

Sept. 1, 1964

V. GREGOR

3,146,915

VIBRATORY TRANSFER CHUTE

Filed Oct. 26, 1962

2 Sheets-Sheet 1

FIG. 2.

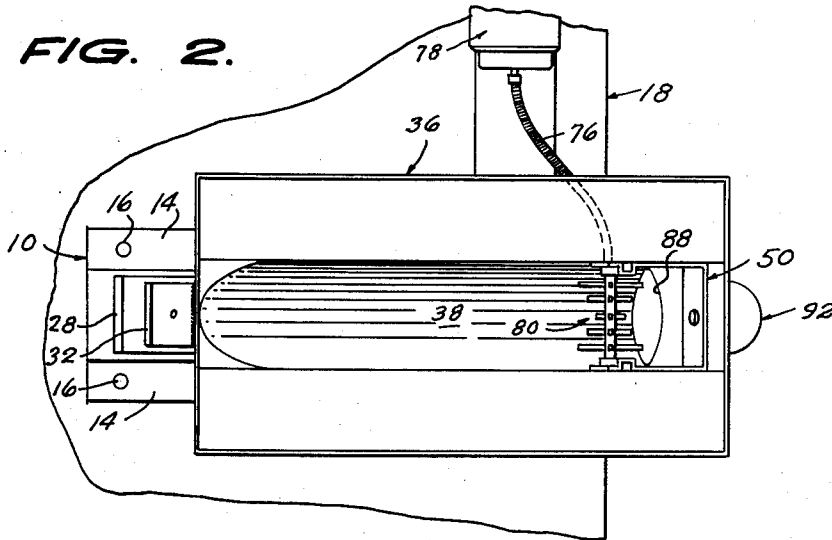


FIG. 1.

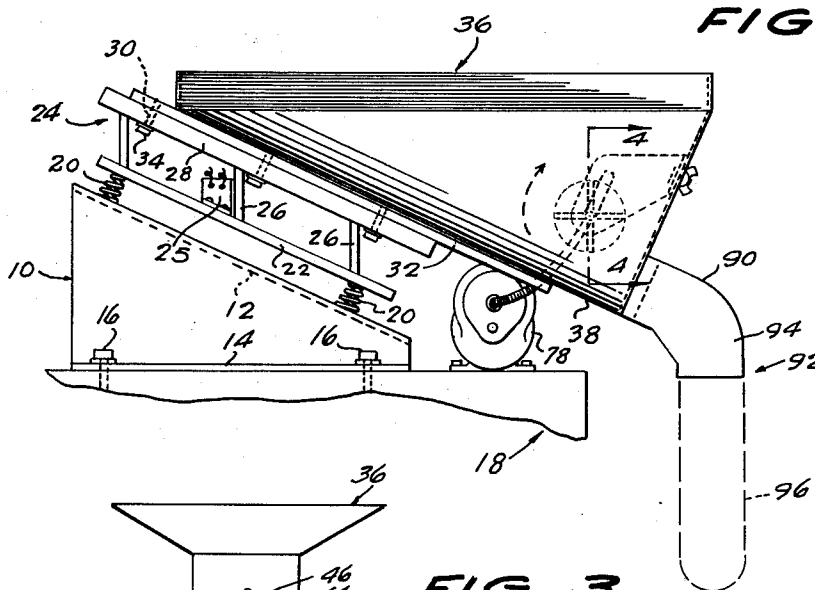
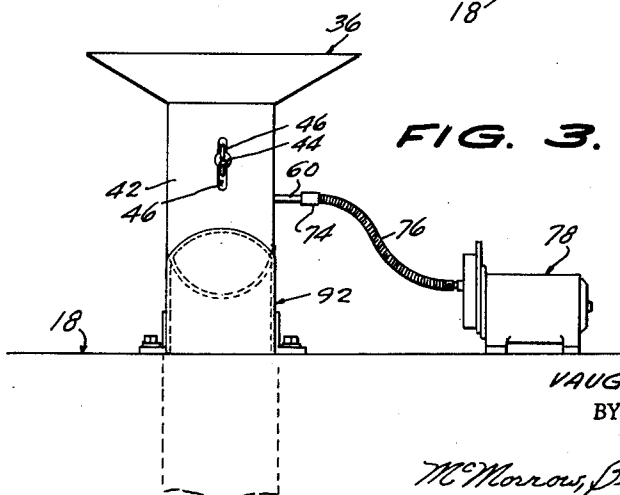


FIG. 3.



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FIG. 4.

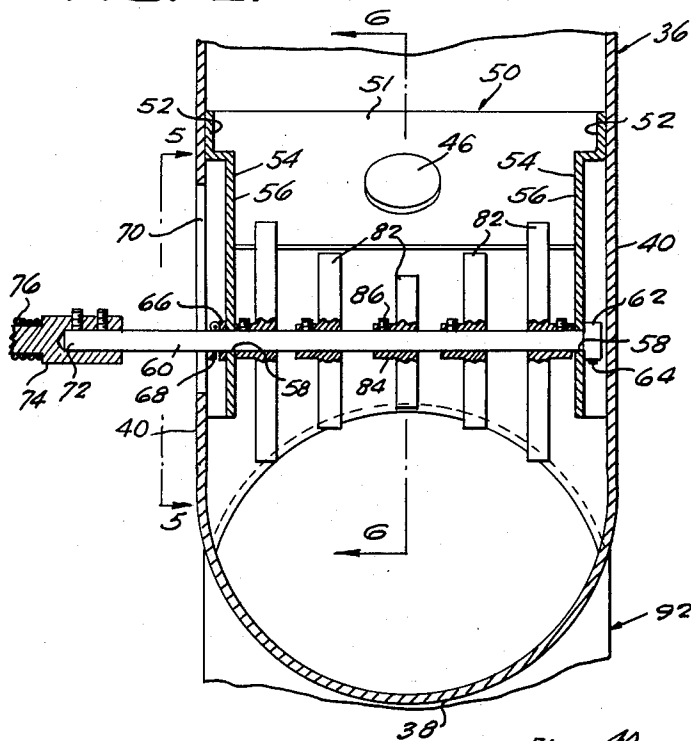


FIG. 5.

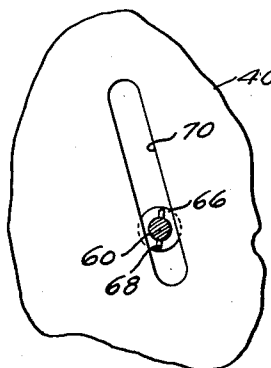


FIG. 6.

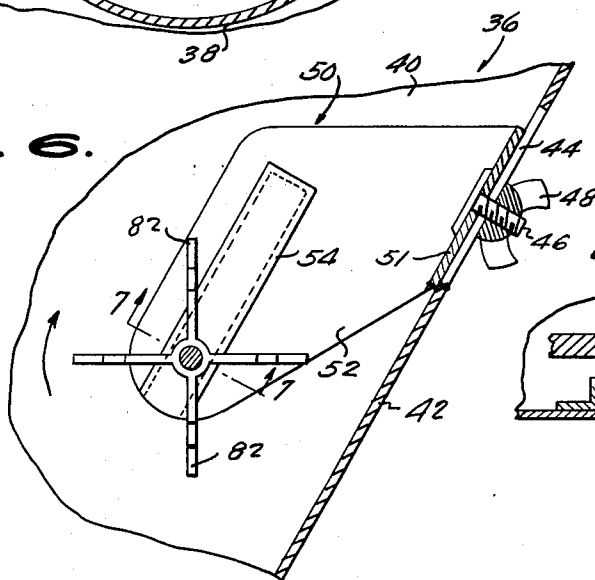
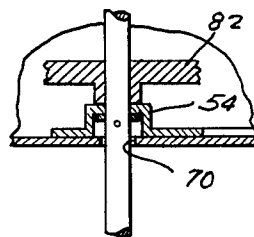


FIG. 7.



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VIBRATORY TRANSFER CHUTE
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This invention relates to a novel vibratory transfer chute having a material raking and shaping rotor.

The primary object of the invention is the provision of an improved method and a more practical and efficient device of the kind indicated, for transferring non-free flowing material, such as macaroni, vegetables, and others, from scaling or measuring devices, without bridging or clogging in the chute, in a gravitationally moved stream of predetermined cross section, as for filling tubular bags.

Another object of the invention is the provision of a device of the character indicated above, in which the chute is inclined, and in which the rotor extends horizontally across the lower end of the chute and has longitudinally spaced groups of circumferentially spaced teeth, the teeth at the sides of the chute being of greatest length and the remaining teeth progressively reduced in length toward the middle of the rotor, whereby a discharging stream of material is forcibly shaped to the contour of the chute bottom while being forcibly shaped to the contour of the rotor.

A further object of the invention is the provision, in a device of the character indicated above, of a rotor which acts to restrict the amount of flow of material from the discharge end of the chute by raking the material in a retrograde direction, and to break up and rake the material in a manner to prevent its clogging and bridging the chute.

Other important objects and advantageous features of the invention will be apparent from the following description and the accompanying drawings, wherein, for purposes of illustration only, a specific form of the invention is set forth in detail.

In the drawings:

FIGURE 1 is a side elevation of a mounted device of the present invention, a stream of discharged material therefrom being shown in phantom lines;

FIGURE 2 is a top plan view of FIGURE 1;

FIGURE 3 is a right-hand end elevation of FIGURE 1;

FIGURE 4 is an enlarged fragmentary vertical transverse section taken on the line 4-4 of FIGURE 1;

FIGURE 5 is a fragmentary vertical transverse section taken on the line 5-5 of FIGURE 4;

FIGURE 6 is a fragmentary vertical longitudinal section taken on the line 6-6 of FIGURE 4; and,

FIGURE 7 is an enlarged fragmentary horizontal section taken on the line 7-7 of FIGURE 6.

Referring in detail to the drawings, wherein like numerals designate like parts throughout the several views, the illustrated device comprises an elongated rectangular base 10 having a declining top wall 12, and lateral flanges 14 at the lower edges of its sidewalls which are adapted to be secured, as by means of bolts 16 to a horizontal support 18. Longitudinally centered and spaced upwardly tapering coil springs 20 are suitably fixed to and extending upwardly from and normal to the base top wall 12, and are suitably fixed to the underside of an elongated straight lower bar 22 of a vibratory frame 24.

The frame 24 further comprises upstanding perpendicular members 26, spaced along and fixed to the bar 22, and suitably fixed, at their upper ends, to the underside of an elongated straight upper bar 28, which has a centered line of spaced bolt holes 30 extending there-through. The upper and lower frame bars are in parallel relationship and decline in parallel spaced relation to the top wall 12 of the base 10. A conventional electric

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vibrator 25 is fixedly mounted upon the lower bar 22, upwardly of the upper one of the members 26.

A straight trough support bar 32, longer than the upper frame bar 28, and having its elevated end portion bearing upon the upper surface of the upper bar 28, extends forwardly below the lower end of the upper bar, and is secured to the upper bar by means of bolts 34 extending through the bolt holes 30. A trough 36 of inverted triangular profile, has an arcuate concave bottom wall 38 suitably fixed to and extending along and forwardly below the support bar 32, and flat parallel upstanding side walls 40.

The forward end of the trough 36 is closed by a forward end wall 42, which is normal to the bottom wall 38, and is provided with a centered vertical, closed adjustment slot 44, in its upper part, through which extends a bolt 46 provided with a wing nut 48, which bears against the outer surface of the end wall, and carries a rotor frame 50, within the lower end of the trough.

The rotor frame 50 is U-shaped and comprises a straight flat cross member 51 which bears against the inward surface of the end wall 42 and is fixed to the bolt 46, and has downwardly angled flat arms 52, on its ends, which bear against the inward surfaces of the trough side walls 40. The arms 52, as shown in FIGURES 4 and 6, are formed with vertically elongated indentations 54, which, at their lower ends, open to the lower edges of the arms.

The indentations 54 are formed, in their bottom walls 56, with journal holes 58, through which a rotor shaft 60 is journaled. The shaft 60 has, on one end thereof, a collar 62, held in place by a set screw 64, which bears against the bottom wall of the indentation of one of the rotor frame arms 52. A washer 66 on the shaft bears against the bottom wall of the other indentation and is held in place by a cotter pin 68 extending through the shaft. The shaft 60 extends laterally outwardly from the trough 36, through a vertical clearance slot 70, in the adjacent trough side wall, and has a free end 72. A coupling 74 connects the free end to the adjacent end of a flexible shaft 76, whose other end is connected to the shaft of a reversible electric motor 78, mounted on the support 18.

The rotor 80 comprises the shaft 60 and substantially equally spaced circumferential rows of equally circumferentially spaced straight, flat and radial rectangular teeth 82, on tubular hubs 84, which are circumposed on the shaft 60, between the indentations 54 and are secured in place, as by means of set screws 86.

As shown in FIGURE 4, the rotor teeth 82 next to the indentations 54 are of maximum length, and the teeth therebetween are reduced progressively in length toward the middle row of teeth, so that the periphery of the rotor 80 is concave. The rotor teeth 82 are spaced upwardly from the trough bottom wall, and the radius of curvature thereof is smaller than the radius of curvature of the bottom wall. The rotor frame 50 and hence the rotor 80, is vertically adjustable, relative to the trough bottom wall, for the purpose of providing a regulated flow of material downwardly along the trough for discharge therefrom.

The lower part of the trough end wall is formed with a centered circular discharge opening 88 around which is suitably fixed the elevated end of a forwardly declining arm 90 of a discharge spout 92, which has a pendant perpendicular lower arm 94 which is open at its lower end. The spout arms 90 and 92 are cylindrical in cross section, to produce a gravity flow stream 96 of discharged material, of cylindrical cross section.

The motor 78 is reversible for the purpose of reversing the normal clockwise direction of rotation of the rotor 80, as indicated in FIGURES 1 and 6, and producing

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counter raking of the material in the trough 36, for breaking up unusual bridging and clogging thereof. The operation of the vibrator 25 and the resilience of the trough supporting springs 20, produces vertical vibration of the trough, which acts to facilitate regulated sliding of material introduced from the upper end of the trough, down to the lower end of the trough and into the discharge spout 92.

The counter-rotation of the rotor 80 relative to the direction of movement of material downwardly within the trough 36, breaks up the material, to prevent clogging and bridging thereof in the trough, and at the same time, shapes the top of the material to the cross section of the discharge spout, therebetween facilitating and regulating the amount of and the rate of movement of material through the spout, into a container, such as a tubular bag, supported to the lower end of the spout.

Although there has been shown and described a preferred form of the invention, it is to be understood that the invention is not necessarily confined thereto, and that any change or changes in the structure of and in the relative arrangements of components thereof are contemplated as being within the scope of the invention as defined by the claims appended hereto.

What is claimed is:

1. A transfer chute comprising a support, a base fixed upon the support and having a forwardly declining top wall, upstanding spring means fixed upon said top wall, a vibrator equipped trough mounted upon said springs, said trough having a forwardly declining bottom wall and upstanding side walls, an end wall closing the lower end of the trough and providing a discharge opening, a rotor journaled across the lower end of the trough, said rotor having longitudinally spaced circumferential rows of teeth spaced therearound, said rotor being spaced above the trough bottom wall, and means for rotating the rotor, the outer rows of rotor teeth being of maximum length and a center row of minimum length, the intervening rows being progressively smaller from the outer rows to the center row.

2. A transfer chute comprising a support, a base fixed upon the support and having a forwardly declining top

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wall, upstanding spring means fixed upon said top wall, a vibrator equipped trough mounted upon said springs, said trough having a forwardly declining bottom wall and upstanding side walls, an end wall closing the lower end of the trough and provided with a discharge opening, a rotor journaled across the lower end of the trough, said rotor having longitudinally spaced circumferential rows of teeth spaced therearound, said rotor being spaced above the trough bottom wall, and means for rotating the rotor, the trough bottom wall being concave, the outer rows of rotor teeth being of maximum length and a center row of minimum length, the intervening rows of teeth being progressively smaller in length than the outer rows and imparting a concave contour to the rotor opposed to the concavity of the trough bottom.

3. A transfer chute comprising a support, a base fixed upon the support and having a forwardly declining top wall, upstanding spring means fixed upon said top wall, a vibrator equipped trough mounted upon said springs, said trough having a forwardly declining bottom wall and upstanding side walls, an end wall closing the lower end of the trough and provided with a discharge opening, a rotor journaled across the lower end of the trough, said rotor having longitudinally spaced circumferential rows of teeth spaced therearound, said rotor being spaced above the trough bottom wall, and means for rotating the rotor, the trough bottom wall being concave, the outer rows of rotor teeth being of maximum length and a center row of minimum length, the intervening rows of teeth being progressively smaller in length than the outer rows and imparting a concave contour to the rotor opposed to the concavity of the trough bottom, said teeth being radial, straight, and of flat rectangular shape.

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