

July 16, 1935.

M. E. FIRST

2,008,247

FEEDING MECHANISM

Filed July 9, 1930

3 Sheets-Sheet 1

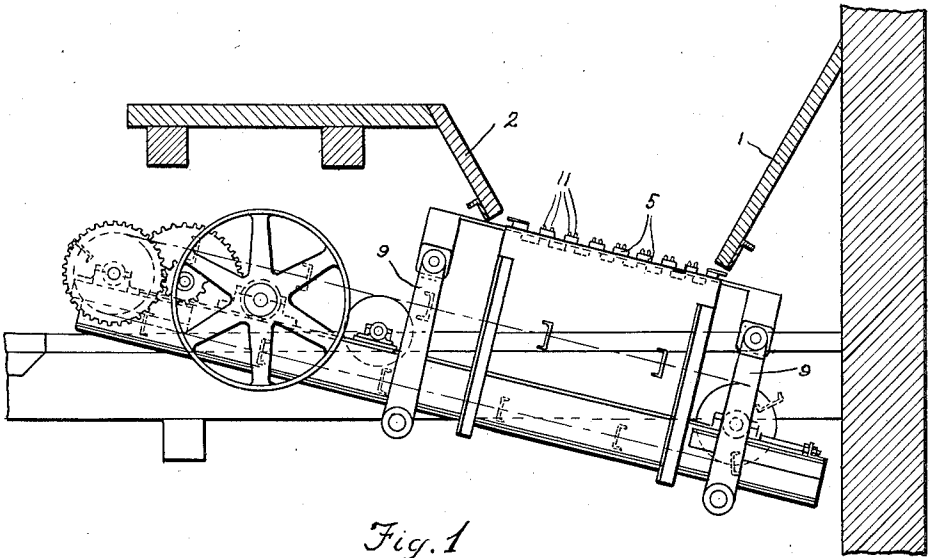


Fig. 1

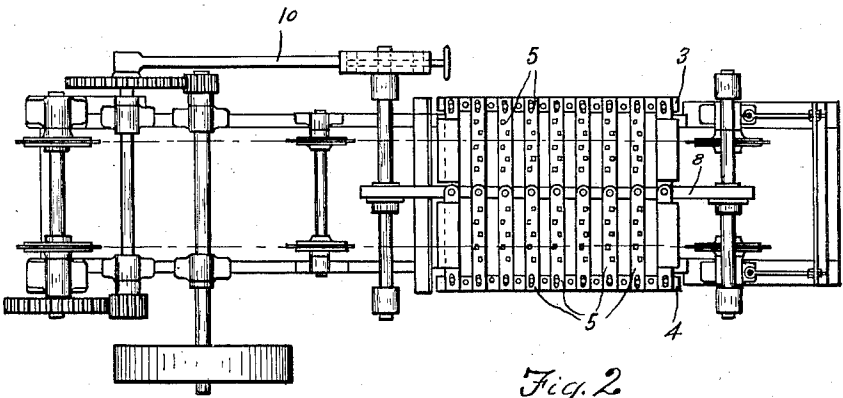


Fig. 2

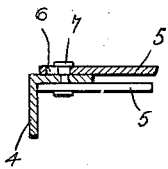


Fig. 4

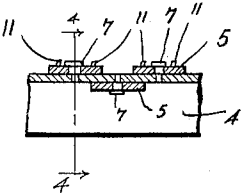


Fig. 3

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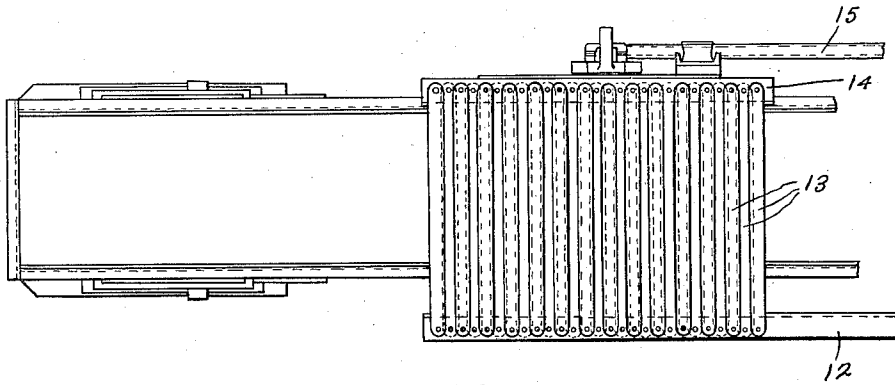


Fig. 5

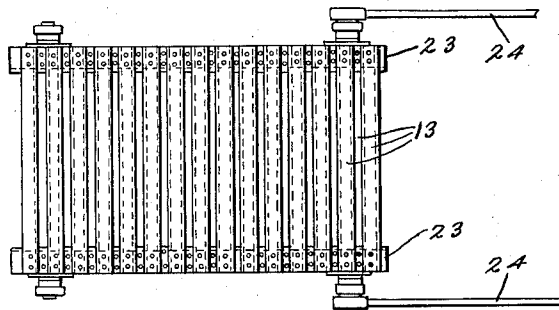


Fig. 6

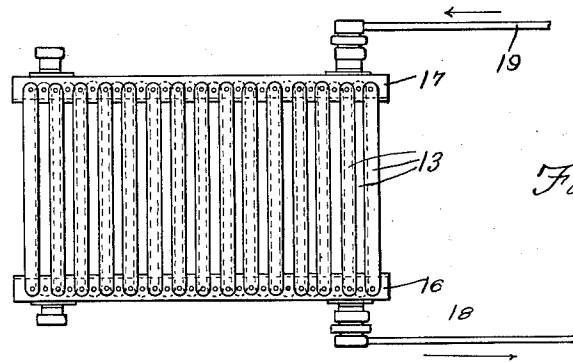


Fig. 7

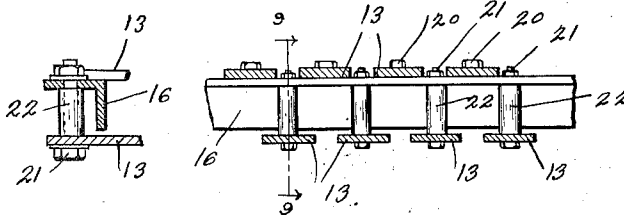


Fig. 9

Fig. 8

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3 Sheets-Sheet 3

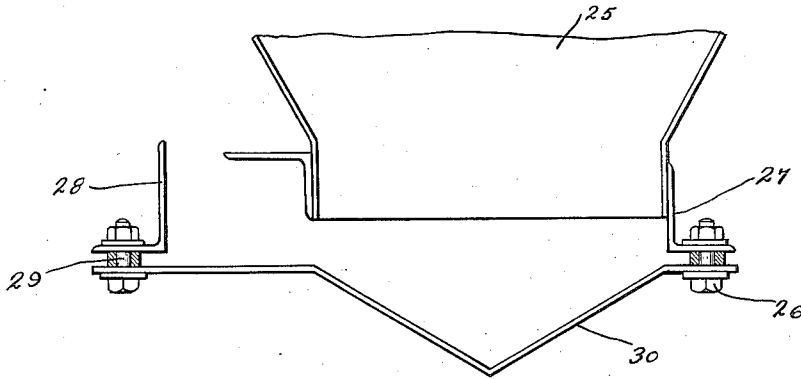


Fig. 10

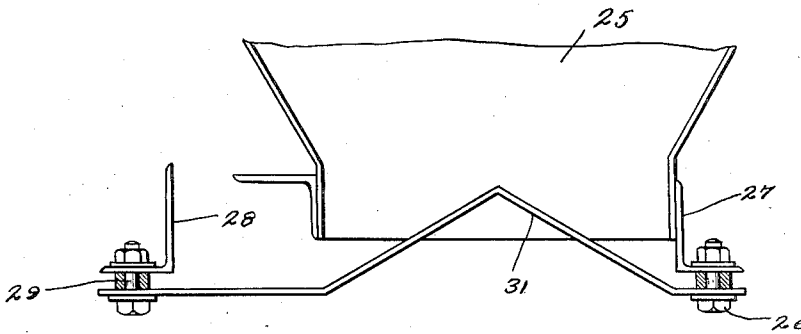


Fig. 11

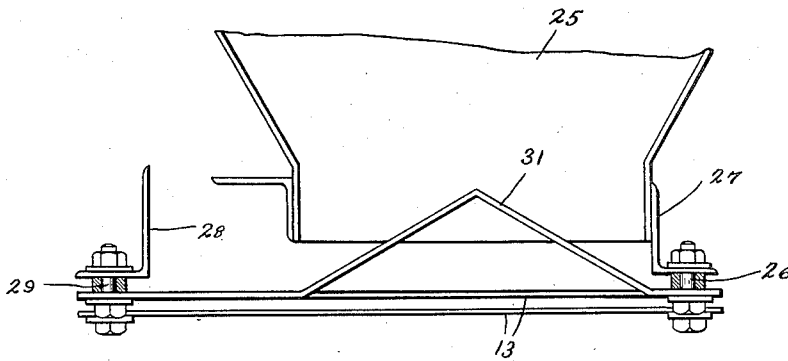


Fig. 12

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2,008,247

FEEDING MECHANISM

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Application July 9, 1930, Serial No. 466,686

8 Claims. (Cl. 83—44)

This invention, relating as indicated to feeding mechanism, has specific reference to improvements in the clay feeding mechanism forming the subject matter of a patent to Arthur O. Dupuy, No. 1,238,117, dated August 28, 1917. The mechanism disclosed in the above named patent is particularly applicable to the feeding of coarse materials, such as clay, which materials have a tendency to bridge over the discharge opening of the feeding chute, and which are to be preliminarily broken up or disintegrated by the feeding means associated with the delivery sheet. Such mechanism is, however, unsatisfactory for the purpose of feeding relatively fine or dry materials, such as molding sand, due to the fact that such material will flow freely through the spaces between the feeding bars so that the feeder fails in performing the function for which it is designed, namely the feeding of uniform quantities of the material from the feed chute to the receptacle or conveyor adapted to receive such material. Another disadvantage of the form of feeder construction as illustrated and described in the above named patent is that when certain types of material are sought to be fed thereby, such material will have a tendency to form a bridge across the feed chute, which bridge entirely overlies the feeding mechanism sometimes preventing the material from freely flowing from the feed hopper to the feed bars.

The mechanism comprising my invention includes an auxiliary set of feeding bars which are arranged in a plane parallel to the feeding bars of the above described construction, such auxiliary bars being positioned intermediately of those in the upper plane. An alternative form of construction of the mechanism comprising my invention includes bending the intermediate portion of some or all of the feeder bars laterally of the plane or planes of the ends thereof, which intermediate portions will materially assist in the functioning of such feeder by breaking down any bridges of material which may occur in the feed chutes and further assists in producing a superior feeding mechanism in the manner hereinafter more fully explained. By employing this form of construction all of the advantages of the mechanism disclosed in the above named patent may be realized, and, in addition a large class of materials may be fed by such improved mechanism which could not be handled by the construction heretofore employed. It is among the objects of my invention to provide a feeding mechanism having all of the above named desirable characteristics. Other objects of my in-

vention will appear as the description proceeds. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:

Fig. 1 is a part sectional, part elevational view of the feeding mechanism comprising my invention shown in association with a delivery chute; Fig. 2 is a plan view of the mechanism illustrated in Fig. 1 with the feed chute omitted; Fig. 3 is a fragmentary longitudinal sectional view through one of the frame members of the feeding mechanism showing secured thereto, terminals of the feeder bars; Fig. 4 is a fragmentary transverse sectional view of the feeder bar supporting frame taken on a plane substantially indicated by the line 4—4 in Fig. 3; Figs. 5, 6 and 7 are plan views of alternative forms of construction of the feeder bar arrangement and supporting means; Fig. 8 is a fragmentary longitudinal sectional view of the feeder bar supporting structure as illustrated in either Figs. 5 or 7; Fig. 9 is a transverse sectional view of such supporting means taken on the plane substantially indicated by the line 9—9 in Fig. 8; Fig. 10 is a transverse fragmentary, part sectional, part elevational view of an alternative form of construction of the feeder bars showing the intermediate portions thereof bent downwardly from the plane of the ends; Fig. 11 is a view similar to Fig. 10 showing an alternative form of construction in which the feeder bars are bent upwardly of the plane of their ends; and Fig. 12 is a view similar to Figs. 10 and 11 showing a form of construction in which a combination of straight and bent feeder bars is employed.

Referring more specifically to the drawings and more especially to Figs. 1 and 2, the delivery chute, from which the material to be fed is delivered to the mechanism comprising my invention, consists of sloping side members 1 and 2 which preferably are the sides of a hopper containing the material to be fed. In the particular embodiment of my invention shown in Fig. 1 for purposes of illustration, the feeding mechanism is disposed at an angle with respect to the horizontal, although it will be noted that the arrangement of such mechanism depends solely upon the

particular requirements of such mechanism and the plant layout with which it is associated. Extending on opposite sides of the open bottom of the delivery chute are frame members 3 and 4 which have loosely mounted thereon a plurality of bars 5 which extend partially across the space between such frame members. The specific manner in which the terminals of the bars 5 are loosely mounted on the side frames 3 and 4, is not important from the standpoint of the operation of the mechanism comprising my invention. The specific form of construction here shown for purposes of illustration, consists of slotted apertures 6 formed in the terminals of the bars 5, which apertures receive pins 7 which are secured to the frame members 3 and 4. The bars 5 are arranged in substantially parallel planes, the bars in the lower plane lying intermediate the bars in the upper plane. The overlying inner ends of the bars 5 are pivotally mounted on a driving member 8 which is pivotally secured to rocker arms 9. Oscillation of the rocker arms 9 may be obtained in any suitable manner, such as the pitman 10, which is suitably connected to an eccentric forming part of the driving mechanism which forms no part of this invention. In order to prevent a packing or bridging of the material over the feeding bars, such bars may be provided with prongs 11 which will scrape off such packed material and prevent the formation of a bridging of the material over the feeding bars.

In the operation of the feeding mechanism just described, the member 8 is caused to oscillate through limits preferably twice the width between the feeder bars so that a proper criss-cross action is effected by such bars resulting in an even feeding of the material. The arcuate travel of the upper terminals of the rocker arms 9 will result in a similar movement of the feeder bars 5 so that the prongs 11 may dig into and destroy any bridging or caking of the material over the feeder bars. The arrangement of the feeder bars spaced vertically and horizontally and staggered as described, prevents loose or relatively fine dry material from flowing through the feeding mechanism in excess of the desired rate of feed while the mechanism is operating, and further prevents any flow of such material while the feeding mechanism is stationary.

An alternative form of construction of the mechanism comprising my invention is illustrated in Fig. 5 in which the frame member 12 is positioned alongside the bottom of the open feed chute in a line somewhat removed from the side of such open bottom, this frame member being fixed and having pivotally secured thereto the terminals of bars 13 which, in this form of construction, extend entirely across the bottom of the open feed chute and are pivotally secured at their opposite terminals to an oscillatable frame member 14. The feeding of the material in the manner hereinbefore described is effected by this form of construction upon oscillation of the frame member 14 by a pitman 15 which may be connected to any suitable eccentric or like means for producing a reciprocating motion.

Instead of having the feeder bars 13 pivotally supported at one end on a fixed frame member and their other ends similarly supported on an oscillatable frame member, both such frame members may be oscillatable as illustrated in Fig. 7 in which the side frames 16 and 17 have pivotally secured thereto the feeder bars 13, the relative oscillation of the frame members 16 and

17 being effected in the direction indicated by the arrows associated with the pitmen 18 and 19 respectively effecting such reciprocation or oscillation. As illustrated in Figs. 8 and 9, the manner in which the feeder bars 13 may be pivotally mounted on the side frame members may take the form of pins 20 which are utilized to secure the bars 13 in the upper plane to the side frame members, and pins 21 which have coaxially mounted thereon spacer sleeves 22 which secure the bars 13 in the lower plane.

Another form in which the principles of my invention may be advantageously employed, consists in rigidly securing the feeder bars 13 to side frame members 23, reciprocation of which may be effected by pitmen 24. In each of the above described forms of the construction, the arrangement of the feeder bars in spaced vertical and horizontal and staggered relation prevents dry or relatively thin material from flowing through the feeder mechanism unless such mechanism is in operation, and the rate at which the feeding takes place will be directly proportional to the rate of reciprocation of the frame members, so that the feed of the material may be accurately controlled.

Another form of construction of the feeder bars forming a part of the mechanism comprising my invention is most clearly illustrated in Figs. 10, 11 and 12 in which such bars extend transversely of the discharge end of the feed hopper 25, one end thereof being pivotally supported by a pin 26 secured in an aperture provided therefor in a bracket 27 which may be attached to one side of the feed hopper while the opposite ends of such bars are pivotally supported on a reciprocating member 28 by means of pivot pins 29. The intermediate portion of the feeder bars specifically that portion thereof directly beneath the feed hopper 25 is bent laterally of the plane of the ends thereof as at 30 in Fig. 10, such bars as illustrated in this figure being bent downwardly with respect to the bottom of the hopper. In Fig. 11 a construction similar to that illustrated in Fig. 10 is employed with the exception that the intermediate portions 31 of the feed bars is bent upwardly so as to extend for a short distance into the feed hopper thereby, upon oscillation thereof, destroying and breaking down any bridges, and the like, of material which may form across the discharge opening of such hopper.

With the forms of construction illustrated in Fig. 10, a single row of bars may advantageously be employed for the purpose of feeding the material although, as illustrated in Fig. 12, such bent bars may be employed in association with straight feeder bars such as 13 which have been described in connection with the previous figures.

According to the particular type of material which is to be fed by the apparatus comprising my invention, the feed bars may be bent either upwardly as at 31, or downwardly as at 30 in Figs. 11 and 10, respectively, and further, only so many bent bars as is advisable need be employed in connection with straight bars, as most clearly illustrated in Fig. 12. The feeder bars which have their intermediate portions bent laterally of the ends of the planes thereof may likewise be employed advantageously with vertically staggered bars, so that the combined effect of a positive feeding of the material as effected by the bent bars and an accurate control of such feeding by the staggered arrangement of the bars can be effected.

In connection with the description of Figs. 9 to

12, it will be noted that I have used similar reference numerals to designate like parts, such forms of construction as illustrated in these separate figures differing only in the arrangement and combination of the several forms of feeder bars.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In a material feeding mechanism, the combination of a material chute open at its bottom, a plurality of spaced bars lying in a horizontal plane and extending across such bottom, a plurality of spaced bars lying in a horizontal plane disposed in spaced relationship under said first named bars and intermediately thereof, one end of said bars being pivotally fixed and means adapted to simultaneously reciprocate the other ends of all of said bars in a horizontal plane across the spaces between the same.

2. In a material feeding mechanism, the combination of a material chute open at its bottom, a plurality of spaced bars lying in a horizontal plane and extending across such bottom, a plurality of spaced bars lying in a horizontal plane disposed in spaced relationship under said first named bars and in overlapping relation therewith, one end of said bars being pivotally fixed, and means adapted to reciprocate the other ends of said bars in a horizontal plane across the spaces between the same.

3. In a material feeding mechanism, the combination of a material chute open at its bottom, a plurality of horizontally spaced vertically staggered bars extending across such bottom, said bars being pivotally fixed at one end, and means adapted to simultaneously reciprocate the other ends of all of said bars across the horizontal spaces between the same.

4. In a material feeding mechanism, the combination of a material chute open at its bottom, a plurality of horizontally and vertically spaced bars arranged in staggered relation extending across such bottom, two frame members mounted, one on each side of such bottom opening, said bars pivotally secured to said frame members, and means adapted to reciprocate at least one of said frame members to move said bars with a criss-cross motion across the spaces between the same.

5. In a material feeding mechanism, the combination of a material chute open at its bottom,

a plurality of horizontally spaced bars extending across such bottom, a plurality of spaced bars above said bars and in staggered relation therewith, the intermediate portions of such bars extending laterally of the plane of the ends thereof, and means adapted to impart a reciprocal scissor movement to said bars across the spaces between the same.

6. In a material feeding mechanism, the combination of a material chute open at its bottom, two frame members mounted one on each side of such bottom opening, a plurality of bars, movably secured to said frame members and mounted in horizontally spaced relation in two vertically spaced planes with the spaced bars in one plane in staggered relation to the spaced bars of the other plane and means adapted to effect relative movement of said frame members whereby they are continuously reciprocated relatively during operation of the mechanism.

7. In a material feeding mechanism, the combination of a material chute open at its bottom, frame members mounted at opposite sides thereof, an oscillatable driving member horizontally disposed parallel to said frame members, a plurality of bars spanning the spaces between said driving member and said frame members, and supported thereby, each of said bars being slidably and pivotally secured to one of said supporting members and pivotally secured to said driving member, a plurality of bars affixed to said supporting members across the bottom opening in spaced relation in a horizontal plane which is vertically spaced from said first-named bars, said last-named bars being in staggered relation with said first-named bars, and means adapted to oscillate said driving member in the plane defined by the bars pivoted thereto.

8. In a material feeding mechanism, the combination of a material chute open at its bottom, frame members supported on opposite sides thereof, a plurality of spaced bars supported by said members and lying in a horizontal plane beneath the bottom of said chute, a plurality of spaced bars lying in a horizontal plane disposed in spaced relationship with said first-named bars and intermediately thereof, said last-named bars having one end pivotally fixed and the other end restrained against movement other than linear and pivotal, and means adapted to simultaneously reciprocate the pivoted ends of said last-named bars in the horizontal plane defined thereby in a direction transverse to the length of said bars.

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