This invention relates to packaging apparatus for powder, granular, flaky and other fluent solid materials (hereinafter referred to as “powder”). The invention is concerned with the type of apparatus in which the powder is fed from a hopper to one or a succession of pockets having movable bases from which the charges of powder are discharged into containers. The pockets are made adjustable, e.g., by telescoping, to vary the volume and thus the charge delivered to the container. This type of apparatus will be referred to herein as the “type described.”

According to the invention there is provided an apparatus of the type described, wherein the pockets are made adjustable by the provision of at least an intermediate portion of rubber or other flexible material capable of being telescoped. The intermediate portion thus allows adjustment of the volume of the pocket by telescoping one part of the pocket into another or, when the intermediate portion is formed from rubber, to a lesser degree by stretching.

The pocket is preferably made entirely of rubber though it will be understood that it may be constituted by upper and lower portions of stiff material, e.g., metal, connected by the intermediate portion. When made entirely of rubber, it is necessary to stiffen the upper and lower portions, e.g., by supporting the portions by stiff material or by providing stiffening inserts or facings.

The invention is particularly useful in connection with pockets of truncated conical construction because of the difficulty of providing an adequate steel between conical surfaces when arranged to be telescoped one into the other.

The invention may be used on any type of apparatus in which adjustable pockets are used. It has been found useful, for example, in connection with the packaging apparatus described in applicants’ Patent No. 2,616,682, issued September 12, 1952. The invention, as applied to such apparatus, will now be described in greater detail with reference to the accompanying drawings which shows, in sectional elevation, part of an apparatus of the same general construction as that described in the specification mentioned above, to which reference should be made.

Referring to the drawing, powder 11 flows from a supply pipe 12 into a collecting chamber 13 from which it passes through apertures 14 in a rotatable apertured wheel 16 into pockets 17, having movable bases 19 pivoted at 21. The bases 19 are opened at intervals to allow the powder to fall into discharge chutes 22 leading to cartons 23 moved into position to receive the charges by a conveyor chain 24.

The chamber 13 is arranged in an annular channel 26 the walls of which extend upwardly of the wheel 16, and in the base of which are formed the apertures 14. The chamber 13 forms with the base of the channel 26 an enclosed chamber through which the pockets 17, pass in succession, the chamber 13 being of such dimensions that a number of apertures 14 have access to the chamber at the same time. Filling of the pockets 17, thus taking place over the period of time required for the hopper to pass through the chamber.

The pockets 17 are each constituted by a moulded rubber sleeve bonded at its upper end to a securing flange 20 and at the lower end to an adjusting flange 25, the sleeve being formed with an upper conical portion and a lower conical portion connected by an intermediate portion 30. The upper and lower conical portions are stiffened by the flanges 20 and 25, respectively, while the intermediate portion 30 is free to flex for purposes of adjustment.

The wheel 16 is carried by a series of pillars 27 secured to and extending upwardly from a chain-wheel 28 forming one of the supports for the conveyor chain 24. The chain-wheel 28 is secured to a sleeve 29 forming part of the main driving gear for the machine. The wheel 16 carries the securing flanges 20 while the adjusting flanges 25 are carried by an adjusting wheel 32 formed with a series of depending bosses 34 by which it is slidably mounted on the series of pillars 27. The wheel 33 is formed with a central hub 36 by which it is supported on a thrust bearing 37 carried by an adjusting sleeve 38 making threaded engagement at 39 with an adjusting shaft 41 extending co-axially with the chain-wheel 28.

The wheel 33 carries a series of depending brackets 42 (one for each pocket 17) each pivotally supporting at 43 a two-armed lever 44 the arms of which carry cam rollers 46 and 47 arranged, respectively, to engage stationary cams (not shown) mounted on the main framework 51 of the machine. The bases 19 of the pockets 17, are provided with arms 52 each of which is pivotally connected to a spring toggle member 53 carried by the lever 44. It will thus be seen that, as the rollers 46 and 47 engage the cams, the bases 19 are opened or closed, as the case may be.

The chutes 22 are carried by arms 54 extending radially from a supporting ring 56 having
a series of depending bosses 57 by which it is secured to the pillars 27. The chain wheel 28 thus drives the wheels 16 and 33 and the ring 58 simultaneously.

The cartons 23 are guided into pockets 59 carried by the chain 24 in well known manner, the pockets 59 being provided with supporting bases 58 carried on arms 61 pivoted at 62 on the sprocket 28 and extending radially therefrom. The arms 61 are raised by a stationary cam 63 as the cartons approach the filling position so that their open ends embrace the mouths of the chutes 22.

Adjustment of the capacity of the pockets 17, is brought about by rotation of the adjusting shaft 41 (either manually or by mechanical means) which causes the sleeve 38 to rise or fall (depending on the direction of rotation) so as to raise or lower the wheel 33 carrying the adjusting sleeves 25 thus causing the pockets 17, to telescope inwardly or outwardly as the case may be.

We claim:
1. Apparatus of the type described for packaging fluent materials, comprising upper and lower pocket-carrying members mounted for rotation about a common axis and relatively movable in an axial direction, at least one pocket adapted to receive successive charges of material, said pocket being constituted by an upper portion secured to the upper pocket-carrying member, a lower portion secured to the lower pocket-carrying member and an intermediate portion of deformable flexible material connecting the upper and lower portions, means for rotating the upper and lower pocket-carrying members in unison to carry the pocket to successive operating stations and means for causing a relative axial movement between the upper and lower pocket-carrying members so as to deform the intermediate portion of the pocket and thus vary the capacity of the pocket.
2. Apparatus as in claim 1, wherein the pocket is formed entirely from flexible material.
3. Apparatus as in claim 2, comprising tubular stiffening members for the upper and lower portions of the pocket.
4. Apparatus as in claim 3, wherein the pocket is of truncated conical shape, the smaller end constituting the inlet.
5. Apparatus as in claim 1, wherein the upper and lower pocket portions are formed from rigid material.
6. Apparatus as in claim 1, wherein the pocket is of truncated conical shape, the smaller end constituting the inlet.

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References Cited in the file of this patent

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>928,658</td>
<td>Hoyt</td>
<td>July 20, 1909</td>
</tr>
<tr>
<td>1,001,855</td>
<td>Jagenberg</td>
<td>Aug. 29, 1911</td>
</tr>
<tr>
<td>2,009,416</td>
<td>Schilder</td>
<td>July 30, 1935</td>
</tr>
<tr>
<td>2,144,569</td>
<td>Frazier</td>
<td>Jan. 17, 1939</td>
</tr>
<tr>
<td>2,234,951</td>
<td>Belcher</td>
<td>Mar. 18, 1941</td>
</tr>
<tr>
<td>2,356,212</td>
<td>Burdett et al.</td>
<td>Aug. 22, 1944</td>
</tr>
</tbody>
</table>