE.

GEORGE H. L. SCHOONMAKER AND JOHN A. CANFIELD, OF DANBURY, CONNECTICUT.

HAT-FORMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 649,995, dated May 22, 1900.

Application filed November 21, 1899. Serial No. 737,787. (No model.)

To all whom it may concern:

Be it known that we, GEORGE H. L. SCHOONMAKER and JOHN A. CANFIELD, citizens of the United States, residing at Danbury, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Hat-Forming Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to certain new and useful improvements in hat-forming machines, but more particularly has reference to automatic weighing-out mechanism used as an attachment to the hat-forming apparatus whereby the fur will be accurately weighed out and delivered to the hat-forming instrumentalities.

The object of our invention is to improve upon the construction shown and described in our pending application for Letters Patent, filed May 6, 1899, under Serial No. 715,843, and we will now proceed to describe our present invention, reference being had to the accompanying drawings, which form a part of this application, and in which—

Figure 1 is a side elevation of a portion of a hat-forming machine equipped with our improvement; Fig. 2, a view similar to Fig. 1, but looking from the opposite side of the machine; Fig. 3, a vertical longitudinal section of the machine; Fig. 4, a broken side elevation of the forming-chamber proper and that portion of the frame immediately joining the same; Fig. 5, a plan view of the broken construction shown at Fig. 4; Fig. 6, a section at the line *x x* of Fig. 3, showing only the upper part of the machine; Fig. 7, a detail broken sectional elevation of the magnet and armature, and Fig. 8 a detail broken perspective illustrating one of the fur-carrying aprons.

Similar numbers and letters of reference denote like parts in the several figures of the drawings.

In our pending application above referred to a predetermined weight rested upon the scale-beam near the pan, and as the pan descended an electrical circuit would be closed by contacts secured to the frame and to said weight, and this closing of the circuit would effect the disengagement of clutch mechanism for the purpose of stopping the feed from the large belt, and when the final weighing had been completed from the smaller belt the closing of an electrical circuit by contacts carried by the scale-beam and the frame of the machine would effect the disengagement of clutch mechanism, whereby the feed from the smaller belt would be stopped, and then the operator would dump the pan. In our present improvement we accomplish everything by mechanical contrivances and employ electricity solely for the purpose of controlling the operation of a certain pawl which has to do with the final feeding of the fur from the smaller belt, all of which will be hereinafter fully set forth.

In our present improvement, which we have operated on a large scale in hat-factories, we have ascertained that the initial underweight of fur is of the greatest importance in a machine of this character, and we therefore have retained the feature of the pivoted dog, which rests by gravity upon the scale-beam near the weighing-pan, the weight of this dog being predetermined so that when the scale-beam first descends there will be a short weight of fur substantially equal to the weight of this dog, and the final filling of the pan will consist in feeding therein from the small belt an amount of fur to make up this deficiency. We have also provided certain instrumentalities to be operated in connection with the opening and closing of the doors of the hat-forming chamber, whereby there can be no feeding of fur into said chamber when the doors thereof are open, while the closing of the doors themselves will restore all parts to normal position, so that the machine as an entirety will resume its functions; but in the present application we make no claim whatever to said instrumentalities, since they form the subject-matter of a separate application for patent filed by us January 30, 1900, under Serial No. 3,320.

1 is the frame of the machine; 2, the fur-distributing chamber; 3, the hat-forming chamber proper, which contains the usual support for the perforated cone and is provided with doors 4.

5 represents standards rising from the frame. 6 is the scale-beam pivoted in any suitable manner between these standards and provided with an adjustable weight 7 at one end,

while the other end is yoke-shaped, and 8 is the weighing-pan, pivoted within the yoke end of the scale-beam and provided with a hinged bottom 9, which is kept normally closed by means of springs 10, whose ends are connected, respectively, with said bottom and with the scale-beam.

Immediately beneath the weighing-pan is an endless apron 11, carried by rolls 12 13, and at the bottom of the fur-chamber 2 is also an endless apron 14, carried by rolls 15 16.

At the outer end of the apron 11 are the usual feed-rolls 17 18, by means of which the fur from the belt is carried into the chamber 2, and immediately beyond these rolls is a picker-roll 19, which operates in the usual manner.

Immediately beyond the chamber 2 the fur-blowing chamber is located, which we have not shown, since it forms no part of our present invention; but we have shown an idle roll 19^a, which mats the fur as it leaves the apron 14, the feed-rolls 20 21, the picker-roll 22, and the blower-roll 23, all of which are contained within this fur-blowing chamber, which latter is intermediate of the chamber 2 and the hat-forming chamber 3.

The parts above described are all common and well known in connection with hat-forming machinery, and we have merely referred to them briefly, since it is not deemed necessary to enter into any detailed description thereof, and we will now describe the parts that are more intimately associated with the weighing-out devices.

24 is a hopper secured to the frame of the machine and at its upper extremity overhanging the scale-pan and provided with doors 25, through which the fur is introduced. Journaled within this hopper, near the top and bottom thereof, and extending from side to side are shafts 26 27 and shafts 28 29, the shafts 26 27 being coincident and held in position at their inner or abutting ends by a sleeve 30, while the shafts 28 29 are likewise coincident and similarly held in position at their inner abutting ends, although the sleeve corresponding to the sleeve 30 is not shown in this instance. The shafts 26 28 are provided with collars 31 32, while the shaft 27 is provided with collars 33, and the shaft 29 is likewise provided with collars. (Not shown.)

34 is an endless belt which is carried by the collars 31 32, and 35 is also an endless belt carried by the collars on the shafts 27 29, and it will be readily understood that these belts are capable of independent traveling, owing to the independent nature of the shafts which carry them.

It will be observed that the shafts 26 28 are considerably longer than the shafts 27 29 and that the belt 34 is much wider than the belt 35, and therefore it will be clearly understood that a greater amount of fur within a given time will be fed by the belt 34 than by the belt 35.

On the outer extremities of the shafts 26 27 are loose pulleys 36 37, while tight on these shafts and close to said pulleys are ratchet-wheels 38 39. Tightly secured upon the outer extremities of a shaft 39^a, journaled in the sides of the hopper, are pulleys 40 41 and also spur-gears 42 43. The pulleys 36 37 are normally engaged with the ratchets 38 39 by any suitable frictional contrivance, such as ordinary spring-cup washers *s w*, as shown at Fig. 6.

44 is a shaft which extends through the lower portion of the hopper from side to side and carries gears 45 46 at each end, which mesh, respectively, with the gears 42 43, and said shaft also carries at each end pulleys 47 48.

49 is the power-pulley, which is belted up to the pulley 48 through the medium of any suitable pulley 50, while the pulley 47 is belted up to the pulley 51, carried by the shaft of the usual paddle-picker 52, journaled in the top portion of the hopper in proximity to the front of the belts 34 35 at the points where they pass over their upper rotary supports, this pulley 51 being in turn belted to the pulley 53, which is carried by the fan 54, journaled in the upper portion of the hopper in the rear of the belts. It will therefore be clearly understood that the belts within the hopper will be caused to travel to feed the fur and that any surplus of the latter will be removed by the fan 54, while the paddle-picker 52 will knock off the fur from the belt, so that it will drop readily into the weighing-pan, and that these operations will all be effected through the connections by means of the pulleys and belts hereinbefore described. The connections between the power-pulley and the picker-rolls and between the power-pulley and the feed-rolls are very ordinary, and as these parts constitute no feature of our invention we will enter into no further description of the same.

We will now describe the operation of the instrumentalities which control the delivery of the fur from the hopper within the weighing-pan from both belts 34 35 until the pan descends with a shortage of weight substantially equal to the weight of the pivoted dog above referred to.

55 is a dog which is pivoted to the side of the hopper and which normally rests by gravity against the scale-beam in proximity to the weighing-pan, and 56 is a pawl pivoted to the side of the hopper and connected with the tail end of this dog by means of a rod or wire 57. The normal position of this dog at the beginning of the weighing operation is such that the pawl 56 will be held out of engagement with the ratchet 38; but when the nose of the dog has dropped, owing to the lowering of the scale-pan, the tail of this dog will be elevated, so as to throw the pawl 56 in engagement with the ratchet 38, so as to stop the revolution of the latter. Presupposing an amount of fur to have been delivered within the weighing-pan of a shortage in weight substantially

equal to the weight of the dog 55, the scale-pan will now descend and the nose of the dog will by gravity follow the same until the elevation of the tail of said dog will have thrown the pawl 56 into engagement with the ratchet 38, whereupon a resistance will be opposed to the revolution of the pulley 36 sufficient to overcome the friction between it and the ratchet 38, so that said pulley will revolve idly around the shaft 26, the result of this being that the wider belt 34, carried by the shafts 26 28, will become stationary. As the delivery of the fur into the weighing-pan from the smaller belt 35 continues after the operation of the wider belt has ceased, the scale-beam will be relieved of the weight of the dog 55, owing to the engagement of the pawl 56 with the teeth of the ratchet 38, and the scale-beam will descend until an amount of fur equal to said shortage has been deposited in said pan by means of the smaller belt, and simultaneously with this final delivery of the fur the scale-beam will come in contact with the pivoted finger 58, which is heaviest at its outer end and is held in normal position by the upward abutment of its forward end against the pin 59, projecting from the side of the hopper.

An ordinary battery (denoted by 60) is suitably located and is connected in proper circuit with a magnet 61, the terminals of the circuit being respectively connected with the finger 58, which is insulated, and the scale-beam 6, which is likewise insulated.

A pawl 62 is pivoted loosely around a pin 63, projecting from the side of the hopper, and a spring-projected armature 64 is pivoted in proximity to the poles of the magnet 61 and is provided at its extremity with a hook 65, which normally extends athwart and below the tail end of the pawl 62 when the latter is out of engagement with the ratchet 39, as clearly shown at Fig. 2.

66 represents counterbalanced bell-cranks pivoted loosely around pins 67 at each side of the hopper, and 68 is a dog loose around the pin 63 and having a pin 69, which extends laterally above the nose of the pawl 62, which pin is connected by means of a rod 70 to a stud *c*, which extends within an elongated slot *d*, horizontally disposed within the upper leg of one of the bell-cranks 66, said stud capable of moving freely throughout said slot, so that when said leg is depressed the dog 68 will likewise be depressed, so that the pin 69 will strike against the pawl 62 and withdraw the latter from engagement with the ratchet 39, all of which will be more clearly understood from the description hereinafter to be given.

71 represents bell-cranks pivoted at each side of the hopper around the pins 67, the upper legs of said bell-cranks extending above pins 72, which project from the bottom 9 of the weighing-pan, while the lower legs of these bell-cranks have inclined portions 73.

74 is a dog loosely hung around the pivot-pin of the pawl 56 and having a pin 75, which extends laterally above the nose of said pawl and is connected by means of a rod 76 to a stud *e*, which extends within an elongated slot *f*, horizontally disposed within the upper leg of the other bell-crank 66, said stud capable of moving freely throughout said slot, so that when said leg is depressed the dog 74 will likewise be depressed, so that the pin 75 will strike against the pawl 56 and withdraw the latter from engagement with the ratchet 38.

77 is a shaft which extends through the hopper from side to side and carries at each end crank-arms 78, this shaft also having rigid thereon at one end a worm-wheel 79, which meshes with a worm 80, carried by a shaft 81, journaled in bearings at the side of the hopper. This shaft 81 carries at one extremity a bevel-gear 82, which meshes with a bevel-gear 83, carried by the hub of a spur-gear 84, journaled at the side of the hopper and meshing with the spur-gear 42. As the shaft 77 revolves the crank-arms 78 will strike against the beveled portions 73 of the bell-cranks 71, thereby causing the upper legs of these cranks to operate to open the bottom of the weighing-pan against the resiliency of the springs 10. Just as these crank-arms are on the point of leaving the surfaces 73 the lugs 85, (only one shown,) carried by the heel ends of the cranks, will strike against the lower legs of the bell-cranks 66, thereby withdrawing the pawls 56 62 from the respective ratchet-wheels 38 39, and simultaneously the electrical circuit will be broken by the elevation of the scale-pan after dumping and the armature 64 will spring out from the magnets and interpose its hook portion 65 beneath the tail of the pawl 62, so that the latter cannot, owing to the gravity of its tail end, come into engagement with the ratchet 39.

The operation of our improvement is as follows: The fur is at first delivered into the weighing-pan by means of both feeding-belts until the scale-pan descends by reason of the combined weight of the fur therein and of the dog 55. As this dog swings on its pivot in following the descent of the pan the pawl 56 will be thrown into engagement with the ratchet 38, thereby stopping the movement of the wide feeding-belt and relieving the scale-beam from the weight of the dog. The subsequent feeding of the fur will be effected by means of the smaller belt until the full weight of fur has been deposited within the weighing-pan, whereupon the latter will descend until the scale-beam strikes against the finger 58, and thereby closes the electrical circuit and causes the armature 64 to be attracted by the magnets, thereby removing the hook end 65 from beneath the pawl 62 and allowing the latter to engage by gravity with the ratchet 39, whereby the pulley 37 is caused to revolve loosely around the shaft 27, thereby stopping the movement of the small feeding-belt. The cranks 78 now strike against the inclined surfaces 73 and effect the dumping of the fur upon the apron

11, and as these cranks leave these inclines the bell-cranks 71 will be restored to normal position and the bottom of the weighing-pan will close and the scale-beam will rise, so that the pan may be elevated to receive a fresh supply. At the proper moment after the pan has been dumped the lugs 85 will strike against the lower legs of the bell-cranks 66, thereby causing the pawls 56 62 to be withdrawn from the ratchets 38 39, and just before these lugs have finished their function the electrical circuit will be broken by the elevation of the scale-beam and the hook end of the armature 64 will spring beneath the tail end of the pawl 62, so as to hold the same in its position out of engagement with the ratchet 39, and the operation of weighing out is again repeated in the same manner.

A hat-forming machine equipped with our improvement has at one end the weighing apparatus and at the other end the hat-forming chamber, provided with doors which the operator is continually opening and closing, and it therefore is very essential that there should be no delivery of the fur into the forming-chamber while the doors are open, and we have therefore shown in the drawings certain means automatically operated by the opening and closing of these doors, whereby the feeding of the fur is stopped and continued at the proper times; but, as we above stated, this forms no part of the present invention and has been made the subject of another application for patent, which has been specifically referred to. However, for the purpose of enabling any one to clearly understand that our present improvement in weighing apparatus does not interfere with the proper delivery of the fur to the hat-forming chamber we will describe the construction and operation of these parts referred to, which are intimately associated with the forming-chamber proper, although, as above stated, we make no claim thereto in the present instance.

86 is a reciprocatory slide-bar having therein an inclined slot 87, the extremities of this bar being loosely housed within supports 88, extending from the frame of the machine. Connected to one end of the slide-bar by means of a universal joint is a rod 89, the other end of this rod being hinged to a rod 90, fastened to one of the doors of the forming-chamber, so that it will be readily understood that the opening and closing of these doors will effect the reciprocation of the slide-bar 86.

91 is a journal-box whose lower extremity is pivoted at 92 to any convenient part of the frame, and 93 is a disk supported within this journal-box.

94 represents pins which extend through the journal-box into an annular groove (shown only in dotted lines at Fig. 4) in the face of this disk so that it will be clear that said disk may revolve freely, but at the same time will partake of movement parallel with its axis and caused by the swinging of the journal-box upon its pivotal point.

95 is a shaft journaled at one end in the frame of the machine, while the other end has a splined connection with the disk 93. 96 is a pulley loose on this shaft 95, and 97 is a hub which projects from the inner face of the disk 93, the adjacent surfaces of this hub and pulley being constructed in the usual manner common to friction-clutches, so that when the hub is driven against the pulley the latter will be practically rigid with the shaft 95, while the disengagement of said hub and pulley will cause this shaft to revolve, while the pulley itself will be stationary.

98 is a short shaft journaled at the side of the frame and carrying a pulley 99 and also a gear 100, which latter meshes with a gear 101, carried by the shaft 95, so that it will be clear that motion can be communicated to the shaft 95 by the revolution of the pulley 99.

102 is a pin which projects within the slide 87 and also within the annular groove in the disk 93. The pulley 99 is belted up to the power-shaft, while the pulley 96 is belted to the pulley 103, which latter is on the shaft of the upper feed-roll 20. It will therefore be clear that when the doors of the forming-chamber are opened the slide-bar will be driven backward, thereby causing the splined disk to slide along the shaft 95, owing to the connections of the pin 102 with the inclined slot 87 and the annular groove around the disk, thus disengaging the hub 97 and pulley 96, and consequently stopping the movements of the feed-rolls, so that the fur cannot be delivered into the forming-chamber. When the doors of this chamber are closed, the various parts just described will operate to effect the revolution of the pulley 96, whereupon the feeding of the fur will be resumed.

Of course there are very many changes which can be made in the details of construction of our weighing apparatus proper, all of which are within the range of ordinary mechanical skill, and we do not wish to be limited to the exact construction and arrangement of parts which we have shown.

What we claim as new, and desire to secure by Letters Patent, is—

1. In a hat-forming machine, a weighing apparatus comprising a hopper, a pivoted scale-beam carrying a weighing-pan beneath the mouth of said hopper, wide and narrow feed-belts carried by independent rotary elements within said hopper, the pivoted dog resting by gravity upon the scale-beam near said pan, and means operated by the falling of said dog during the initial descent of the pan for stopping the movement of the wide belt and relieving the scale-beam of the weight of said dog, substantially as set forth.

2. In a fur-weighing apparatus for a hat-forming machine, the combination of the pivoted scale-beam carrying at one end a weighing-pan, the hopper having its mouth extending above said pan, the independent shafts

journaled within said hopper, the wide and narrow feeding-belts carried by said shafts, frictional devices through the medium of which said shafts are revolved, the pivoted dog resting by gravity upon the end of the scale-beam near said pan, means operated by said dog for stopping the movement of the wide belt as the scale-pan descends by reason of the weight of the fur therein and of said dog, means operated by the final descent of said pan for stopping the movement of the narrow belt, and means for automatically dumping said pan, substantially as set forth.

3. The combination of the hopper, the pivoted scale-beam carrying a pan immediately beneath the mouth of said hopper, the independent shafts 26, 27, journaled at the top of the hopper, the independent shafts 28, 29, journaled at the bottom of said hopper, the wide and narrow feed-belts carried by the shafts 26, 28, and 27, 29, respectively, the ratchets tight on the shafts 26, 27, the pulleys loose upon said shafts and having frictional engagement therewith, means whereby said pulleys are revolved, the pawls pivoted to the sides of the hopper in close proximity to said ratchets, and means for throwing said pawls into engagement with said ratchets at predetermined times, substantially as set forth.

4. The combination of the independent shafts which carry respectively the wide and narrow feed-belts, ratchets secured to said shafts, means for revolving said shafts through the medium of frictional devices, the pivoted scale-beam carrying the weighing-pan at one extremity, the hopper within which the feeding-belts are contained, the pivoted pawls near said ratchets, the pivoted dog resting by gravity on the scale-beam near said pan and having its tail rigidly connected to the nose of one of said pawls, whereby the initial descent of the scale-beam will cause said pawl to be thrown into engagement with its adjacent ratchet thereby stopping the movement of the wide belt, the pivoted and weighted finger connected in electrical circuit with the scale-beam, the magnet within said circuit, and the spring-projected armature having a hooked end which normally extends beneath the tail of the other pawl when the electrical circuit is open whereby when the circuit is closed by the final descent of the scale-beam into contact with said finger, said armature will be withdrawn from said pawl and the latter allowed to come into engagement with its adjacent ratchet thereby stopping the movement of the narrow belt, substantially as set forth.

5. The combination of the ratchets 38, 39, secured upon the independent shafts which carry the wide and narrow feed-belts, the pawls pivoted in proximity to said ratchets, the weighted bell-cranks pivoted to the sides of the hopper, the loosely-pivoted dogs having pins which extend athwart said pawls and are connected with the upper legs of said bell-cranks on each side of the hopper, and the rotary crank-arms 78 which operate against the lower legs of said bell-cranks whereby said pawls are withdrawn from engagement with said ratchets, substantially as set forth.

6. The combination of the pivoted scale-beam carrying the weighing-pan at one end, the hinged bottom of said pan having projecting pins, the springs whereby said bottom is normally closed, the bell-cranks pivoted at each side of the hopper and having their upper legs extended immediately above said pins while their lower legs are provided with inclined portions, and the rotary crank-arms capable of striking against said inclined portions whereby the upper legs of the bell-cranks are operated to open the bottom of the pan, substantially as set forth.

7. The combination of the independent shafts which carry respectively wide and narrow feed-belts, the hopper within which said belts are contained, the ratchets tight upon said shafts, the pawls pivoted in proximity to said ratchets, the loosely-pivoted dogs having pins extending athwart said pawls, the pivoted bell-cranks whose upper legs are connected with said pins, the pivoted weighted finger at one side of the hopper, the scale-beam connected in electrical circuit with said finger and carrying the weighing-pan, the hinged bottom of said pan having laterally-extending pins and normally closed by springs, the pivoted bell-cranks having their upper legs extending immediately above said pins while their lower legs are provided with inclined portions, the magnet in said electrical circuit, the spring-projected armature near said magnet and provided with a hook which extends beneath the heel of one of said pawls when the electrical circuit is open, the pivoted dog resting by gravity upon the scale-beam near the pin and having its tail connected with the nose of the other pawl, means for communicating motion through the medium of frictional devices to said shafts which carry said belts whereby when the scale-pan initially descends the dropping of the dog resting thereon will cause the pawl connected therewith to be thrown out of engagement with its ratchet thereby stopping the movement of the wide belt and whereby when the scale-beam comes in contact with said finger the armature will be withdrawn from the other pawl and the latter allowed to engage with its ratchet thereby stopping the movement of the narrow belt, and the rotary crank-arms which act successively against the lower legs of said bell-cranks whereby the bottom of the pan is opened and said pawls withdrawn from their ratchets preparatory to succeeding weighing operations, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE H. L. SCHOONMAKER.
JOHN A. CANFIELD.

Witnesses:
WILLIAM SCHOONMAKER,
EVA J. BROOKS.