

999.030

PATENT SPECIFICATION

DRAWINGS ATTACHED

999.030



Date of Application and filing Complete Specification: July 8, 1964.

No. 28210/64.

Complete Specification Published: July 21, 1965.

© Crown Copyright 1965.

Index at acceptance:—B8 N(6B1B3B, 6B2)

Int. Cl.:—G 01 f

COMPLETE SPECIFICATION

Apparatus for Measurement and Feeding of Powdered Materials

I, MAHARAJ KRISHEN MEHTA, an Indian citizen of Bhilai-1, District Durg, Madhya Pradesh, India, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an improved machine for accurate measurement and feeding of material, particularly materials in powder or granular form.

Various types of machines have been proposed and are in use for measuring and feeding of material in powder or granular form. British Patent Specification No. 881,022 describes a machine including a feed roll contained and revolving within a hopper and having on its periphery axial and circumferential rows of charge chambers or holes, each hole having a spring-loaded ejector, the cam actuated outward movement of which ensures that the charge of powder or granules is dislodged when the hole reaches the feeding position and the charge is deposited in capsule halves.

A machine of this type has, however, certain drawbacks, such as: (a) that once the feed mechanism is installed and put into operation the charge chambers or holes in the feed roll have a fixed volume with the result that the said feed mechanism has to be disassembled, adjusted and re-assembled for every change, however small, of the dosage or quantity of the fill material and (b) that even for a fixed dosage or quantity of fill material minor adjustment to control the quantity to within plus or minus 1 or 2 per cent. is not possible.

This invention relates to an improved machine whereby dosage of material to be fed in powder or granular form may be varied within pre-determined limits and each pre-determined dosage may be varied to obtain a close accuracy during operation.

With these objects in view, this invention, in its most general aspect, consists of a machine for measuring and feeding material in powder or granular form comprising of a feed roll contained and revolving within a hopper and having on its periphery axial and circumferential rows of charge chambers or holes with angular and axial spacing such as to coincide with capsule halves on die rolls or openings in containers wherein the material is to be deposited below the hopper, each charge chamber having a spring-loaded ejector, the cam actuated outward movement of which ensures that the pre-measured charge of powder or granules is dislodged and deposited in the capsule half or container below, the said machine being characterised in that each charge chamber incorporates means for raising or lowering the ejector so as to vary the free volume of the said charge chamber.

In a machine as described, the bottom surface of the head or crown of the said ejectors in the charge chambers in the feed roll may have a tapered surface and may be seated on a washer with a matching tapered surface.

The said tapered washer may have a tapered side which engages with a tapered notch on a rod housed in a drilled passage between each pair of adjoining off-set rows of charge chambers in the feed roll parallel to the axis of the feed roll.

The rod may have tapered notches on both sides along its length which engage with tapered sides of tapered washers in two adjoining off-set rows of charge chambers.

The rod may be adapted to be moved backwards or forwards in the drilled passage in the said feed roll by means of a screw in the front end of the drilled passage and a compression spring in the rear end of the drilled passage, the said spring ensuring contact between the rod and the screw.

The tapered notches on the rod engage the tapered side of the tapered washer, so that the

movement of the rod towards the rear end of the feed roll moves the tapered washer transversely in a direction away from the rod against the lower tapered surface of the head of the ejector, so that the ejector moves outwards, thereby reducing the free volume of the charge chamber on the feed roll and the movement of the rod towards the front end of the feed roll moves the tapered washer transversely in a direction towards the rod against the lower tapered surface of the head of the ejector, so that the ejector moves inwards thereby increasing the free volume of the charge chamber on the feed roll.

These and other features of this invention will now be described with reference to the accompanying drawings in which:

Fig. 1 is the front elevation, partly in section of the medicine hopper, feed roll, ejectors and other parts of the machine.

Fig. 2 is a partial longitudinal section through the feed roll, tapered washers, ejectors and rod.

The machine comprises a medicine hopper 1 and an annular housing 2, within which is provided a rotatable feed roll 6. The feed roll 6 has on its periphery axial and circumferential rows of charge chambers 7, with spacing such as to coincide with the spacing of formed capsule halves on any rotatable die roll or of openings in containers on a moving conveyor belt wherein material is to be deposited below the hopper. Each charge chamber 7 has a spring loaded ejector 9 contained within it, which is seated on a loose fitting tapered washer 12, which is in turn seated on a stationary ring 11. The ejector is held in position by a compression spring 10. The ejector 9 is forced down on the spring 10 when the hemispherical bottom of the ejector 9 rides on an axial cam 21 on a stationary shaft 20. The hopper 1 also contains a rotatable agitator 5. The annular housing 2 is provided with a partial lining 3, made of resilient material such as soft rubber, which bears against the feed roll 6.

The rod 15 in the passage 19 is retained between a compression spring 18 at the rear of the passage 19 and a screw 17 at the front end of the passage 19. The clockwise movement of the screw 17 moves the rod 15 towards the rear end of the feed-roll 6 in the passage 19 and the counter-clockwise movement of the screw moves the rod 15 towards the front end of the feed roll 6 in the passage 19. The tapered washers 12 have tapered sides 13, which engage with tapered notches 16 on the rod 15 in the passage 19, which lies between two adjoining off-set rows of charge chambers 7. The rod 15 has the notches 16 on both sides for engaging the tapered sides 13 on the tapered washers 12 in the two adjoining off-set rows of charge chambers.

Spring wires 14 are secured to the tapered washers 12 and enter recesses 8 in the walls

of the charge chambers 7, so that the tapered washers are held in position against the tapered notches 16 on the rod 15. The movement of the rod 15 towards the rear end of the feed roll 6 moves the tapered washer 12 transversely in a direction away from the rod 15, so that the ejector 9 moves outwards, thereby reducing the free volume of the charge chamber 7. The movement of the rod 15 towards the front end of the feed roll 6 moves the tapered washer 12 transversely in a direction towards the rod 15, so that the ejector 9 moves inwards, thereby increasing the free volume of the charge chamber 7. The shape and size of the charge chamber 7 may be varied to suit the capsule halves and containers to be filled.

The feed roll 6, charge chamber 7, ejector 9, ring 11, tapered washer 12 and rod 15 may be adapted to provide dosage for two or three sizes of capsules with adjustment of the outward and inward movement of the said ejector 9. The volume of the charge chamber 7 may be preset for a particular dosage within the designed limit. Minor adjustments in the volume of charge chamber 7 may be made during operation to obtain the desired accuracy.

The machine illustrated in the drawings operates as follows:—

As the feed roll 6 revolves, the axial rows of charge chambers 7 reach the intake or charge receiving position below the revolving agitator 5. The volume of the charge chambers 7 has been preset with the help of the screws 17 and the rods 15 to contain the desired quantity of charge. The emptying of the full charge contained in the charge chamber 7 into formed capsule halves 22, or containers on a moving conveyor belt (not shown), below the medicine hopper 1 takes place as the axial rows of charge chamber 7 reach the discharge position diametrically below the intake position. The slight cam controlled outward movements of the spring loaded ejector 9 ensure that the complete charge is dislodged from the charge chamber 7. The sliding lid 4 when pushed in, covers the feed roll 6, so that no powder or granules enter the charge chamber.

Adjustments in the volume of the charge chamber 7 are made by turning the screw 17 clockwise or counter-clockwise during operation to obtain desired accuracy in dosage.

WHAT I CLAIM IS:—

1. Apparatus for dispersing measured quantities of powdered or granular material including a rotary feed roll mounted below a hopper and having on its periphery charge chambers for receiving material from the hopper and conveying it to be discharged into a container, each charge chamber having an ejector for ensuring the discharge of the material and means for adjusting the innermost position of the ejector to vary the free volume

movement of the rod towards the rear end of the feed roll moves the tapered washer transversely in a direction away from the rod against the lower tapered surface of the head of the ejector, so that the ejector moves outwards, thereby reducing the free volume of the charge chamber on the feed roll and the movement of the rod towards the front end of the feed roll moves the tapered washer transversely in a direction towards the rod against the lower tapered surface of the head of the ejector, so that the ejector moves inwards thereby increasing the free volume of the charge chamber on the feed roll.

These and other features of this invention will now be described with reference to the accompanying drawings in which:

Fig. 1 is the front elevation, partly in section of the medicine hopper, feed roll, ejectors and other parts of the machine.

Fig. 2 is a partial longitudinal section through the feed roll, tapered washers, ejectors and rod.

The machine comprises a medicine hopper 1 and an annular housing 2, within which is provided a rotatable feed roll 6. The feed roll 6 has on its periphery axial and circumferential rows of charge chambers 7, with spacing such as to coincide with the spacing of formed capsule halves on any rotatable die roll or of openings in containers on a moving conveyor belt wherein material is to be deposited below the hopper. Each charge chamber 7 has a spring loaded ejector 9 contained within it, which is seated on a loose fitting tapered washer 12, which is in turn seated on a stationary ring 11. The ejector is held in position by a compression spring 10. The ejector 9 is forced down on the spring 10 when the hemispherical bottom of the ejector 9 rides on an axial cam 21 on a stationary shaft 20. The hopper 1 also contains a rotatable agitator 5. The annular housing 2 is provided with a partial lining 3, made of resilient material such as soft rubber, which bears against the feed roll 6.

The rod 15 in the passage 19 is retained between a compression spring 18 at the rear of the passage 19 and a screw 17 at the front end of the passage 19. The clockwise movement of the screw 17 moves the rod 15 towards the rear end of the feed-roll 6 in the passage 19 and the counter-clockwise movement of the screw moves the rod 15 towards the front end of the feed roll 6 in the passage 19. The tapered washers 12 have tapered sides 13, which engage with tapered notches 16 on the rod 15 in the passage 19, which lies between two adjoining off-set rows of charge chambers 7. The rod 15 has the notches 16 on both sides for engaging the tapered sides 13 on the tapered washers 12 in the two adjoining off-set rows of charge chambers.

Spring wires 14 are secured to the tapered washers 12 and enter recesses 8 in the walls

of the charge chambers 7, so that the tapered washers are held in position against the tapered notches 16 on the rod 15. The movement of the rod 15 towards the rear end of the feed roll 6 moves the tapered washer 12 transversely in a direction away from the rod 15, so that the ejector 9 moves outwards, thereby reducing the free volume of the charge chamber 7. The movement of the rod 15 towards the front end of the feed roll 6 moves the tapered washer 12 transversely in a direction towards the rod 15, so that the ejector 9 moves inwards, thereby increasing the free volume of the charge chamber 7. The shape and size of the charge chamber 7 may be varied to suit the capsule halves and containers to be filled.

The feed roll 6, charge chamber 7, ejector 9, ring 11, tapered washer 12 and rod 15 may be adapted to provide dosage for two or three sizes of capsules with adjustment of the outward and inward movement of the said ejector 9. The volume of the charge chamber 7 may be preset for a particular dosage within the designed limit. Minor adjustments in the volume of charge chamber 7 may be made during operation to obtain the desired accuracy.

The machine illustrated in the drawings operates as follows:—

As the feed roll 6 revolves, the axial rows of charge chambers 7 reach the intake or charge receiving position below the revolving agitator 5. The volume of the charge chambers 7 has been preset with the help of the screws 17 and the rods 15 to contain the desired quantity of charge. The emptying of the full charge contained in the charge chamber 7 into formed capsule halves 22, or containers on a moving conveyor belt (not shown), below the medicine hopper 1 takes place as the axial rows of charge chamber 7 reach the discharge position diametrically below the intake position. The slight cam controlled outward movements of the spring loaded ejector 9 ensure that the complete charge is dislodged from the charge chamber 7. The sliding lid 4 when pushed in, covers the feed roll 6, so that no powder or granules enter the charge chamber.

Adjustments in the volume of the charge chamber 7 are made by turning the screw 17 clockwise or counter-clockwise during operation to obtain desired accuracy in dosage.

WHAT I CLAIM IS:—

1. Apparatus for dispersing measured quantities of powdered or granular material including a rotary feed roll mounted below a hopper and having on its periphery charge chambers for receiving material from the hopper and conveying it to be discharged into a container, each charge chamber having an ejector for ensuring the discharge of the material and means for adjusting the innermost position of the ejector to vary the free volume



of the charge chamber and thereby vary the quantity of material measured out by the charge chamber.

5 2. Apparatus as claimed in claim 1 in which the ejectors are cam-operated and have return springs.

10 3. Apparatus as claimed in claim 1 or 2 in which each ejector has an inclined surface which rests against a similarly inclined surface of an adjusting member movable transversely to the direction of movement of the ejector.

15 4. Apparatus as claimed in claim 3 in which the adjusting member has a second inclined surface engageable by an operating member movable in a direction parallel to the axis of the feed roll and common to a number of charge chambers arranged in a row extending parallel to the axis of the roll.

5. Apparatus as claimed in claim 4 in which the operating member is common to two axial rows of charge chambers. 20

6. Apparatus as claimed in claim 4 or 5 in which the operating member is a rod having notches presenting inclined surfaces for engagement with the second inclined surfaces of the adjusting members. 25

7. Apparatus as claimed in claim 6 in which the rod is spring-loaded and adjustable against the spring by a screw.

8. Apparatus for dispensing measured quantities of powdered or granular material substantially as described with reference to the accompanying drawing. 30

REDDIE & GROSE,

Agents for the Applicant,

6, Bream's Buildings, London, E.C.4. 49.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press (Leamington) Ltd.—1965. Published by The Patent Office, 25 Southampton Buildings, London, W.C.2, from which copies may be obtained.



* C L M S *