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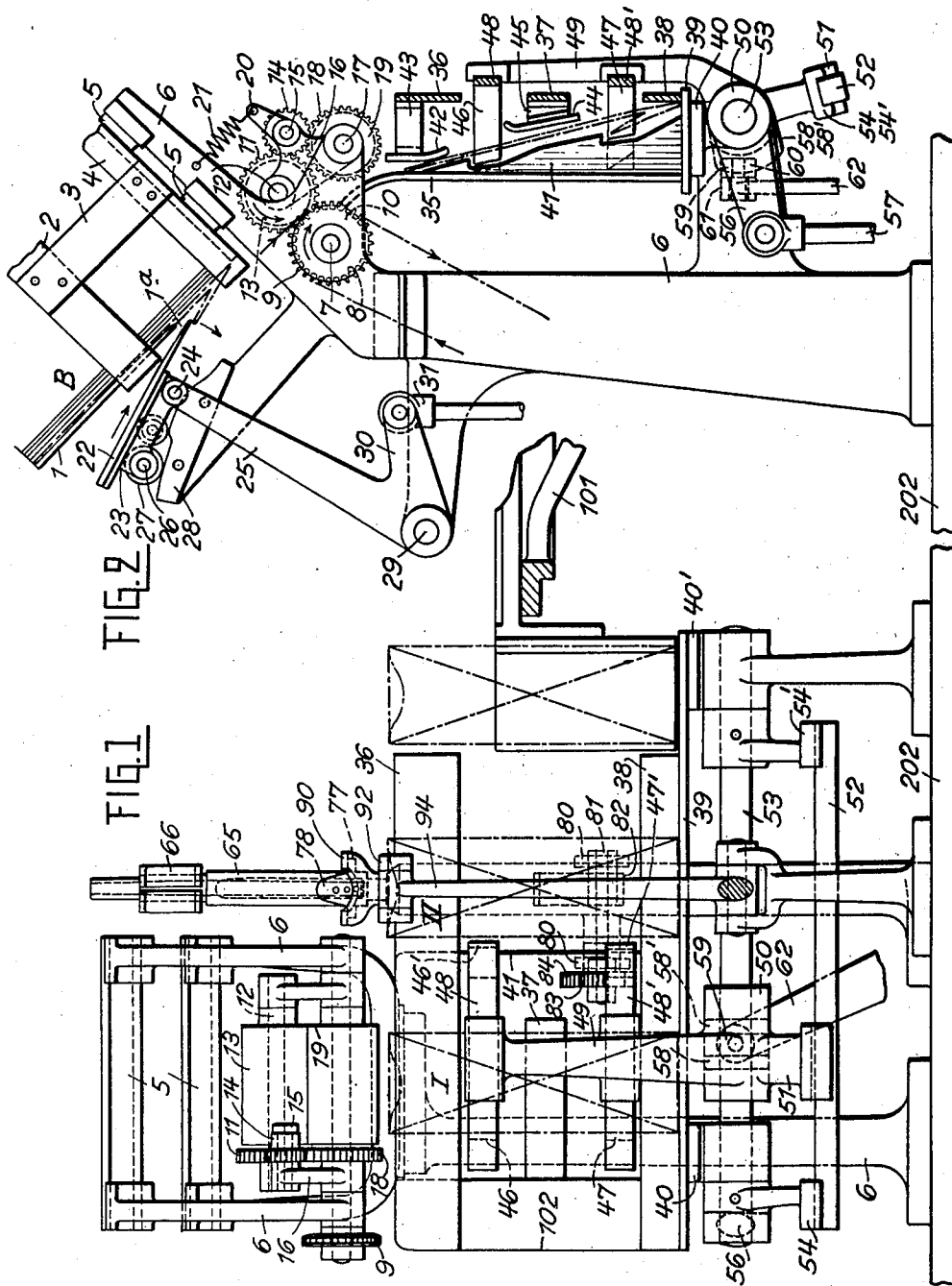
P. GANGLER

1,937,015

DEVICE FOR OPENING FLAT BAGS

Filed Aug. 30, 1932

4 Sheets-Sheet 1



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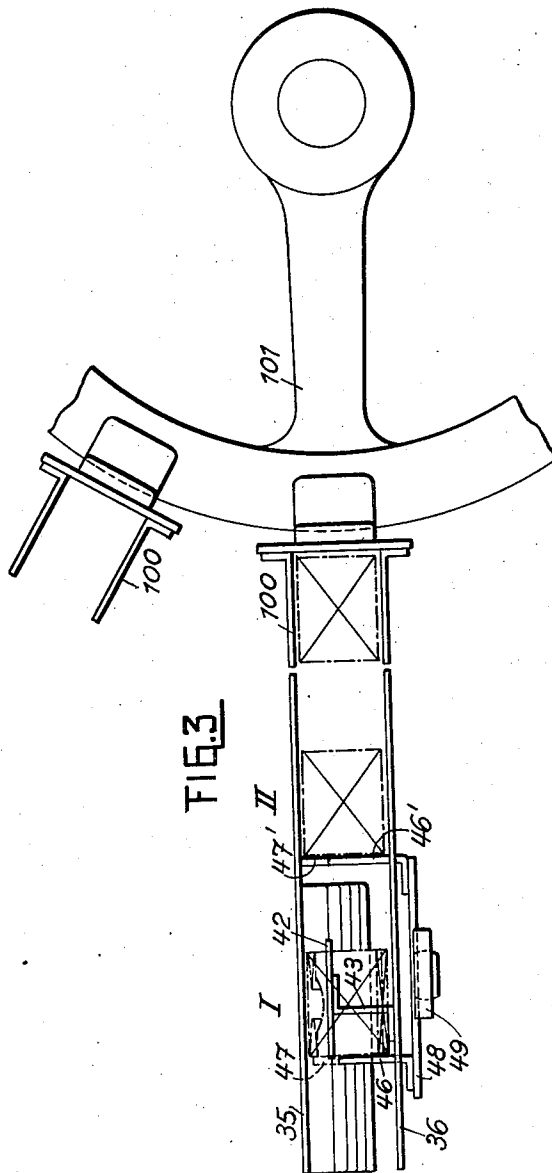
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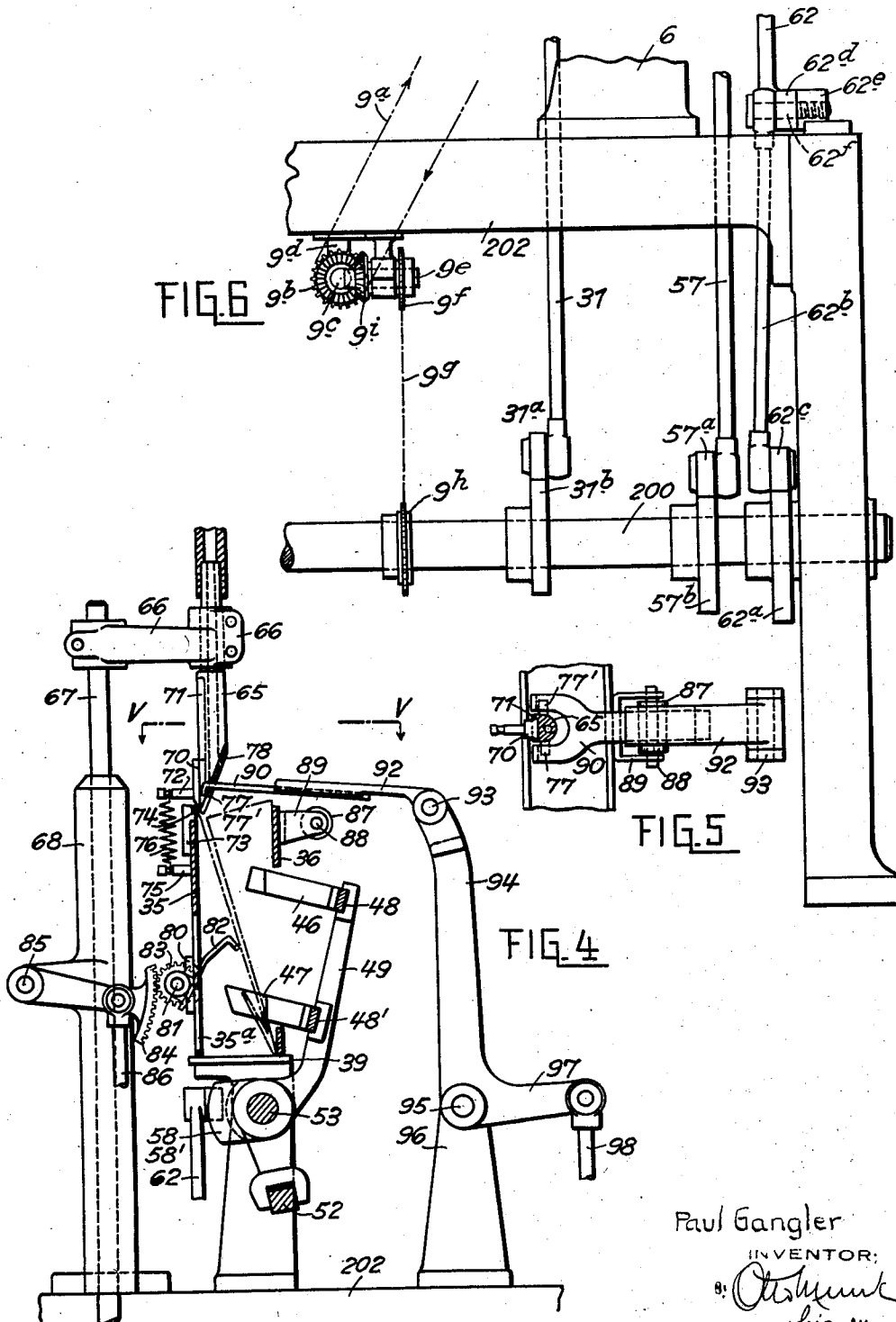
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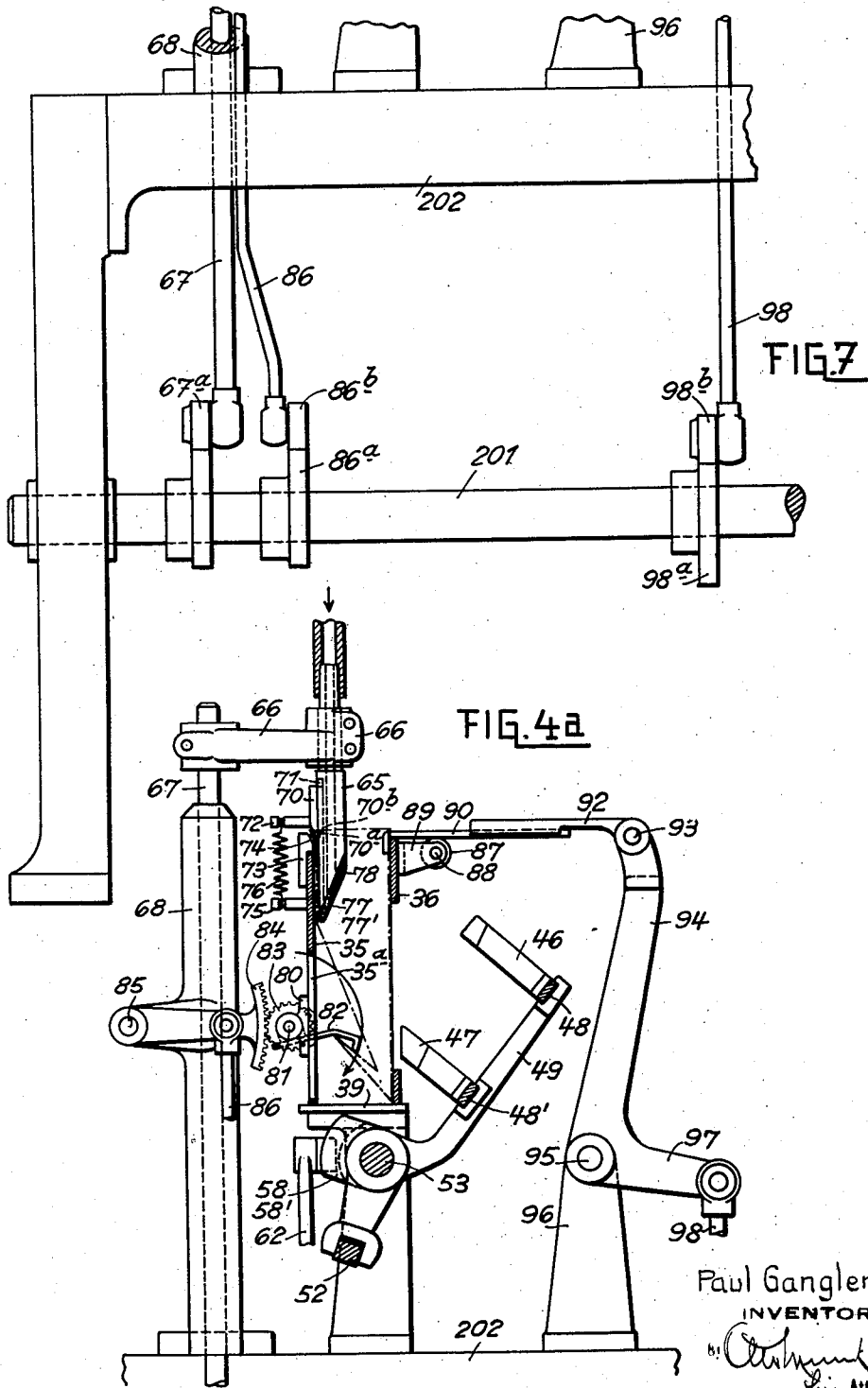
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UNITED STATES PATENT OFFICE

1,937,015

DEVICE FOR OPENING FLAT BAGS

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Application August 30, 1932, Serial No. 631,022,
and in Germany September 22, 1931

10 Claims. (Cl. 226—49)

My invention relates to bag filling and closing machines of the type in which finished folded or flattened bags are used, and more particularly to means for such machines for feeding and opening the flat paper bags. In automatic packing plants or assemblies these bags are generally produced on a bag making machine forming part of the plant and cooperating directly with the bag filling machine, the finished folded or flattened bags produced on the bag making machine being directly transferred from the folding mandrels of this machine into the conveyor receptacles of the filling and closing machine.

These automatic packing plants are rather extensive, comparatively expensive as regards capital cost, and due to their high capacity cannot be sufficiently utilized in small or medium works. Their fairly complicated construction, furthermore, calls for expert supervision and skilled attendance.

The invention relates to a simplification in automatic packing plants in so far as the said bag making machine is eliminated and instead of it finished flattened-down paper bags obtainable from the bag manufacturer are used, which after having been opened assume the customary rectangular or the like shape and can thus be treated in the filling and closing machine in exactly the same manner as the bags hitherto made on the bag making unit of the plant.

This simplification is of particular economical advantage for small and medium plants, because the purchase and storage of the reels of paper necessary for producing the bags is no longer necessary and a considerable saving of capital, room and power is effected.

There are already known machines in which finished flat-ended or pointed bags are individually withdrawn from a pile and filled during the opening process, and then closed. The bags retain their original flat form, however.

The novel feature of the present invention is that in a folded bag filling and closing machine with feed and opening mechanism for finished flat bags the flat bags stored in a pile are individually withdrawn from the pile by suitable conveying means engaging the flat bottom of the folded bag and transferred into a receiving trough or gutter whence the individual bags are conveyed to means for opening the bags into the rectangular or the like form, whereupon the opened bags are fed to the various working stations of the machine for filling and closing the bags in any known or suitable manner.

An embodiment of the invention is, by way of

example, illustrated in the accompanying drawings, in which shows

Fig. 1, a front-elevation of the bag feeding and opening mechanism of the machine,

Fig. 2, a side-elevation of Fig. 1,

Fig. 3, a plan view of the bag feeding mechanism with a part of the filling machine cooperating with it,

Fig. 4, a side-elevation of the mechanism for opening the bags, in its initial position,

Fig. 4a, in side-elevation, the opening mechanism during the opening of a bag, and

Fig. 5, a section along line V—V of Fig. 4,

Fig. 6, in side-elevation, a part of the driving mechanism for operating parts shown in Fig. 2, and

Fig. 7 a part of the driving mechanism for operating parts shown in Fig. 4.

As particularly clearly shown in Fig. 2, the pile of flat bags B rests upon an inclined plate 1 and is maintained in position by a structure of lateral rails 2, 3 and 4 joined by transverse rails 5. This bag pile supporting structure is mounted upon a bifurcated supporting standard 6. In this standard 6 is journaled a shaft 7 which carries a sprocket 9, a feed roller 8 and a gear wheel 10 which latter meshes with a spur wheel 11 keyed to a shaft 12 upon which is also mounted a conveying roller 13 cooperating with the said roller 8. The said sprocket 9 is driven by a chain 9^a from a sprocket wheel 9^b mounted on a shaft 9^c journaled in a socket 9^d which is secured to the machine table 202. The shaft 9^c is rotated in well known manner by a bevel wheel (not shown) keyed on it and meshing with a corresponding bevel wheel 9^d of a shaft 9^e. A sprocket wheel 9^f keyed on this shaft is driven by a chain 9^g by a sprocket wheel 9^h which is mounted on a suitable driving shaft 200 of the machine. With the said spur wheel 11 meshes a gear wheel 14 adapted to rotate upon a bolt 15. This bolt 15 and the shaft 12 are mounted on a rocking lever 16 pivotally mounted in an extension of the standard 6, by means of a pin 17. Upon this pin 17 revolves the spur wheel 18 meshing with the gear wheel 14, as well as the guide roller 19. An arm 20 of the rocking lever 16 is engaged by a helical spring 21, the other end of which is attached to the standard 6. In this way, the two conveying rollers 13 and 8 are resiliently pressed together.

To enable the withdrawal of the bottommost bag from the pile B, the plate 1 upon which the bags are piled up, is cut away or provided with an opening 1^a at its lower end. Through this

opening 1^a a knife-like member 22 is able to pass in proximity of the bag and by engaging the turned-over bottom of the bag to pull the bag out from the pile and to push it between the conveying rollers 8, 13.

The knife 22 is mounted on a carriage or cradle 23 pivotally connected to a lever 25 by a pin 24. The carriage 23 carries on an axle 26 a rotatable roller 27 adapted to run along a cam-shaped runway 28 secured to an extension or bracket on the standard 6, when the knife 22 performs a forward motion. The lever 25 is adapted to rock upon a pin 29 provided on a further bracket of the standard 6, and is operated by means of a lever 30 and a connecting rod 31 having an anti-friction bowl 31^a which is held in the well known manner by a suitable spring (not shown) in operative contact with an eccentric 31^b of the driving shaft 200.

For transferring the flat paper bag from the pile of bags into the bag opening mechanism there is below the rollers 8, 13 provided a guide wall 35 suitably curved at its upper end and against which leans an oblique trough or channel-like guideway consisting of a wedge-shaped piece 41 of wood or other suitable material and guide rails 42, 44 rigidly connected to rails 36, 37 by means of angle pieces 43, 45. A further rail 38 supports the bottom of the bag within the gutter. The guide wall 35 and the rail 38 are rigidly joined to a bottom plate 39 supported by brackets 40 and 40', see in particular Fig. 1. The rails 36 and 37 are secured to a lateral vertical rail 102 which is secured to the rail 38. As shown in Figs. 1 and 3, the wall 35 as well as the rails 36 and 38 extends with the bottom plate 39 along the various working stations I and II up to the entrance of the opened bag into the receptacles 100 of the well known conveyor wheel 101 of the filling and closing machine and thus securely guides the bag during its longitudinal movement. The said conveyor wheel 101 is rotated stepwise by any suitable and known driving mechanism in the well known and, therefore, not shown manner.

For conveying the still closed bag from the station I, Fig. 2, to station II, and from station II into the receptacle 100, there are provided feeding members 46, 47 and 46', 47', mounted on rails 48 and 48' secured to an arm 49, see in particular Figs. 1 and 3. The arm 49 possesses a hub 50 adapted to slide along a horizontal shaft 53. From the hub extends downwards an arm 51 which with its bifurcated lower end embraces a bar 52. This bar is rigidly secured to the arms 54 and 54' pinned to the shaft 53. The shaft 53 is adapted to be rocked by means of an arm 56 mounted on the hub of the arm 54 and a connecting rod 57 pivotally connected to the end of the arm 56. The rod 57 is operated in the well known manner by an anti-friction bowl 57^a, provided at its lower end, being held by a spring (not shown) in operative contact with a suitable eccentric 57^b of the driving shaft 200. In this way, the bar 52 is also able to perform angular movements around the axis of the shaft 53.

To move the conveying apparatus also parallel to itself, the hub 50 is provided with extensions 58, 58' between which projects and is slidably guided a block 60 pivotally mounted on the head 61 of the upper arm of a double-armed lever 62 which is adapted to be reciprocated from a suitable eccentric 62^a of the driving shaft 200. The double-armed lever 62 is jour-

naled with its hub 62^d (Fig. 6) on a bolt 62^e secured in a bracket 62^e mounted on the table 202. The other horizontal arm (not shown) of the lever 62 is engaged at its end by a lever 62^b which is held in the well known manner with an anti-friction bowl 62^c mounted at its lower end in operative contact with the said eccentric 62^a. In this way, the conveying apparatus is adapted to perform a movement parallel to itself on the shaft 53 and is furthermore at predetermined times also oscillated around this shaft 53.

The bag conveyed to the station II is here opened by suitable means, such as a blast of air and mechanically operated means. The pneumatic opening of the bag is effected by means of a blow pipe 65 provided at its lower end with a nozzle plate 78 directed obliquely downwards. The blow pipe 65 is clamped in an arm 66 mounted at the end of a rod 67 adapted to be vertically reciprocated within a sleeve 68 in a known manner by means of an anti-friction bowl 67^a of the rod 67 being kept in operative contact by a spring (not shown) with a suitable eccentric of a suitable driving shaft 201 of the machine. Into a longitudinal groove 71 of the blow pipe 65 projects a slide member 70 which at its lower outer end is provided with an inclined portion 70^a and a slightly receding inner inclined portion 70^b. At the upper edge of the wall 35 there is at the station II opposite the slide member 70 situated an abutment 73 for the upper end of the bag and which possesses a bevelled surface 74. The slide member 70 is maintained in its bottommost position by a spring 76 extending between a fixed pin 75 of the wall 35 and a pin 73 of the slide member 70. Air pressure is supplied to the blow pipe 65 in the well-known and therefore not shown manner by any suitable and known air pump, known valve means being provided for controlling, also in the well known manner, the supply of the compressed air to the blow pipe 65.

At the lower end of the wall 35, there is provided a hook 82 which is mounted on a shaft 81 which also carries a spur wheel 83. The shaft 81 is journaled in two bearings 80 at the back of the wall 35 in such a manner that the hook 82 is able to protrude through a slot 35^a of the wall 35. With the spur wheel 83 meshes a toothed segment 84 adapted to turn at an eye 85 of the tube sleeve and operated in a known manner by a connecting rod 86 from a suitable eccentric 86^a of the driving shaft 201 by means of an anti-friction bowl 86^b of the rod 86 being held by a spring (not shown) in operative contact with the said eccentric 86^a.

At the upper end of the rectangular shaft formed by the walls 35 and 36, there is secured to the wall 36 a bifurcated bracket 89 in which is journaled a spindle 88 supporting a roller 87. On the roller 87 rests usually a hook 90 for pulling the bag open. This pulling hook is bifurcated at its front end so that it is able to embrace the blow pipe 65 from both sides in the position shown in Figs. 4 and 5. In its raised position, this forked end of the hook 90 rests upon the lateral extensions 77, 77' of the nozzle plate 78, as shown in Figs. 4 and 5. The hook 90 is secured to an articulated member 92 which is pivotally mounted on the bifurcated end 93 of a lever 94, which itself is able to rock around the pin 95 of a pedestal 96 and is operated in known manner from a suitable eccentric 98^a of the driving shaft 201, by means of a connecting rod 98 engaging its arm 97, the said rod 98 being held with an

anti-friction bowl 98^b by a spring (not shown) in operative contact with the said eccentric 98^a.

The machine operates in the following manner:

5 On withdrawing the bottommost bag from the pile of bags B, the knife 22 passes during its forward movement in the direction of the arrow indicated in Fig. 2 through the opening 1^a of the pile bottom plate 1 and engages the bag between its turned-over bottom and its body portion, so
10 that the bag is pulled out of the pile B by means of the knife 22 operated by the roller 27 and the cam-shaped runway 28 and passed on between the two conveying rollers 8 and 13. By these two
15 rollers the bag is conveyed past the upper curved end of the guide wall 35 as well as the guide roller 19 into the inclined receiving trough and there takes up the upright and slightly inclined position shown in Fig. 2 between the wedge-shaped
20 part 41 and the rails 42, 44. In this position of the bag, the lever 49 swings inwards, and the feeding members 46, 47 place themselves against the side of the bag and transfer it to the working station II parallel with itself when the lever 49 performs its forward movement.

At the station II, the blow-pipe 65 is first brought into the position shown in Fig. 4 from its upper position not illustrated. The bag opening hook 90 resting on the extensions 77, 77' is
30 then lowered as well as the slide 70, due to the action of the spring 76. The bevel 70^a of the slide 70 forms during the downward motion together with the lower end of the nozzle plate 78 a wedge, which enables the blow pipe to enter between the upper open ends of the flattened-out bag, the
35 upper end of the rear wall of the bag being clamped in position by the slide 70 in conjunction with the abutment 74. During the further downward movement, the blow pipe 65 enters the bag due to the obliquely downward directed nozzle
40 plate 78 and opens the bag to such an extent that the bag opening hook 90 which by encountering the roller 87 is prevented from further downward motion, is able to place itself with its bifurcated end behind the upper end of the front wall of the
45 bag. Simultaneously the hook 90 is brought into the position according to Fig. 4a whereby it opens the bag completely at its upper end. The hook 82 has been simultaneously swung towards the bag by the toothed quadrant 84 in conjunction
50 with the spur wheel 83 through the recess 35^a of the wall 35, in such a way that it is able to enter with its hooked end between the bottom of the bag and the rear wall of the bag, Fig. 4a. On continuing the swinging motion in the direction
55 of the arrow, the bottom of the bag is moved downwards. The blow pipe 65 has then attained its lowest position and the paper bag is now completely opened by a valve-controlled current of air, so that it assumes the rectangular or square cross-section and the bottom of the bag rests flat upon the bottom plate 39. The complete opening
60 of the bag is considerably facilitated by the hook 82 effecting the downwards bending of bag bottom. During the upward return motion of the blow pipe, the bag opening hook 90 is again returned into its position according to Fig. 4 and carried upwards by the ascending lateral extensions 77, 77'. The slide 70 is likewise moved out
65 of its clamping position in consequence of the inner bevel 70^b encountering the lower end of the nozzle plate 78 against the resistance of the spring, so that the open bag is now conveyed forward into the receptacles 100 of the filling and closing machine by the feeding members 46', 47'

during the stroke of the lever 49. Simultaneously the feeding members 46 and 47 bring a flat bag meanwhile conveyed from the pile into the receiving trough into the opening device.

It is obvious that various changes and modifications may be made in the construction of the described and illustrated device without departing from my invention and the scope of the appended claims.

What I claim as my invention, is:—

1. A device for opening flat bags and feeding them to a packing machine, comprising a holder for a pile of flat bags and means for spreading the bags into their open shape, said holder and spreading means being arranged successively along a channel-like guideway leading to the packing machine, a knife-like member adapted to engage the flat bottom of the lowermost bag in the pile and to move it to conveyor rolls arranged between said pile and guideway and adapted to convey a bag into the said guideway, and feeding means adapted to convey the bag in the guideway to the said spreading means and then out of the guideway.

2. A device for opening flat bags and feeding them to a packing machine, comprising a holder for a pile of flat bags and means for spreading the bags into their open shape, said holder and spreading means being arranged successively along a channel-like guideway leading to the packing machine, means adapted to engage the lowermost bag in the pile and to convey it into the said guideway, and feeding members adapted to convey the bag in the guideway to the said spreading means and then out of the guideway, said feeding members being mounted on a shaft extending parallel to the said guideway and adapted to be displaced and to be oscillated upon said shaft.

3. A device for opening flat bags and feeding them to a packing machine, comprising a holder for a pile of flat bags and means for spreading the bags into their open shape, said holder and spreading means being arranged successively along a channel-like guideway leading to the packing machine, means adapted to engage the lowermost bag in the pile and to convey it into the said guideway, and feeding members adapted to convey the bag in the guideway to the said spreading means and then out of the guideway, said feeding members being secured to an operating arm mounted for lateral displacement on a shaft extending parallel to the guideway, a slide-block engaging the hub of the said arm and adapted to be displaced along the shaft, said operating arm having on its hub an arm-like extension embracing with its bifurcated end a guide-bar extending parallel to and rigidly connected by arms with the said shaft, another operating arm being secured to the shaft and adapted to impart a rocking movement to the shaft together with the said guide bar and the arm bearing the feeding members.

4. A device for opening flat bags and feeding them to a packing machine, comprising a holder for a pile of flat bags and means for spreading the bags into their open shape, said holder and spreading means being arranged successively along a channel-like guideway leading to the packing machine, means adapted to engage the lowermost bag in the pile and to convey it into the said guideway, and feeding means adapted to convey the bag in the guideway to the said spreading means and then out of the guideway, said spreading means comprising a blowing mem-

ber adapted to be raised and lowered, in cooperation with means for clamping one upper edge of the upper bag end against a wall of the channel-like guideway, and with a hook-like member adapted to pull the free upper edge of the bag away from the said clamped edge.

5 A device for opening flat bags and feeding them to a packing machine, comprising a holder for a pile of flat bags and means for spreading the bags into their open shape, said holder and spreading means being arranged successively along a channel-like guideway leading to the packing machine, means adapted to engage the lowermost bag in the pile and to convey it into the said guideway, and feeding means adapted to convey the bag in the guideway to the said spreading means and then out of the guideway, said spreading means comprising a blowing member adapted to be raised and lowered, in cooperation with means for clamping one upper edge of the upper bag end against a wall of the channel-like guideway, and with a hook-like member adapted to pull the free upper edge of the bag away from the said clamped edge, another hook-like member being provided for laying flat down the bottom of the bag.

6. A device for opening flat bags and feeding them to a packing machine, comprising a holder for a pile of flat bags and means for spreading the bags into their open shape, said holder and spreading means being arranged successively along a channel-like guideway leading to the packing machine, means adapted to engage the lowermost bag in the pile and to convey it into the said guideway, and feeding means adapted to convey the bag in the guideway to the said spreading means and then out of the guideway, said spreading means comprising a pipe shaped blow member having a nozzle plate and adapted to be raised and lowered, in cooperation with means for clamping one upper edge of the upper bag end against a wall of the channel-like guideway, and further with a hook-like member adapted to be raised and lowered and to pull the free upper edge of the bag away from the said clamped edge, said hook member being shaped to embrace the pipe-shaped blow member in the manner of a fork and resting in its raised position upon extensions of the said blow pipe nozzle plate and entering the mouth of the bag with its ends bent downwards when the blow pipe is lowered.

7. A device for opening flat bags and feeding them to a packing machine, comprising a holder for a pile of flat bags and means for spreading the bags into their open shape, said holder and spreading means being arranged successively along a channel-like guideway leading to the packing machine, means adapted to convey the lowermost bag from the pile into the said guideway, and feeding means adapted to convey the bag in the guideway to the said spreading means and then out of the guideway, said spreading means comprising a blowing member adapted to be raised and lowered, in cooperation with means

for clamping one upper edge of the upper bag end against a wall of the channel-like guideway, and with means adapted to pull the free upper edge of the bag away from the said clamped edge.

8. A device for opening flat bags and feeding them to a packing machine, comprising a holder for a pile of flat bags and means for spreading the bags into their open shape, said holder and spreading means being arranged successively along a channel-like guideway leading to the packing machine, means adapted to convey the lowermost bag from the pile into the said guideway, and feeding means adapted to convey the bag in the guideway to the said spreading means and then out of the guideway, said spreading means comprising a blowing member adapted to be raised and lowered, in cooperation with means for clamping one upper edge of the upper bag end against a wall of the channel-like guideway, with means adapted to pull the free upper edge of the bag away from the said clamped edge, and with means adapted to lay the bottom of the bag down flat.

9. A device for opening flat bags and feeding them to a packing machine, comprising a holder for a pile of flat bags and means for spreading the bags into their open shape, said holder and spreading means being arranged successively along a channel-like guideway leading to the packing machine, means adapted to convey the lowermost bag from the pile into the said guideway, and feeding means adapted to convey the bag in the guideway to the said spreading means and then out of the guideway, said spreading means comprising a blowing member adapted to be raised and lowered, in cooperation with means for clamping one upper edge of the upper bag end against a wall of the channel-like guideway, with means adapted to pull the free upper edge of the bag away from the said clamped edge, and with means comprising a hook-like member for laying the bottom of the bag down flat.

10. A device for opening flat bags and feeding them to a packing machine, comprising a holder for a pile of flat bags and means for spreading the bags into their open shape, said holder and spreading means being arranged successively along a channel-like guideway leading to the packing machine, means adapted to convey the lowermost bag from the pile into the said guideway, and feeding means adapted to convey the bag in the guideway to the said spreading means and then out of the guideway, said spreading means comprising a blowing member adapted to be raised and lowered, in cooperation with means for clamping one upper edge of the upper bag end against a wall of the channel-like guideway, said clamping means comprising a slide member yieldingly guided for longitudinal movement on and with said blowing member and adapted to cooperate during the operative stroke of said blowing member with an abutment provided on said wall of the guideway.

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