

March 2, 1948.

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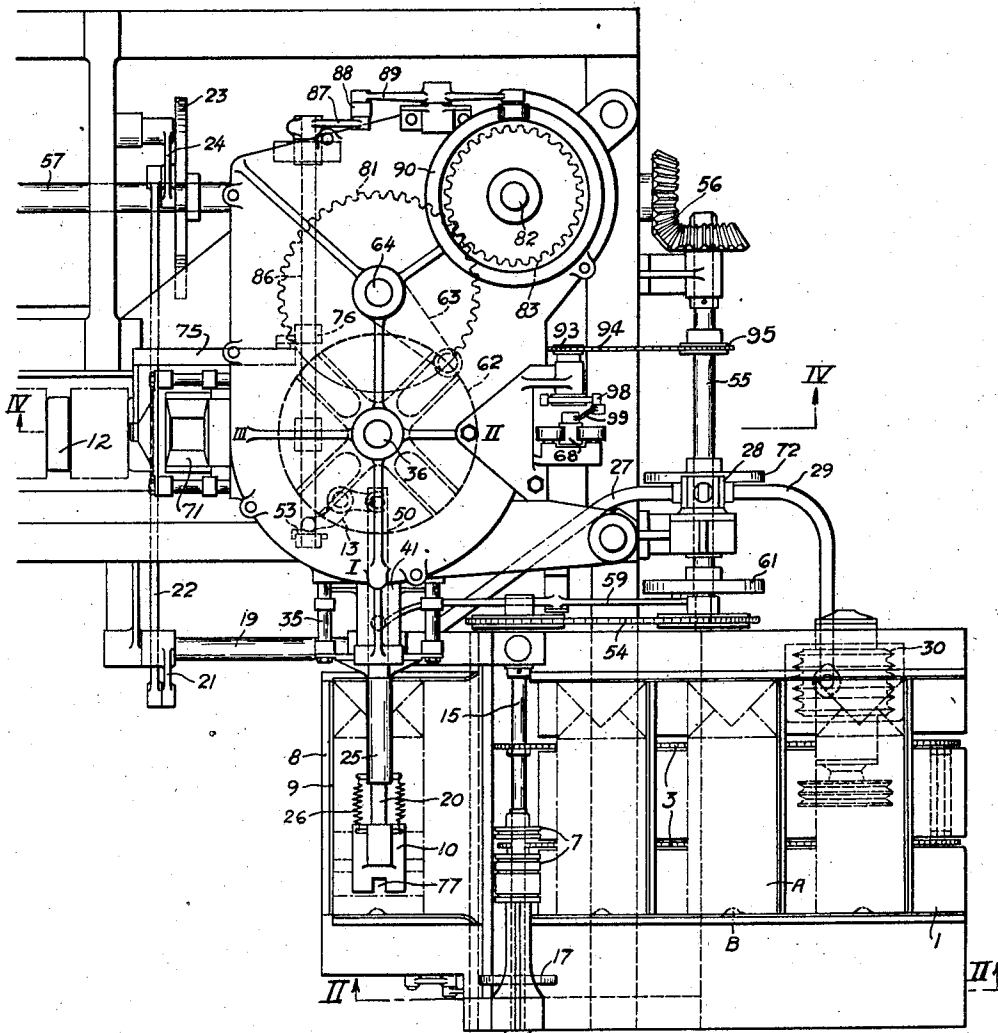
2,437,117

BAG FEEDING MACHINE WITH BAG OPENING AND EXPANDING MEANS

Filed March 13, 1943

5 Sheets-Sheet 1

FIG. 1



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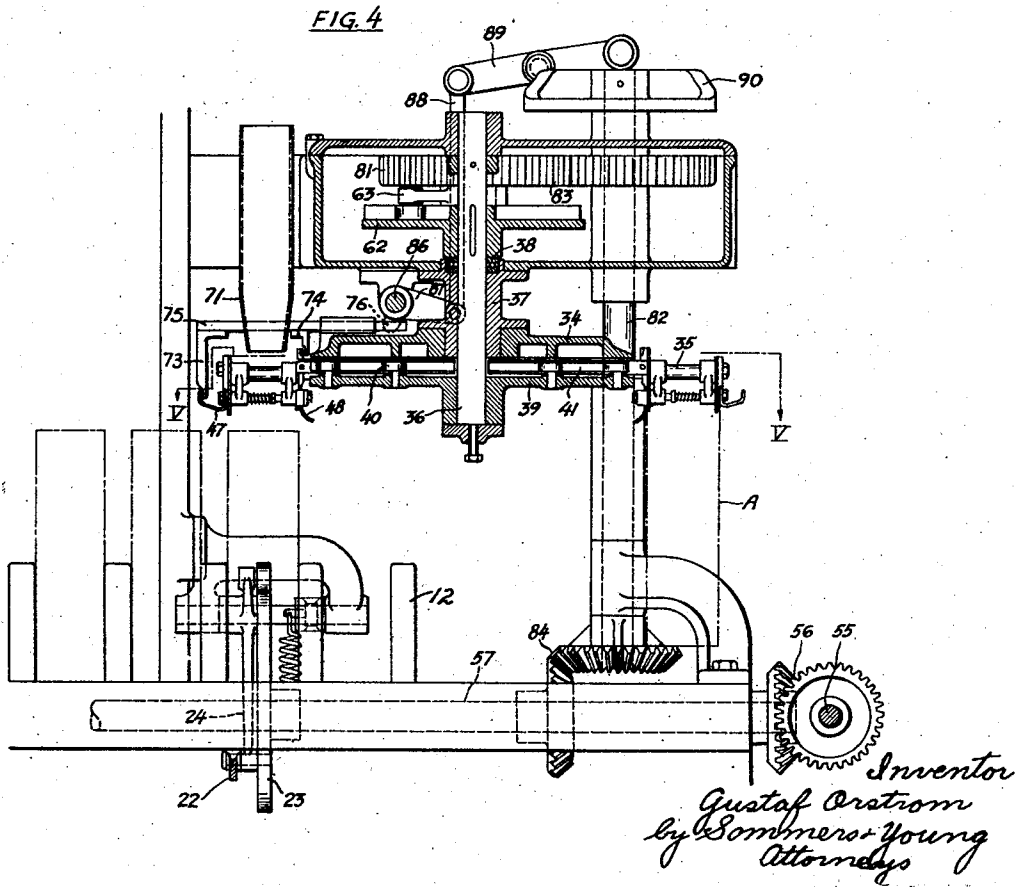
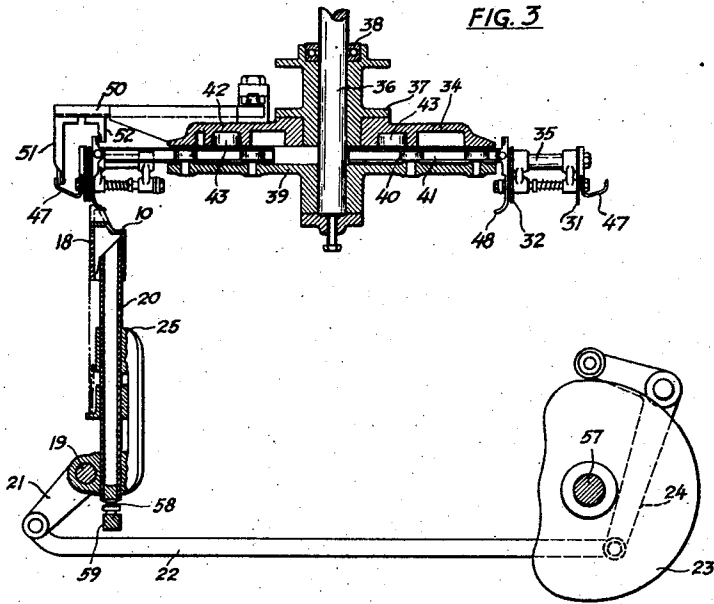
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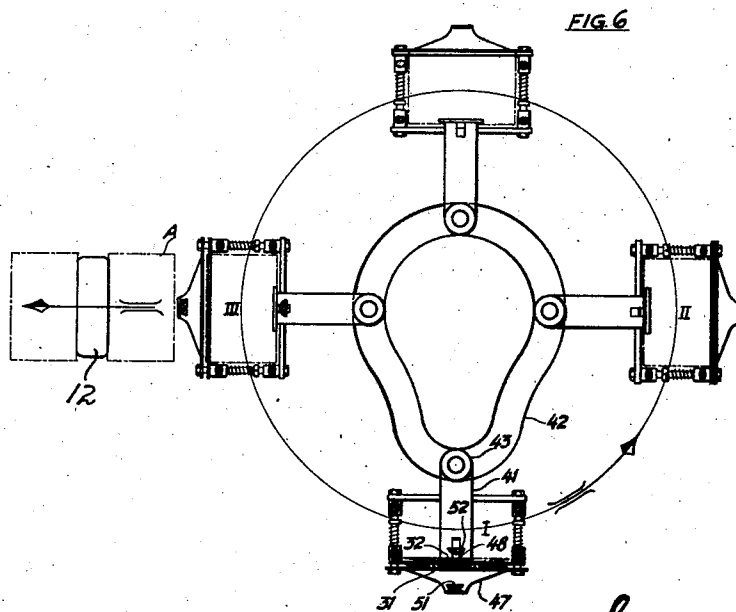
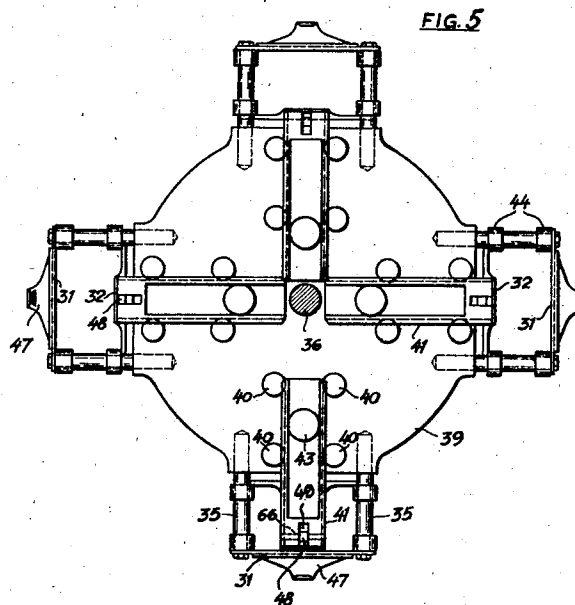
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FIG. 7

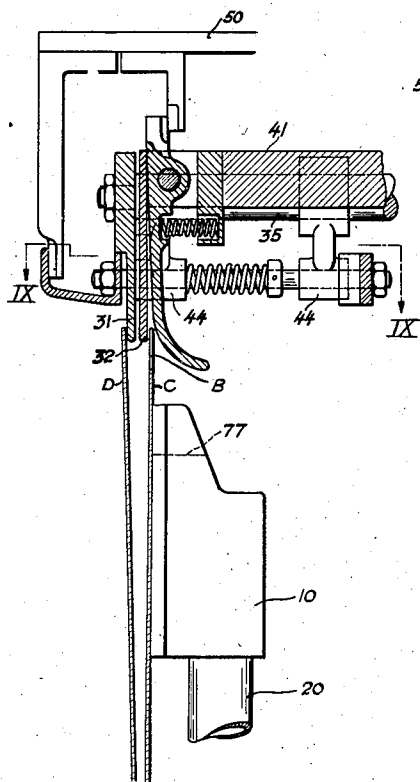


FIG. 8

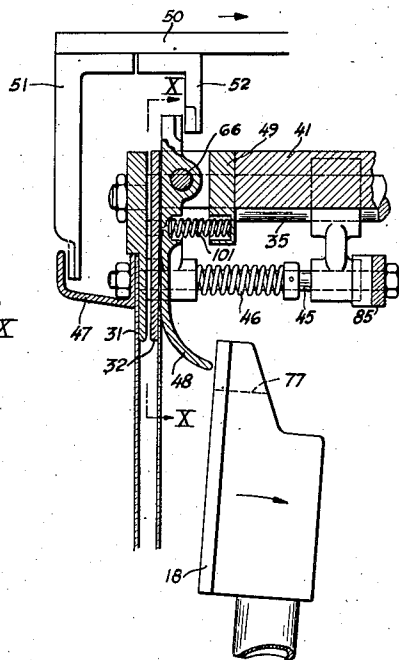


FIG. 9

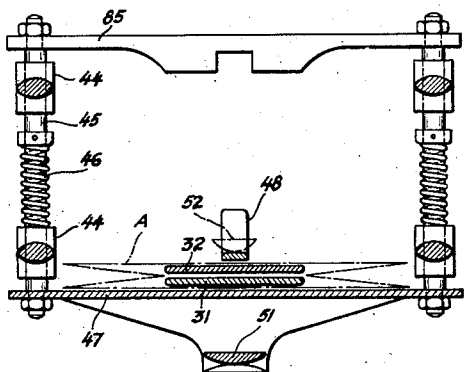
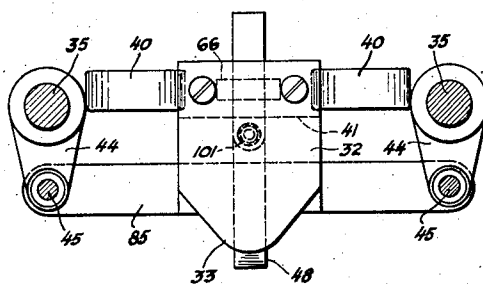


FIG. 10



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UNITED STATES PATENT OFFICE

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BAG FEEDING MACHINE WITH BAG OPENING AND EXPANDING MEANS

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In Sweden March 20, 1942

1 Claim. (Cl. 226—59)

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This invention relates to an improved mechanism in bag feeding machines adapted more particularly to open the collapsed bags and suspend same for receiving a quantity of filling material. In automatic machinery now commonly used, it is customary to manually place the bags upon the suspending means, thus entailing the expense of attendants, who may mutilate or destroy a number of bags and sometimes fail to properly position the bags upon the suspending means. In other machines hitherto known the bags are automatically applied to suspending means by arrangements operating in an uncontrolled manner to successively move the bags laterally against said suspending means or by inserting thin blades into the collapsed bag.

In contradistinction to the above arrangements or means the present invention has for its object to provide means for supplying and opening means which acts on the two walls of the bags transversely of the walls and of the direction of motion of the bags to invariably properly open the bags.

In the drawings:

Fig. 1 is a plan view of a bag feeding machine according to the invention;

Fig. 2 is a front elevational view of the main part of the machine partly in section on line II—II of Fig. 1;

Fig. 3 is a sectional view taken on the line III—III of Fig. 2;

Fig. 4 is a vertical sectional view of the upper part of the machine taken on the line IV—IV of Fig. 1;

Fig. 5 is a sectional view of part of the machine taken on the line V—V of Fig. 4;

Fig. 6 is a plan view of means for suspending and opening the bags and illustrates diagrammatically their operation;

Figs. 7 and 8 are sectional views corresponding to Fig. 3 and showing on an enlarged scale two different operative positions of the bag suspending and opening means;

Fig. 9 is a sectional view taken on the line IX—IX of Fig. 7; and

Fig. 10 is a sectional view taken on the line X—X of Fig. 8.

In the operation of the machine collapsed bellows-shaped bags A having in the top end of one of their walls C a thumb notch B are fed laterally by a chain conveyor 3 upon a table 1 between rollers 6 and 7, which provide folding creases to be utilized later, and are delivered to a table 8 from which they are successively taken by a suction head 10 and transferred to a turret 11 to

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which they are at the station I suspended by their top ends. On the rotation of the turret 11 the suspended bags are during their travel to the station II expanded at their top ends and at the station II they are expanded also at their bottom ends. Thereafter the turret 11 moves the completely opened bags further to a station III where the bags are filled with material.

The endless chain conveyor 3 runs over a sprocket wheel 4 secured to the driving shaft 15 and over an idle sprocket wheel 5. The shaft 15 is rotated by a chain 54 and shaft 55 which by means of a bevel gear 56 is driven from the main driving shaft 57 of the machine.

The table 8 is pivoted to a pin 14 and provided with an abutment 9 against which the bag supplied thereto rests when the table is turned down into the bag receiving position shown in full lines in Fig. 2. The table 8 is by means of a link 16 connected to a lever 60 which by a cam disc 17 secured to the shaft 15 periodically turns the table up and down between the inclined bag receiving position and the horizontal bag delivering position shown in dash and dot lines. The suction head 10 has at its upper end a slot 77 and is provided with a perforated suction plate 18 and secured to a pipe 20 which is longitudinally displaceable in an arm 25 secured to a rotary shaft 19. To the shaft 19 is also secured an arm 21 which by means of a link 22 is connected to a lever 24 actuated by a cam disc 23 secured to the shaft 57. The suction head 10 is by means of tension springs 26 connected to the arm 25 so that the suction head can be elevated against the tension power of the springs which urge the suction head downwards to hold the closed bottom end of the pipe 20 in engagement with a head 53 on a lever 59. The lever 59 is pivoted to a pin 80 and actuated by a cam disc 61 secured to the shaft 55. The pipe 20 is connected to a flexible hose 27 which over a reversing valve 28 and a suction pipe 29 is connected to a suction pump 30. A cam disc 12 is secured to the shaft 55 and actuates the valve 28 so that the suction pipe 29 communicates with the hose 27 when the suction head 10 is taking a bag from the table 8 and delivering same to the turret 11 whereafter the suction in the hose 27 is interrupted by causing the valve 28 to admit air at atmospheric pressure into the hose.

The turret 11 has circumferentially four pairs of plates 31 and 32 which serve as bag opening members. The plates 31 and 32 have each a downwardly directed tongue 33 of substantially the same configuration as the thumb notch B of

the bag but slightly narrower than said notch. The outer bag opening plates 31 are each secured to a pair of pins 35 that project radially from a rotary disc 39 forming the main part of the turret 11. A circular guide plate 34 is secured to a socket 37 fixed to the machine frame and a vertical driving shaft 36 is rotatably journaled in said socket by means of a thrust bearing 38. To the shaft 36 is secured a Geneva-wheel 62 which is driven stepwise (a quarter of a revolution) by an arm 63 which is secured to a vertical rotary shaft 64. To the shaft 64 is secured a gear wheel 81 which meshes with another gear wheel 83 secured to a vertical rotary shaft 82. The shaft 57 drives the shaft 82 by means of a bevel gear 84. The turret disc 39 serving as a rotary conveyor is secured to the shaft 36 below the guide plate 34 and provided with four guides disposed uniformly around its periphery. Each guide consists of two pairs of idle rollers 40 between which is longitudinally displaceable a slide 41 which is forked at its outer end and has a guide roller 43 which runs in a curved groove 42 of the stationary guide plate 34. To the forked outer end of each slide 41 is secured one of the inner bag opening plates 32. To each pin 35 are secured two downwardly directed guides 44 in which is movable a spindle 45 longitudinally of the pin 35. The spindles 45 are at their inner ends interconnected by a cross-head 85 and at their outer ends by a bag clamp 47. Each spindle 45 is provided with a compression spring 46 which urges the spindle inwards towards the shaft 36 so that the clamp 47 positioned beyond the outer bag opening plate 31 is moved inwards against said plate. At the inside of the inner bag opening plate 32 there is provided another clamp 48 which on a pin 56 is pivoted to the slide 41. The slide 41 is provided with an abutment 49. A compression spring 101 is mounted between the clamp 48 and the abutment 49 to urge said clamp against the plate 32. The stationary guide plate 34 is provided at the bag receiving station I with a radially disposed rod 50 which is adapted to reciprocate longitudinally. At its outer end rod 50 is provided with two abutments 51 and 52 adapted to open the clamps 47 and 48, respectively. At its inner end the rod 50 is pivotally connected to a lever 13 which is actuated by a cam 53 secured to a rotary shaft 86 to periodically reciprocate the rod 50. A rocking lever 87 is secured to the rotary shaft 86 and by means of a link 88 it is connected to a lever 89 which by a cam 90 secured to the shaft 82 is caused to perform periodical swinging movements.

At the station II there is provided a rectangular plunger 67 which is secured to a vertical rod 68. The rod 68 is slidably mounted in a guide 91 and a pin 92 is inserted transversely into said guide and carries a sprocket wheel 93 rotatably journaled thereon. The sprocket wheel 93 is driven by means of a chain 94 from another sprocket wheel 95 secured to the shaft 55. The sprocket wheel 93 is secured to still another sprocket wheel 96 and a chain 98 runs over this wheel as well as over an idle sprocket wheel 97. The rod 68 is connected by means of a link 99 to the chain 98 so that on the rotation of the shaft 55 the rod 68 performs long movements up and down to move the plunger 67 into the opened mouth of a bag and down to its bottom to expand said bottom and thereafter to move the plunger upwards out of the bag. The bag will thus have been completely opened, and remains suspended from the bag opening plates 31 and 32.

At the station III there are provided bag filling means (not shown) having a filling spout 71 for the supply of material from a scale (not shown) to the bag finally expanded by the plunger 67. Furthermore, at this station a pair of abutments 73 and 74 similar to the abutments 51 and 52 are operative to open the clamps 47 and 48. The abutments 73 and 74 are secured to rod 75 which is displaceable longitudinally and radially of the guide plate 34. A rocking arm 76 secured to the shaft 86 actuates the rod 75 to make the abutments 73 and 74 open the clamps 47 and 48 when the rod 75 moves said abutments outwardly from the shaft 36 whereby the bag is released from the turret disc 39 and drops onto the conveyer 12.

When a bag is taken from the table 8 by the suction head 10 which is then swung upwards the bag is turned from a horizontal position into a vertical position (Fig. 3). Thereby the bag wall C is, by means of its thumb notch B, moved past the tongues 33 of the plates 31 and 32 whereas the opposite bag wall D engages against the tongue 33 of the plate 31. Thereby the bag mouth is opened slightly to enable the suction head 10 when being elevated by the lever 59 to slide the bag mouth onto the plates 31 and 32 simultaneously as the rod 50 holds the clamps 47 and 48 apart from the plates 31 and 32. Thereby the suction head embraces by its notch 77 the clamp 48. Thereafter the rod 50 is displaced inwardly so that its abutments 51 and 52 allow the clamps to yieldingly move against the plates 31 and 32 and pinch the bag walls C and D at their upper edges. Thereafter the valve 23 is reversed to allow air at atmospheric pressure to enter the hose 27 and suction head 10 so that the latter releases the bag. Then the suction head is swung further inwardly into the position shown in Fig. 8 so that the clamp 48 on the travel of the bag to the station II does not interfere with the suction head. Simultaneously as the turret disc 39 is feeding the bag to the station II the slide 41 is being retracted, that is, moved inwardly by the roller 43 travelling in the curved groove 42 so that the inner pincher consisting of the plate 32 and the clamp 48 is moved inwardly and pulls the bag wall C radially inwardly and opens the bag mouth completely so that it obtains a rectangular cross-sectional shape. Thereafter the plunger 67 enters the bag and expands the bag also at its bottom end which thereby obtains the same rectangular cross-sectional shape as the mouth of the bag. The bag thus having been opened or expanded is fed by the turret through two steps to the filling station III while being suspended by the pinchers 31, 47 and 32, 48 held apart under the control of the guide groove 42.

I claim:

In a bag opening and suspending mechanism for machines for feeding and filling bags each having a notch in one side wall at the upper end thereof, a pair of clamp members, a pair of flat plates located between said clamp members, said clamp members being normally spaced from the respective adjacent plates, said plates having flat tongues narrow enough to pass through said notch of said bag wall and projecting beyond one of the juxtaposed clamp members and being located in a position corresponding to said notch of said bag wall, a suction head for holding a collapsed bag by its wall having said notch, means for moving said suction head transversely past said juxtaposed clamp member and both said plates to allow the bag wall having the notch to pass said plates by lateral movement and to cause

the other bag wall to engage and be detained by one of said tongues to partially open the mouth of the bag, means for then shifting the direction of movement of said suction head to move longitudinally of and towards said plates and thereby to slide the bag thereon, means for then moving said clamp members towards said plates to clamp the bag walls thereto, and means for then moving said plates together with said clamp members apart to complete the opening of the bag.

GUSTAF ÖRSTRÖM.

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