Oct. 31, 1950 T. RAPP 2,527,960

PACKAGING MACHINE

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Fig. 2.

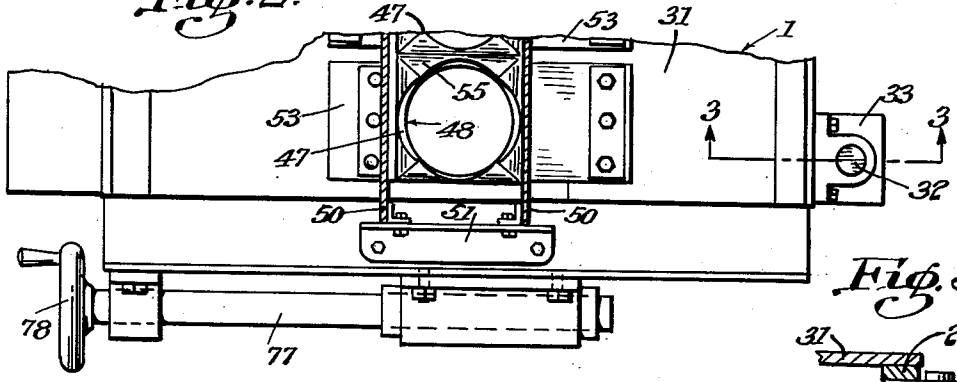

Fig. 3.

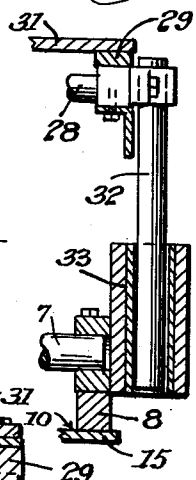

Fig. 1.

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Fig. 5.

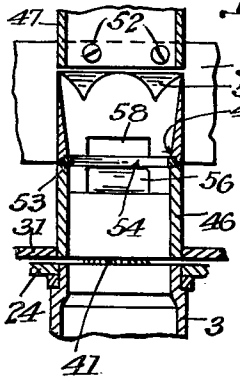

Fig. 4.

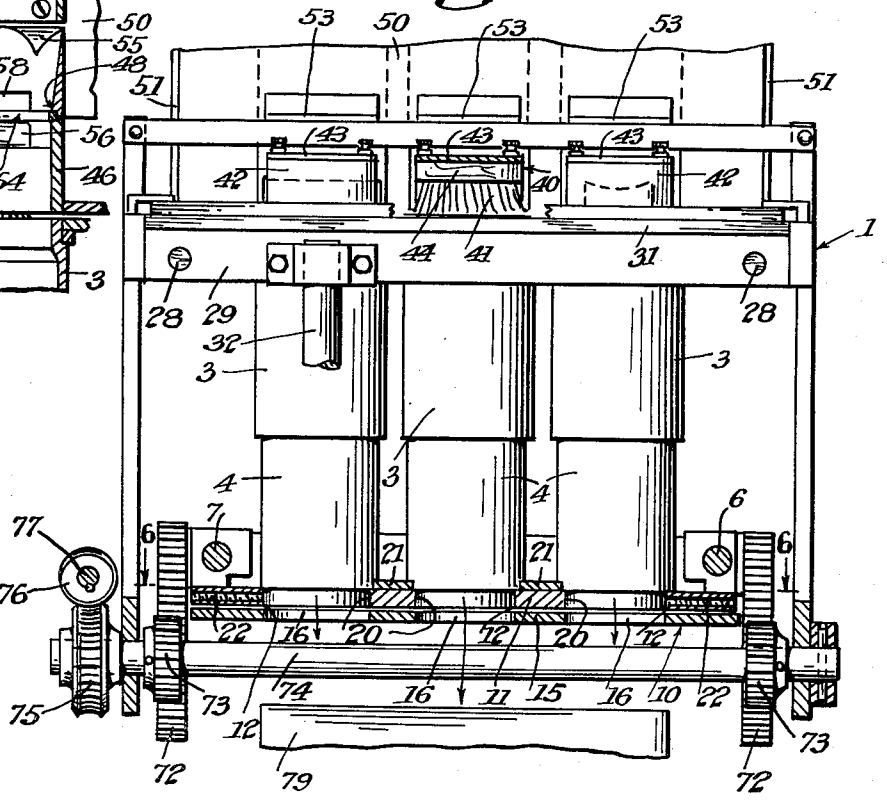

Fig. 7.

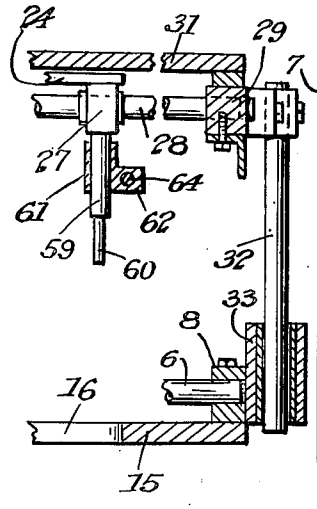

Fig. 6.

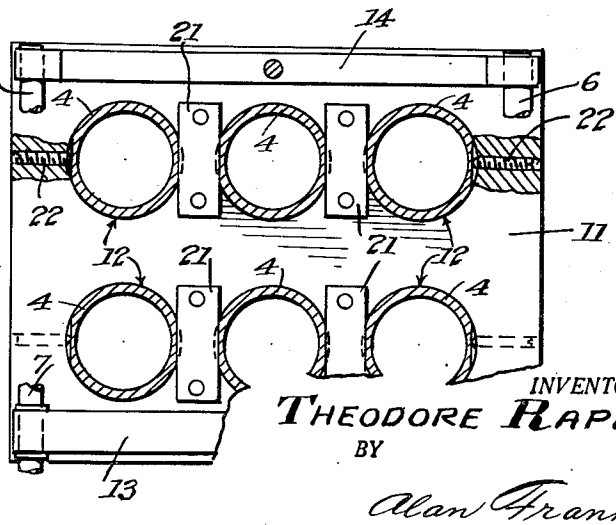

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Fig. 8.

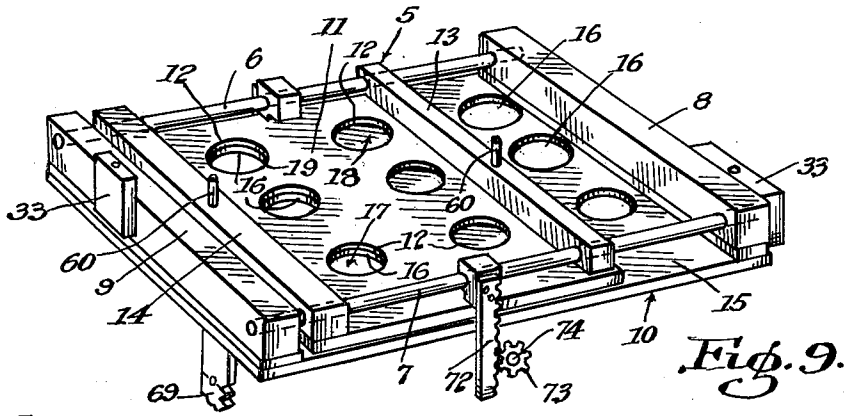


Fig. 9.

Fig. 11.

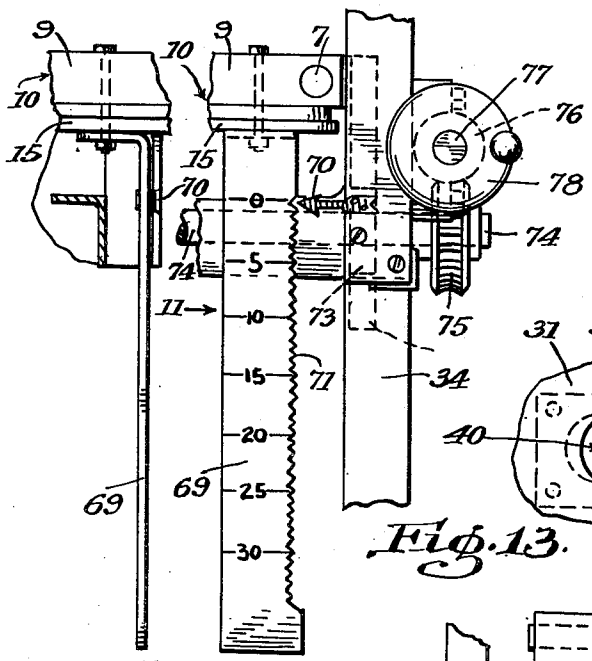


Fig. 12.

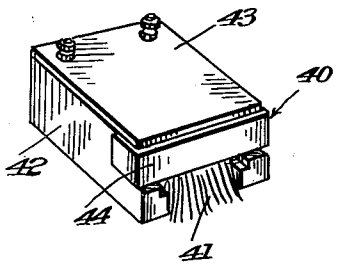


Fig. 10.

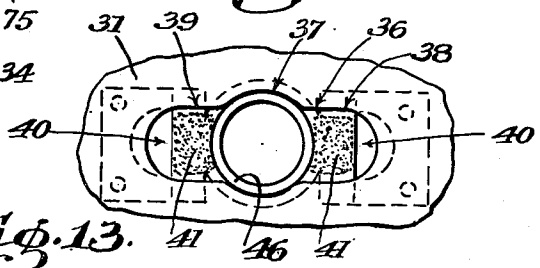


Fig. 13.

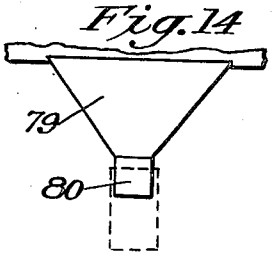
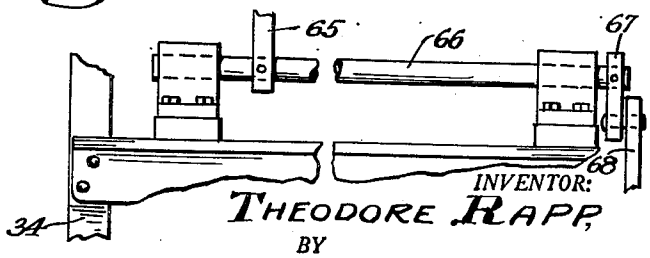


Fig. 14



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UNITED STATES PATENT OFFICE

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PACKAGING MACHINE

Theodore Rapp, Los Angeles, Calif.

Application January 14, 1946, Serial No. 641,128

7 Claims. (Cl. 226—101)

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The present invention relates broadly to packaging machines, and more specifically to a type of packing machine termed volumetric.

The invention has for an object the provision of a packaging machine wherein various commodities which flow may be accurately predetermined as to weight by volume, and thereafter the same volume of material will be discharged for the purpose of sequentially forming packages of identical weight of material.

A further object of the invention is the provision of a packaging machine which is readily adjustable to measure a predetermined weight of granular or pulverulent material by its volume. More specifically, the device of the present invention is of such a character as to direct a substance such as, for instance, dry beans from a hopper into a pair of telescopic tubular members, the tubular members being adjustable, whereby a given volume of said material is received therein and the weight of which volume is known for the material selected.

A further object is the provision in a packaging machine of means which permits rapid filling and discharging of selected volumes of material, and which means is accurate, easily operated and generally superior to packaging machines now known to the inventor.

A further object of the invention is to provide a volumetric packaging machine constructed and arranged to provide a greater range of adjustment than in machines previously suggested with one size of measuring tubes for measuring varying volumes of different materials to be packaged.

A further object is to provide a volumetric packaging machine with multiple sets of measuring tubes, which are adjustable for filling different sizes of containers without changing the tubes or placing inserts therein.

At the present time, so far as the inventor is aware, the average machine which is adapted to measure out or determine a given weight of material by the volume thereof, does not function in an entirely satisfactory manner, in that the material being measured often becomes caught in the moving parts of the machine, which cuts it and otherwise renders the material unsatisfactory so far as salability is concerned.

The present invention has for an object the provision of a machine in which the parts are so arranged as to obviate any cutting of the material being weighed during operation of the machine, and wherein the material to be packaged

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is maintained in its original condition without damage thereto on the part of the machine.

Other objects include a packaging machine which is rugged, foolproof in operation and inexpensive in cost of manufacture.

With the above mentioned and other objects in view, the invention consists in the novel and useful provision, formation, construction, association and relative arrangement of parts, members and features, all as shown in one embodiment in the accompanying drawings, described generally and more particularly pointed out in the claims.

In the drawings:

Fig. 1 is a fragmentary elevation, partly in section, of certain elements of the invention;

Fig. 2 is a fragmentary horizontal sectional view on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary section on the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary end elevation, certain parts being in section, of the machine;

Fig. 5 is an enlarged fragmentary detail, shown in section and taken on the line 5—5 of Fig. 1;

Fig. 6 is a horizontal sectional fragmentary detail taken substantially on the line 6—6 of Fig. 4;

Fig. 7 is a fragmentary sectional view taken on the line 3—3 of Fig. 2;

Fig. 8 is a perspective view of the shiftable table used in the practice of the invention;

Fig. 9 is a perspective view of a brush and associated elements used in the practice of the invention;

Fig. 10 is a fragmentary view taken substantially on the line 10—10 of Fig. 1, showing the brush in position;

Fig. 11 is fragmentary side elevation looking in the direction of the arrow 11 of Fig. 12;

Fig. 12 is a fragmentary front elevation showing in part a scale member used in the practice of the invention; and

Fig. 13 is fragmentary view looking in the direction of the arrows 13—13 of Fig. 1.

Fig. 14 is a side elevation of the delivery hopper.

Referring now with particularity to the drawings:

The improved machine is designated as an entirety by the numeral 1, and the same in its simplest aspect contemplates a hopper 2, which is adapted to receive the material to be packaged. As stated, this material should be dry and of substantially uniform size. To that extent, peas, beans, lentils, tapioca, rice and barley may be the material to be packaged. The hopper 2 is

adapted to communicate with a volumetric measuring device which constitutes a pair of tubes 3 and 4 arranged in telescopic relationship. The degree of telescoping between the tubes is a matter of regulation. Thus if the material to be directed from the hopper 2 into the pair of tubes is to have a given weight, the tubes will be adjusted so that when the tubes are filled with material, the material will be of a given weight. Obviously, the volume of the material will vary, because no two materials weigh the same. There is a difference in weight between rice and peas, by way of example; rice being more concentrated will weigh more per unit of volume than peas, with the consequence that if one pound of rice was to be packaged, the tube 4 would be telescoped to a greater extent within tube 3 than would be the case if a pound of peas was to be packaged.

In the present instance, I have shown a multiple number of sets of tubes 3 and 4, as for instance, two sets of three tubes each shown in Figs. 1, 4 and 6. The sets of tubes are arranged in spaced parallel relationship, and in its simplest embodiment the structure is so arranged that while one set of tubes is discharging material, the weight of which has been ascertained from a volumetric standpoint, the other set of tubes is filling. Referring to Fig. 8, I provide a carriage 5, movable upon two spaced parallel guide rods 6 and 7, secured between end members 8 and 9 of a framing designated generally as 10. This carriage includes a plate 11 formed with a series of openings 12, of which there may be two sets of three openings each, arranged with said sets in substantially parallel relationship, the plate having secured thereto spaced parallel members 13 and 14, which are transversely bored and function as slides, in that the rods 6 and 7 pass through the transverse openings thereof. The carriage 5 has a transverse width less than the length of the frame 10. The frame 10 includes a base member 15, to which the end members 8 and 9 are attached, the said base member being formed with two sets of transverse openings 16, three to each set, of the same size as the transverse openings 12 in the carriage, and which sets, respectively, of openings 16 are so arranged as to register with the sets, respectively, of openings 12 in the carriage when it is moved in one direction or the other. Thus there is one set of transverse openings 16 at the zone marked 17, when the carriage is in the position shown in Fig. 8. There are no transverse openings 16 in base 15 for the openings 12 shown at 18 when the carriage is in the position shown in said Fig. 8. However, when the carriage is shifted to the right, viewing Fig. 8, the transverse set of openings 12 shown at 18 register with the transverse set of openings 16 to the right of base 10, while the openings 12 shown at 19 are covered by base 15. The openings 12 operate in conjunction with the telescopic tubes 3 and 4. Thus, viewing Fig. 8, there would be six pairs of said tubes, see Figs. 1 and 4. The lower ends of each tube 4 are positioned within the opening 12, as best shown in Figs. 1, 4 and 6, by reducing the external diameter of said ends at 20 so as to pressure fit these ends or otherwise secure them, such as by welding. The method that is used in the present instance constitutes short-length plates 21 which enter parallel grooves in adjacent tubes, as shown in Fig. 6. These parallel plates are bolted to the plate 11. The outer or end tubes 4 of each set of tubes are secured in position in the plate 11 by machine screws 22. As stated, any means may be utilized for stabilizing the tubes. The uppermost set of tubes 3 are annularly flanged at 23, and a plate 24 formed with openings 25 is adapted to have the openings encompass the flange for holding the tubes 3 spaced apart. The plate 24 carries slide members 26 and 27, which slide members are adapted for movement on rods 28, of which there may be a spaced pair, the said rods being secured to end members 29 and 30 carried by top plate member 31. Thus plate 24, together with slides 26 and 27, constitutes an upper carriage member for securing the tubes 3 in substantially the same manner as the lower tubes are secured to the carriage, and top plate member 31, together with members 29 and 30, is substantially identical in form with frame member 10. An exception is noted, in that frame member 10 is movable, whereas the top frame is fixed with relation to frame 10. To accomplish this movement, I have provided end rods 32, of which there may be a plurality, secured to members 29 and 30 and dependent therefrom, see Figs. 2 and 3. These rods are passed through guides 33 carried by members 8 and 9 of the frame 10. Thus during telescopic movement between the tubes 3 and 4 in the manner hereinafter set forth, the guide rods will move within the guide members 33.

By way of example, it is to be noted that frame 10 is mounted on suitable supports or legs, designated generally as 34, see Fig. 1, and that such legs extend between the framing 10 and the members 29 and 30, as shown at 35. The character of the framing is relatively unimportant as long as it is sturdy and supports the operating parts of the machine in a secure manner.

A brush member having the design shown in Fig. 9 is positioned on opposite sides of tube 3 when the tube is in the position shown in Fig. 1. There will be as many pairs of brush members as there are tubes in a transverse row or set of tubes.

The top plate 31 is provided with slots 36 of the character shown in Fig. 10. The number of slots will depend upon the number of telescopic tubes 3 and 4 in a transverse row or set of tubes. This slot is centrally enlarged at 37 to correspond in size to the flange portion of tube 3. What may be termed wing portions 38 and 39 of the slot 36 have straight side edges interconnected by curved end portions. The brushes shown in Fig. 9 and designated as 40 are adapted to overlie the slot portions 38 and 39, with the bristles of brushes 41 passed through these portions. These brush members have a casing 42, and an overlying plate 43 detachably secured to the casing, with the bristles of the brush carried by a back 44 interposed between the casing and the plate 43. The casing is substantially U-shaped or horseshoe shaped in form. As stated, the brush members considered as an entirety are positioned in pairs on the opposite sides of the opening 37 leading within tube 3. The brush holders are not movable, and are adapted to be secured to the top of the plate 31 in some appropriate manner. Connecting the hopper 2 with the curved portion 37 of slot 36 is a tube 46 and a throat block 47 having an opening 48 therein corresponding to the inner diameter of said tube. The upper end of the tube 46 is secured in a head block 49. Tube 46 is positioned within opening 37. The throat block 47 is mounted above and in alignment with the tube 46 by means of a pair of plates 50 to which the throat block is secured at its sides,

which plates are secured at their ends to brackets 51 secured to the upper side of the plate 31. The lower end of the hopper 2 is connected to the upper end of the throat block 47 in alignment with the opening 48 therein, by means of the plates 50 and screw bolts 52. Adapted for transverse slide movement between tube 46 and the throat block 47 is a slide 53 which functions as a valve for the admission or closing of entrance from the hopper to the tubes 3 and 4. The arrangement is such that the slide 53 is formed with an opening 54 for passage of the material when the slide is in one position. The inner bore 48 of the tube 47 takes the appearance indicated in Fig. 2 at 48, which is substantially cloverleaf, as this form has been found to direct the material properly into tubes 3 and 4 without clogging. As further assurance against material being impeded in its passage by the slide 53, I provide a notch 56 cut downwardly in the head block 49 and the upper end of the tube 46, the lower side 57 of said notch being inclined downwardly into the upper end of the tube 46. There is also a cut-out portion 58 in the throat block 47 directly above the notch 56. This cut-out 58 in conjunction with the notch 56 assures that during movement of the slide none of the material will be cut by the edge of the slide or otherwise damaged.

Depending from plate 24 are sets of guide tubes 59, and secured to the parallel members 13 and 14 which are secured to the plate 11 are rods 60 adapted to be telescopically received within tubes 59. Secured to certain of the tubes 59 are fixed sleeves 61 provided with lugs 62. A link or links 63 is pinned to said lugs at 64, which link in turn is secured to the end of lever 65, keyed to a rocking shaft 66. The rocking shaft in turn has keyed thereto a lever 67, adapted to be operated by link 68, either manually or under power, in such a manner that as the member 68 is reciprocated, the upper and lower carriage members between which are positioned tubes 3 and 4 are reciprocated first in one direction and then in the other, so as to permit discharge from one series of tubes through opening 16, while another series of tubes is being filled, whereupon the carriage is moved so that the filled tubes are positioned over openings 16 for discharge, the other series being in position to be filled. It is obvious that any variation in distance between the upper and lower carriages for the tubes 3 and 4 will cause a shifting in the position of the rods 60 within tubes 59. Furthermore, during shifting of the carriages on the guide rods therefor, the brush members will pass over plate 24 and free the plate of any of the commodity that may rest thereon, and direct the commodity within the tubes. The arrangement is such that if any of the commodity should pass between the brush and the plate, the commodity will remain uninjured by such movement and will be held in position so as to be received in the next set of tubes being moved into position. It has been found that the elongated portions 38 and 39 of the slots 36 permit the brushes to function to brush the commodity without injuring it in the least.

Carried by frame 10 is a scale 69, see Figs. 8, 11 and 12. The indications on said scale are arbitrary. Secured to the fixed framing for the entire machine is a pointer 70 adjacent a serrated edge 71 for said scale. To move the framing 10 upwardly and downwardly to vary the telescopic arrangement between the tubes 3 and 4, I provide one or more spaced apart parallel racks

72, the teeth of which are in mesh with pinions 73 carried on a shaft 74. The shaft 74 is suitably journaled in the fixed framing, and carries at one end a worm gear 75. This gear is adapted to mesh with a worm 76 carried on shaft 77, the shaft 77 carrying a hand wheel or crank 78. By rotating the hand wheel or crank the movable framing 10, together with its carriage, is moved upwardly or downwardly relative to the upper framing, and such movement will move the scale 69 relative to the pointer 70.

The operation, uses and advantages of the invention just described are as follows:

Assuming that rice is to be packaged, the operator first determines the number of pounds per sack. Thus by rotating the hand wheel 78 the tubes are so telescoped as to contain, say, exactly one pound of rice, when in a certain position. As the gear is nonreversible, after once setting the tubes they will remain in the position selected until changed. Manually or by motor the link 68 is then reciprocated to cause, through the interconnection of arms and links, reciprocation of the upper and lower carriages between which are positioned the tubes 3 and 4. The tubes will then be positioned below the feed hopper 2, so that the commodity will be fed from said feed hopper downwardly past the slide valve 53 and into the tubes to fill the same. When the tubes are filled, the carriage is moved to a second position to allow a filling of further tubes, while the filled tubes are discharging through openings 16 and into a hopper 79. This hopper is adapted to have a bag positioned below its discharge end 80, so that the bag may be filled manually or automatically. It is intended that the link relationship for causing reciprocation of the carriages should have a lag movement, which is easily accomplished by providing an elongated slot in one of the links. This will permit reciprocation of the tubes to have a dwell at each end of their travel and assure not only the proper filling of the tubes but a proper discharge therefor.

The volume and weight of the material to be packaged may be varied by either raising or lowering the measuring tubes 4, or by opening or closing one or more of the hopper slide valves 53, or by both raising or lowering the tubes 4 and opening or closing one or more of the hopper slide valves, whereby more or less of the material to be packaged is directed from the tubes 4 and 3 into the delivery hopper 79 and the container on the lower end of said delivery hopper.

I claim:

1. A packaging machine, including a spaced pair of substantially parallel top and bottom plate members, said top plate member formed with an opening, and said bottom plate member formed with an opening, and said bottom plate member formed with a pair of spaced openings offset with relation to the opening to the top plate member, a carriage positioned between the plate members, two pairs of spaced apart telescopic tubes, one of said pairs of tubes being in axial alignment with the opening in the top plate member when the other pair of said tubes is in alignment with one of the openings in the bottom plate member and means for shifting the carriage to alternate the position of the tubes between the openings in said plate members, a hopper communicating with the opening in said top plate member for directing material therethrough and into a pair of said telescopic tubes and brush members diametrically positioned relative to the opening in said top plate and for

contact with the carriage member for freeing the carriage member of said material during shifting thereof.

2. A packaging machine, including a spaced pair of substantially parallel top and bottom plate members, said top plate member formed with an opening, and said bottom plate member formed with an opening, and said bottom plate member formed with a pair of spaced openings offset with relation to the opening to the top plate member, a carriage positioned between the plate members, two pairs of spaced apart telescopic tubes, one of said pairs of tubes being in axial alignment with the opening in the top plate member when the other pair of said tubes is in alignment with one of the openings in the bottom plate member, said top plate having diametrically positioned slots communicating with the opening therein, and brush members within said diametric slots for contact with the shiftable carriage.

3. A packaging machine, including a fixed framing, a plate member carried by said fixed framing, a carriage, and means positioned above said plate member for shiftably supporting said carriage, said carriage formed with an opening, and said plate member formed with an opening adapted to register with the opening in said carriage when the carriage is shifted in one direction, a pair of telescopic tubes, one of which is positioned within the opening of said carriage, a second plate member spaced above and substantially parallel with the other plate member, and formed with an opening, a second member for said carriage formed with an opening adapted to receive the other of said telescopic tubes, the opening in said second member of the carriage adapted to register when in one position with the opening in the second plate member and means for shifting the position of both plate members and carriage members to vary the telescoping of said tubes as to volumetric capacity.

4. A packaging machine including multiple sets

of pairs of telescopic measuring tubes, means for telescopically adjusting said pairs of measuring tubes to vary the volumetric capacity thereof, a feed hopper for said pairs of measuring tubes, a delivery hopper, means for shifting said sets of measuring tubes to bring the pairs of measuring tubes of either set under said feed hopper to be filled with material to be measured and packaged from said hopper, while another set of measuring tubes is brought into position over said delivery hopper to discharge the contents of said latter set of measuring tubes into said delivery hopper.

5. A packaging machine as claimed in claim 4 including valves in said feed hopper for independently controlling feeding of material from said hopper to the measuring tubes respectively under the hopper.

6. A packaging machine including multiple sets of measuring tubes of one size, means for varying the volumetric capacity of said tubes without varying the size of said tubes, means for filing said tubes, respectively, of each set, when the set is moved to one position, and means whereby the filled tubes of each set are discharged when the set is moved to another position.

7. A packaging machine as claimed in claim 6 including means for shutting off the filling of one or more of the measuring tubes of each set.

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