

July 17, 1956

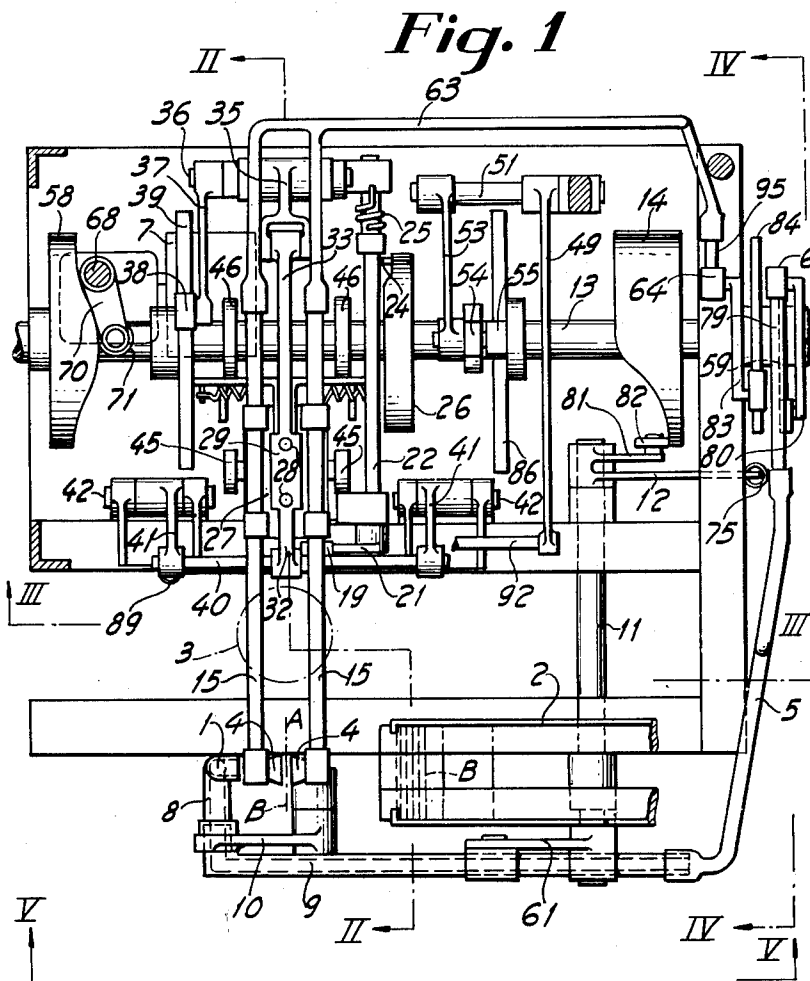
G. ÖRSTRÖM ET AL

2,754,646

BAG FILLING MACHINES .

Filed June 12., 1950

6 Sheets-Sheet 1



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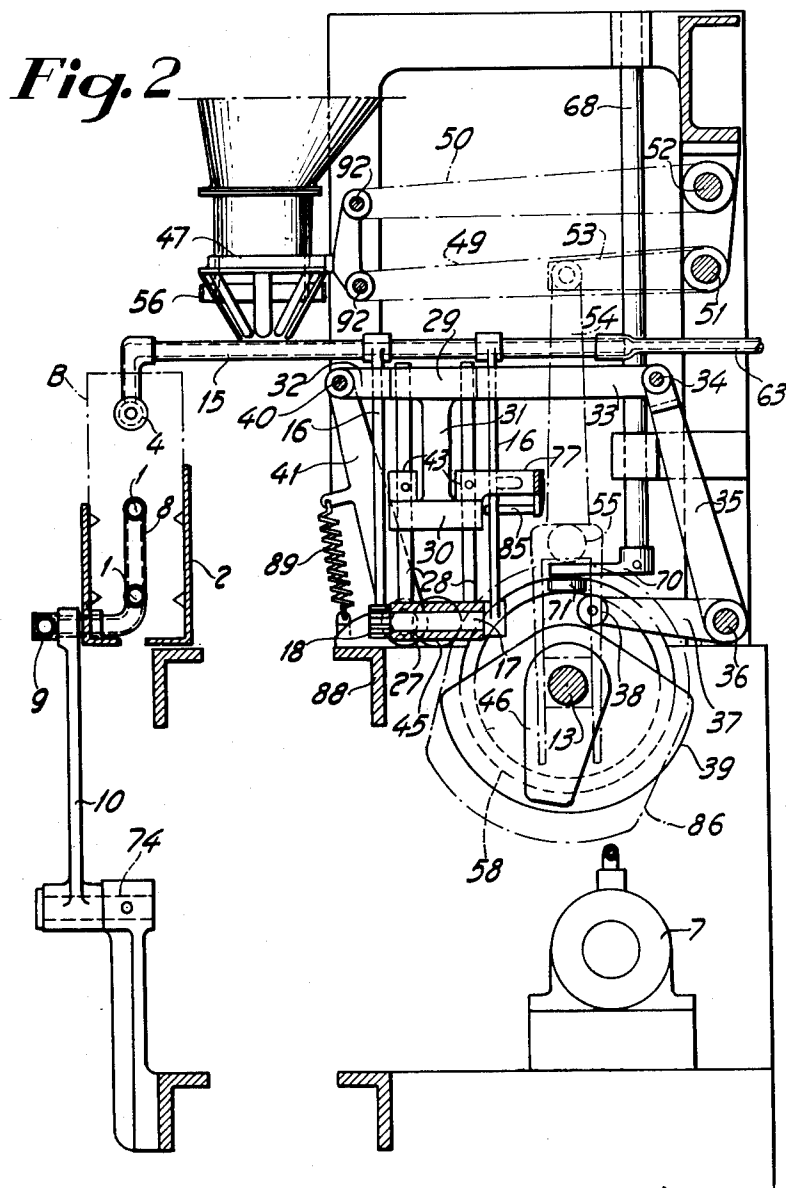
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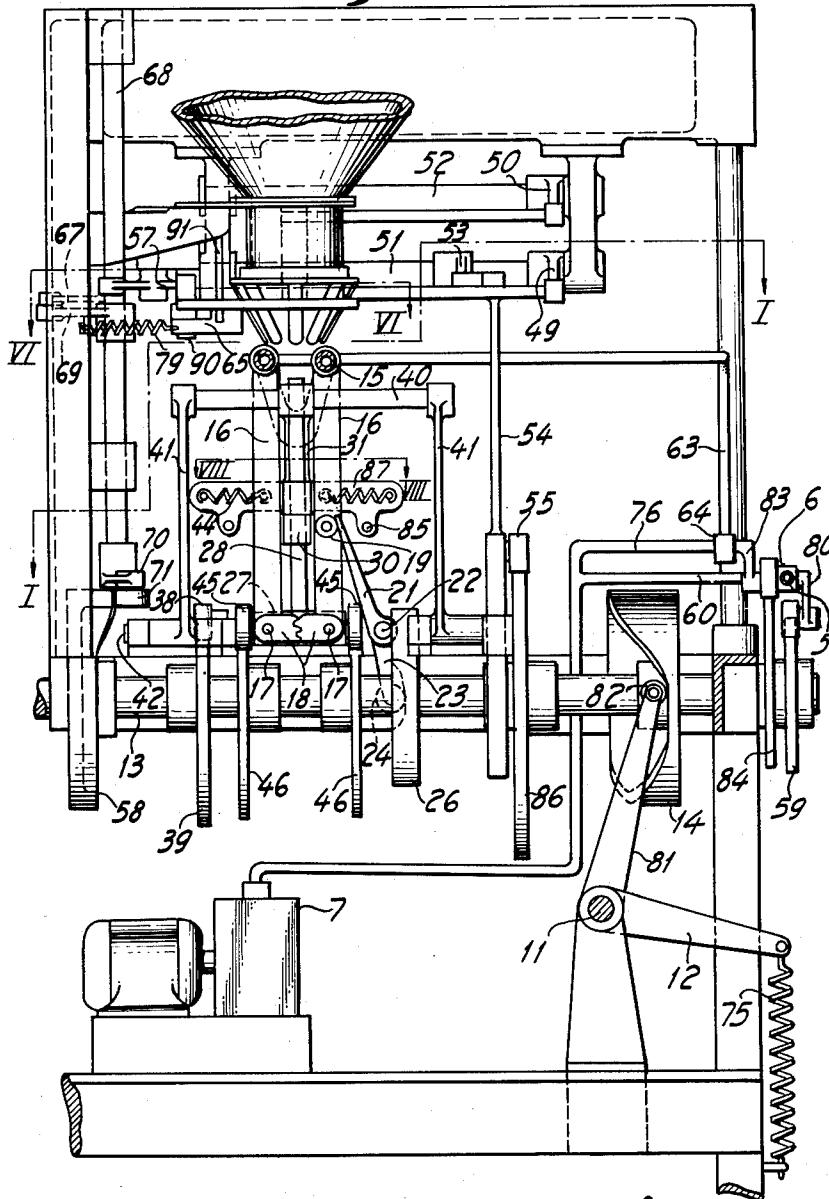
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Fig. 3



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Fig. 4

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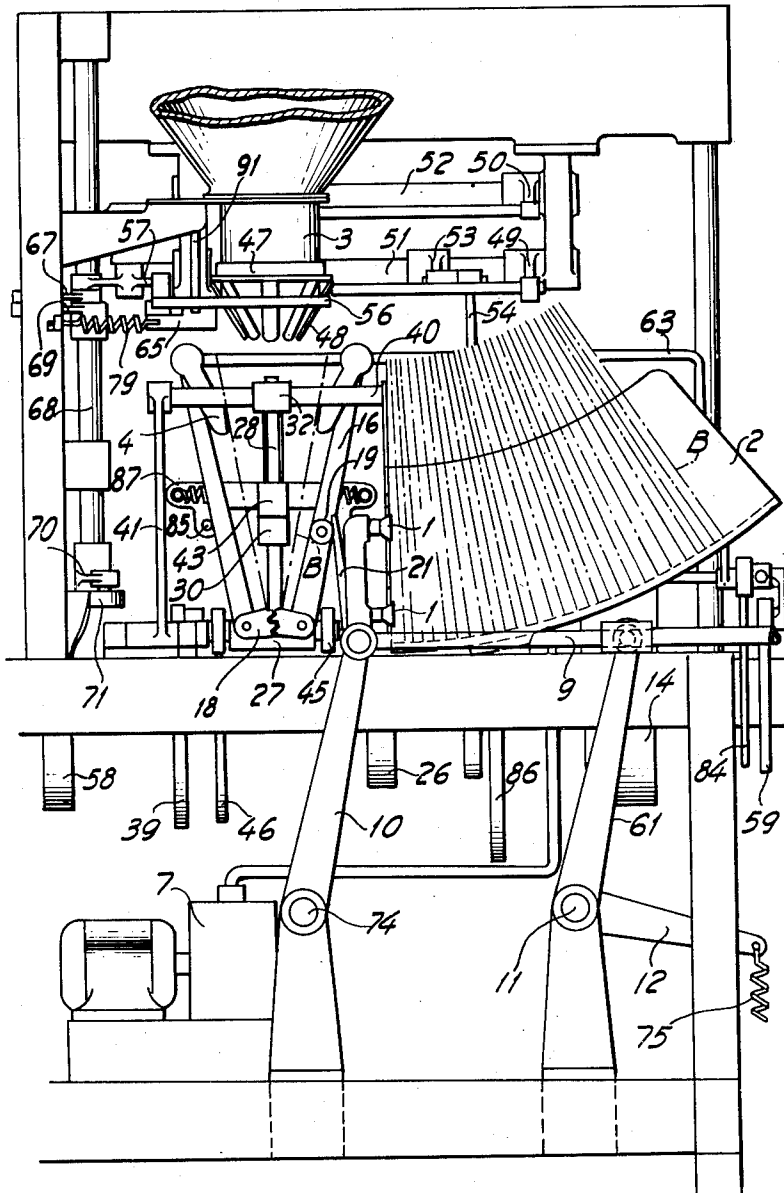


Fig. 5

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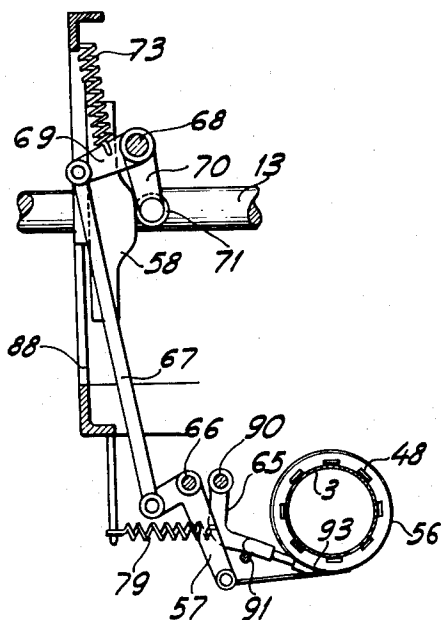


Fig. 6

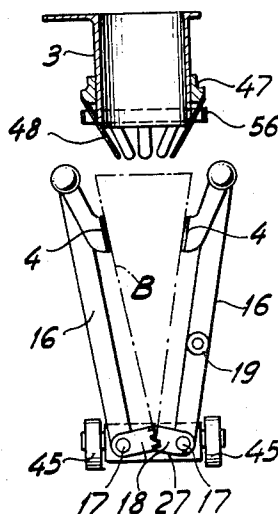


Fig. 7

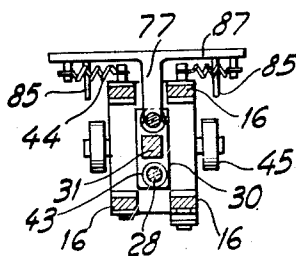


Fig. 8

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2,754,646

BAG FILLING MACHINES

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Application June 12, 1950, Serial No. 167,644

Claims priority, application Sweden June 21, 1949

7 Claims. (Cl. 53—188)

This invention relates to improved means for applying bags to the filling spout of machines for filling bags, e. g. with flour. It is an object of the invention to provide simple and efficient means to facilitate the sleeving of the bag mouth onto the filling spout avoiding damages of the bag due to disconformities between the shapes of the bag and the spout. Another object of the invention consists in the provision of bag expanding means that will not come in contact with the filling material even though said means remains on the spout during the filling operation. Still another object of the invention consists in the provision of means for applying the bag smoothly and tightly to the filling spout without interfering with said means for facilitating the sleeving of the bag onto the spout.

With these and other objects and advantages in view the invention consists in certain novel constructions and arrangements of parts which will be hereby pointed out in the claims hereunto appended reference being had to the accompanying drawings in which:

Figure 1 is a plan view partly in section taken on the line I—I of Figure 3;

Figures 2 and 3 are elevational sectional views taken on the lines II—II and III—III, respectively, of Figure 1 with certain parts removed to facilitate the illustration;

Figure 4 is an elevational view taken on the line IV—IV of Figure 1 with certain parts removed to facilitate the illustration;

Figure 5 is an elevational view taken on the line V—V of Figure 1 with certain parts in other operative positions;

Figure 6 is a horizontal sectional view taken on the line VI—VI of Figure 3;

Figure 7 is an elevational view, partly in section, showing certain members in the same operative positions as in Figure 5;

Figure 8 is a sectional view taken on the line VIII—VIII of Figure 3.

Referring to the drawings, the collapsed bags B are by a pair of suction nozzles 1 successively removed from a stack in a curved receptacle 2 and transferred to the station at A (Figure 1). From said station the bags are by a pair of suction nozzles 4 transferred laterally into a position below a filling spout 3 onto which the bag is to be sleeved after its mouth has been expanded partially by moving the nozzles 4 apart at the station A.

The nozzles 1 form mouths of a pipe 8 which by pipes 9, 60 and 76, a valve 6 and a flexible hose 5 are connected to a suction pump 7. The valve 6 is connected to and operated by an arm 80 which is actuated by a cam disc 59 secured to the continuously rotating main shaft 13. The pipe 9 is pivotally connected to two arms 10 and 61. The arm 10 is rotatably mounted on a pin 74 and the arm 61 is secured to a shaft 11 which is rotatably journaled in the machine frame 38. To the shaft 11 is secured a bell-crank, one arm 12 of which is connected to a tension spring 75. The other arm 81 of the bell-crank carries a roller 82 which rides on a cam disk 14 secured to the shaft 13.

The suction nozzles 4 are each secured to a horizontal

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pipe 15. The pipes 15 are by a forked hose 63, pipes 95, 76 and a valve 64 connected to the suction pump 7. The valve 64 is connected to and operated by an arm 83 which is actuated by a cam disk 84 secured to the shaft 13. The pipes 15 are each secured to a pair of upright arms 16 secured to a rotatably journaled pin 17. One arm 16 of each pair is equipped with a toothed segment 18, which segments intermesh.

The two pins 17 are rotatably journaled in a cross head 27 to which a pair of vertical spindles 28 are secured. The spindles 28 are slidably inserted into two other cross heads 29 and 30 which are formed integrally with an intermediate beam 31. To each spindle 28 is secured a stop 43. The stops 43 are adapted to freely rest on the cross head 30 so as to support the spindles 28 as well as the cross head 27, the arms 16 and the pipes 15. On one of the arms 16 is mounted a roller 19 adapted to be acted upon by a rocking arm 21, so that the pairs of arms 16 and, consequently, also the pipes 15 and the nozzles 4 are swung towards each other. The arm 21 is secured to a rotatably journaled spindle 22 to which is secured another arm 23. The arm 23 is equipped with a roller 24 which by a spring 25 enclosing the spindle 22 is held in engagement with a cam disk 26 secured to the shaft 13. The cam disk 26 will actuate the arm 21 to swing the arms 16 towards each other so that the bag B is seized by the suction nozzles 4 whereafter said arm 21 is swung back so that the nozzles 4 are allowed to swing apart and open somewhat the mouth of the bag. This operation takes place at the station at A.

One of the stops 43 is formed with a T-shaped arm 77 the legs 87 of which are connected to one arm of each pair of arms 16 by tension springs 44 which urge said arms apart (Figures 5 and 8) until they are arrested by abutments 85 on the legs 87.

The cross head 29 is formed integrally with a forward beam 32 and a rear beam 33. The rear beam 33 is pivoted by a pin 34 to a forked arm 35 which is secured to a rotatably journaled pin 36. To the pin 36 is secured another arm 37 which is provided with a roller 38 which rides on a cam disk 39 secured to the shaft 13. The cam disk 39 will swing the arm 35 so that the cross head 29 and thereby also the pipes 15 are reciprocated. Thereby the nozzles 4 having been moved apart, as in Figures 5 and 7, are moved to and fro between the station at A and the station below the spout 3. Into the forward beam 32 is inserted a spindle 40 which is journaled at its ends in two arms 41. The arms 41 are pivotally mounted on pins 42 at the same level as the pin 36 and they have the same lengths as the arm 35. One of the arms 41 is connected to the machine frame by a tension spring 39, which urges the roller 38 against the cam disk 39.

A pair of rollers 45 rotatably mounted on the cross head 27 are positioned each above one of two cam disks 46, secured to the shaft 13, when the pipes 15 have been moved rearwardly so that the nozzles 4 with the partly expanded bag B are positioned below the spout 3. Then the rotating cam disks 46 will elevate the rollers 45 and, consequently, also the cross head 27, the spindles 28, the arms 16, the pipes 15, the nozzles 4 and the bag B carried by them.

A ring 47 is slidably mounted on the spout 3 and provided with thin blade springs forming fingers 48 which engage the edge of the mouth of the spout 3 and constitute a crown enclosing said mouth. To the ring 47 are pivoted by pins 92 two equally long arms 49 and 50 which are each secured to a rotatably journaled pin 51 and 52, respectively. To the pin 51 is secured another arm 53 to which is pivotally connected a rod 54. The rod 54 carries a roller 55 which rides on a cam disk 86 secured to the shaft 13. Thus, the rotating cam disk 86 will

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periodically move the ring 47 up and down on the spout 3.

A steel hoop (blade spring) 56 extends concentrically or substantially concentrically around the crown of fingers 48 embracing the mouth of the filling spout 3. One of the ends of the steel hoop 56 is secured to an arm 65 rotatably mounted on a pin 90. The other end of the steel hoop 56 is pivoted to a bell crank 57. The arm 65 is connected to a tension spring 79 which urges said arm against a stop pin 91. The bell-crank 57 is rotatably mounted on a pin 66 and pivoted to one end of a rod 67 the other end of which is pivoted to an arm 69 secured to a rotatably journaled spindle 68. To the spindle 68 is secured another arm 70 which is provided with a roller 71. A tension spring 73 is connected to the arm 69 and urges the roller 71 against a cam disk 58 secured to the shaft 13. The steel hoop 56 has a free end 93 which projects beyond the attachment to the arm 65 (Figure 6) so that it forms a resilient tongue covered by another portion of said steel hoop. Obviously the arms 65 will by radial pressure exerted by the steel hoop 56 be swung inwardly against the spout 3, when the arm 57, acting as a drawing member, is swung away from the spout to tighten the steel hoop. When the arm 57 is swung back against the spout the steel hoop 56 will expand and its end 93 will follow the outward radial movement of the steel hoop because the arm 65 is urged outwardly by the spring 79. Thus, during said constriction and expansion of the steel hoop 56 the arms 57 and 65 will simultaneously swing in opposite directions and the steel hoop 56 will incessantly maintain its concentric position around the spout 3. The resilient tongue 93 will prevent bending of the steel hoop at the end of the arm 65 so that the steel hoop will always maintain its regular circular shape all around the spout 3.

When the pipes 15 and the nozzles 4 with the partly expanded bag are elevated by the cam disks 46, the bag mouth is sleeved onto the conical crown consisting of the fingers 48 whereby the bag mouth is rounded somewhat. The ring 47 ascends simultaneously therewith so that the crown of fingers 48 is expanded by swinging the fingers outwardly since they engage the mouth of the spout 3. Thereby the bag mouth is rounded furthermore according as the bag ascends and is sleeved onto the spout 3. The ascending movement of the ring 47 continues thereafter so that its fingers 48 are moved out of the bag mouth enclosing the spout 3 and into a position above the circular steel hoop 56. Then the arms 57 will swing to tighten the steel hoop 56 about the spout 3 on pressing the bag mouth tightly against said spout. Thus, the bag mouth will enclose the spout 3 very tightly during the filling. After the filling operation is finished the arm 57 is swung back so that the steel hoop 56 releases the bag whereby said bag will drop onto a conveyor (not shown) by which it is transferred laterally from the filling station.

We claim:

1. In a bag filling machine, a filling spout, a plurality of obliquely inwardly directed and outwardly yielding fingers forming a frusto-conical crown projecting beyond the mouth of the spout and being adapted to enter the mouth of the bag, a tightening band encircling said crown and the spout concentrically in radially spaced relationship to said crown, means to move said crown longitudinally of the spout to expand said crown below said tightening band by engagement with said mouth of the spout and to pull the expanded crown out of said band, and means to then constrict said band around the spout to tighten the bag mouth on said spout.

2. In a bag filling machine, a filling spout, a plurality of obliquely inwardly directed and outwardly yielding fingers forming a frusto-conical crown projecting beyond the mouth of the spout and being adapted to enter the mouth of the bag, a self-expanding tightening band en-

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circling said crown and the spout concentrically in radially spaced relationship to said crown, means to move said crown longitudinally of the spout to expand said crown below said tightening band by engagement with said mouth of the spout and to pull the expanded crown out of said band, and means to then constrict said band around the spout to tighten the bag mouth on said spout.

3. In a bag filling machine, a filling spout, a plurality of obliquely inwardly directed and outwardly yielding fingers forming a frusto-conical crown projecting beyond the mouth of the spout and being adapted to enter the mouth of the bag, a steel hoop encircling said crown and the spout concentrically in radially spaced relationship to said crown, means to move said crown longitudinally of the spout to expand said crown below said steel hoop by engagement with said mouth of the spout and to pull the expanded crown out of said steel hoop, and means to then constrict said steel hoop around the spout to tighten the bag mouth about the spout.

4. In a bag filling machine, a filling spout, a plurality of obliquely inwardly directed and outwardly yielding fingers forming a frusto-conical crown projecting beyond the mouth of the spout and being adapted to enter the mouth of the bag, a tightening band having two overlapping ends and encircling said crown and the spout concentrically in spaced relationship to said crown, means to move said crown longitudinally of the spout to expand said crown below said tightening band by engagement with said mouth of the spout and to pull the expanded crown out of said band, a guide member movable against the spout and being connected to the overlapped band end, and a pivot arm connected to the overlapped band end and to means for swinging said arm to constrict the band around the spout to tighten the bag mouth about said spout.

5. In a bag filling machine, a filling spout, a plurality of obliquely inwardly directed and outwardly yielding fingers forming a frusto-conical crown projecting beyond the mouth of the spout and being adapted to enter the mouth of the bag, a tightening band having two overlapping ends and encircling said crown and the spout concentrically in spaced relationship to said crown, means to move said crown longitudinally of the spout to expand said crown below said tightening band by engagement with said mouth of the spout and to pull the expanded crown out of said band, a turnable guide arm adapted to swing against the spout and being connected to the overlapped band end, and a turnable operating arm connected to the overlapped band end and to means for swinging said operating arm to constrict the band around the spout to tighten the bag mouth about said spout.

6. In a bag filling machine, a filling spout, a plurality of obliquely inwardly directed and outwardly yielding fingers forming a frusto-conical crown projecting beyond the mouth of the spout and being adapted to enter the mouth of the bag, a tightening band having two overlapping ends and encircling said crown and the spout concentrically in spaced relationship to said crown, means to move said crown longitudinally of the spout to expand said crown below said tightening band by engagement with said mouth of the spout and to pull the expanded crown out of said band, a guide member movable against the spout and being connected to the overlapped band end, a pivot arm connected to the overlapped band end and to means for swinging said arm to constrict the band around the spout to tighten the bag mouth about said spout, and a yielding member adapted to urge said guide member away from the spout to urge the overlapped band end radially against the overlapping band end.

7. In a bag filling machine, a filling spout, a plurality of obliquely inwardly directed and outwardly yielding fingers forming a frusto-conical crown projecting beyond the mouth of the spout and being adapted to enter the mouth of the bag, a tightening band having two over-

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lapping ends and encircling said crown and the spout concentrically in spaced relationship to said crown, means to move said crown longitudinally of the spout to expand said crown below said tightening band by engagement with said mouth of the spout and to pull the expanded crown out of said band, a guide member movable against the spout and being connected to the overlapped band end, and a pivot arm connected to the overlapping band end and to means for swinging said arm to constrict the band around the spout to tighten the bag mouth about said spout, the overlapped band end forming a resilient

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tongue projecting circumferentially beyond said guide member.

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