

Sept. 4, 1923.

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C. S. JENNINGS

ADJUSTABLE FEEDER

Filed Aug. 21, 1920

5 Sheets-Sheet 1

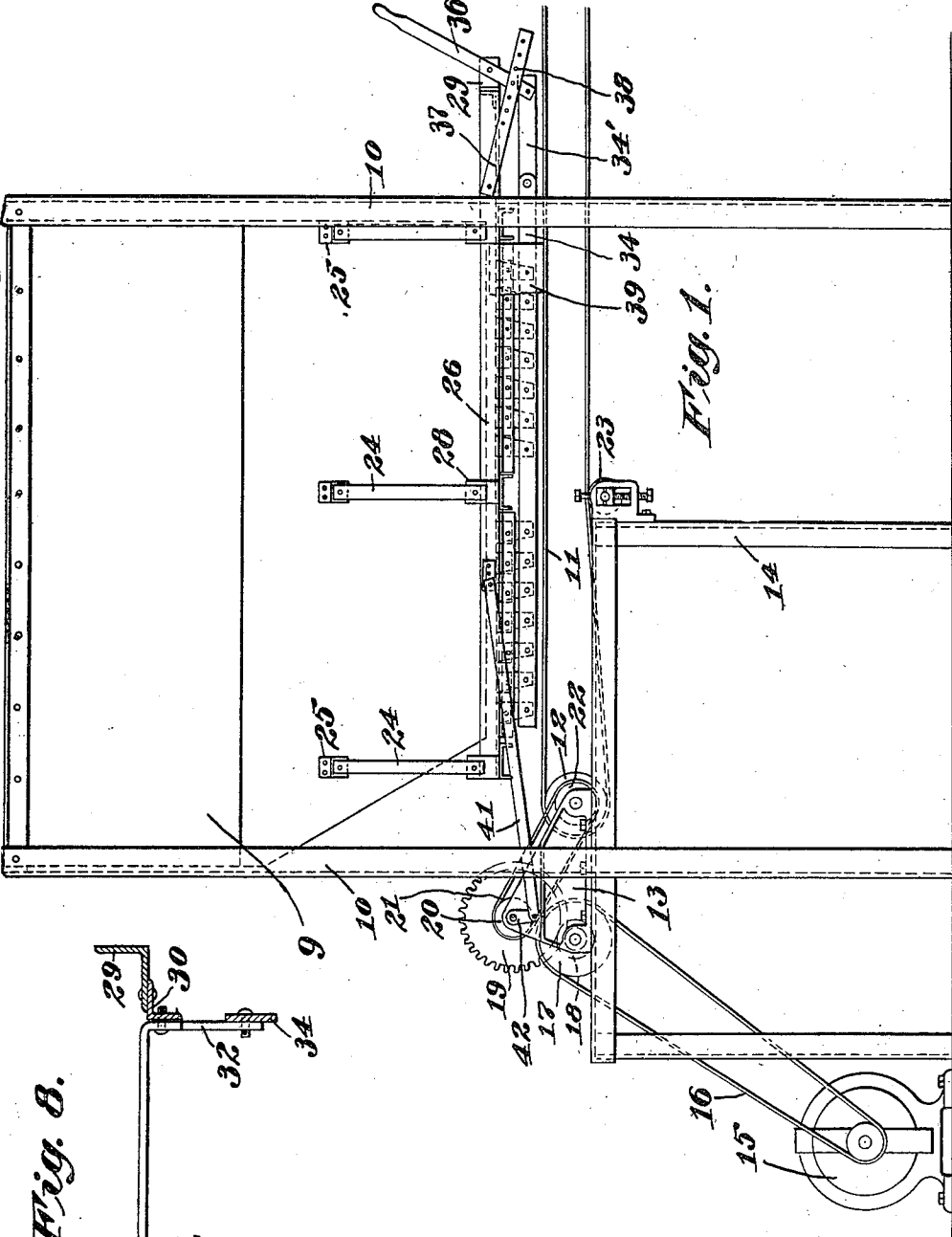
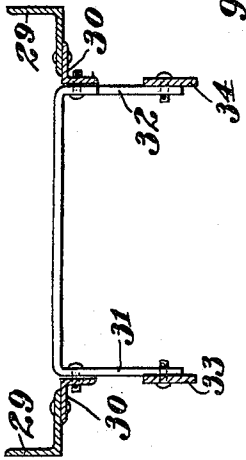


Fig. 8.



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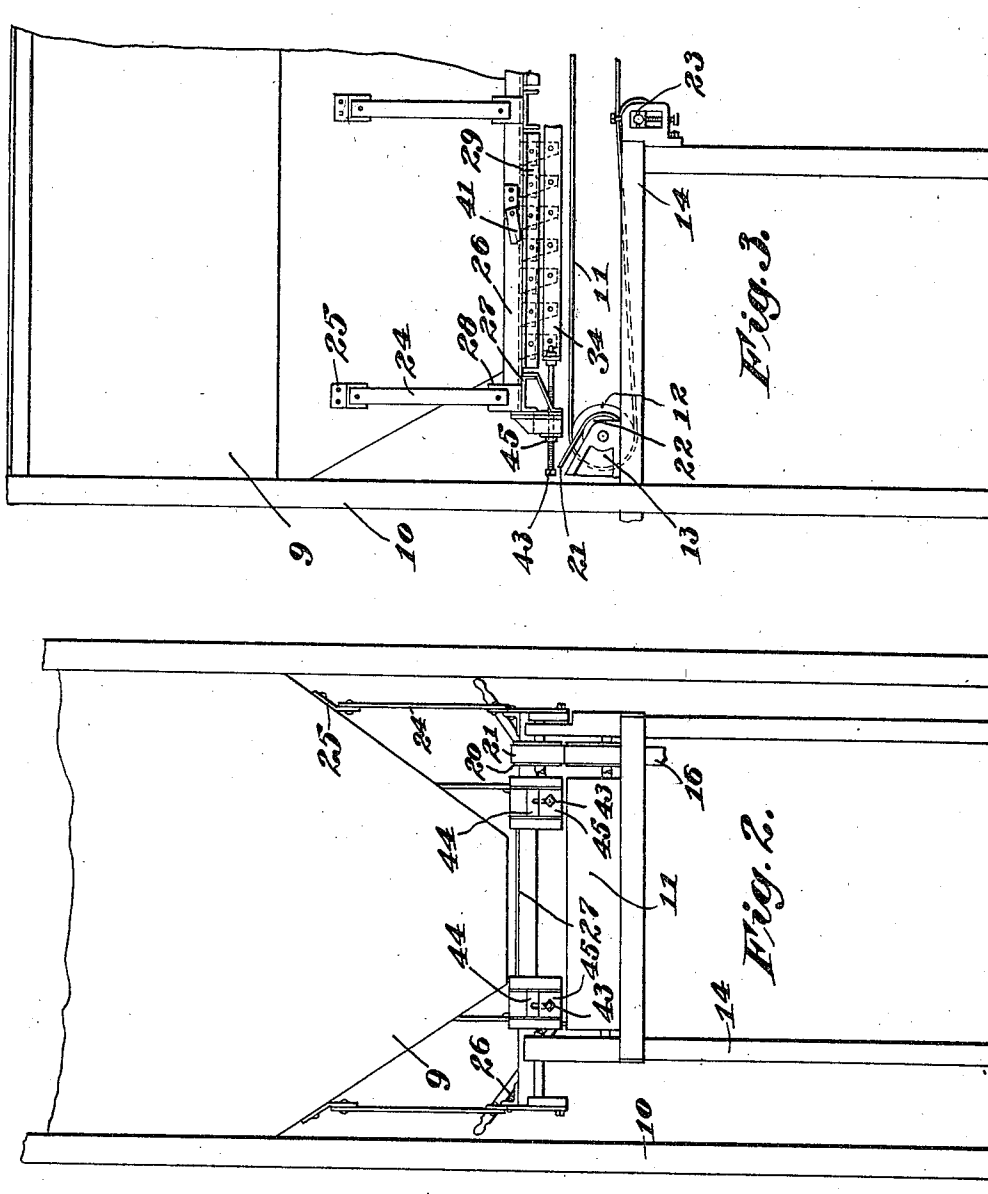
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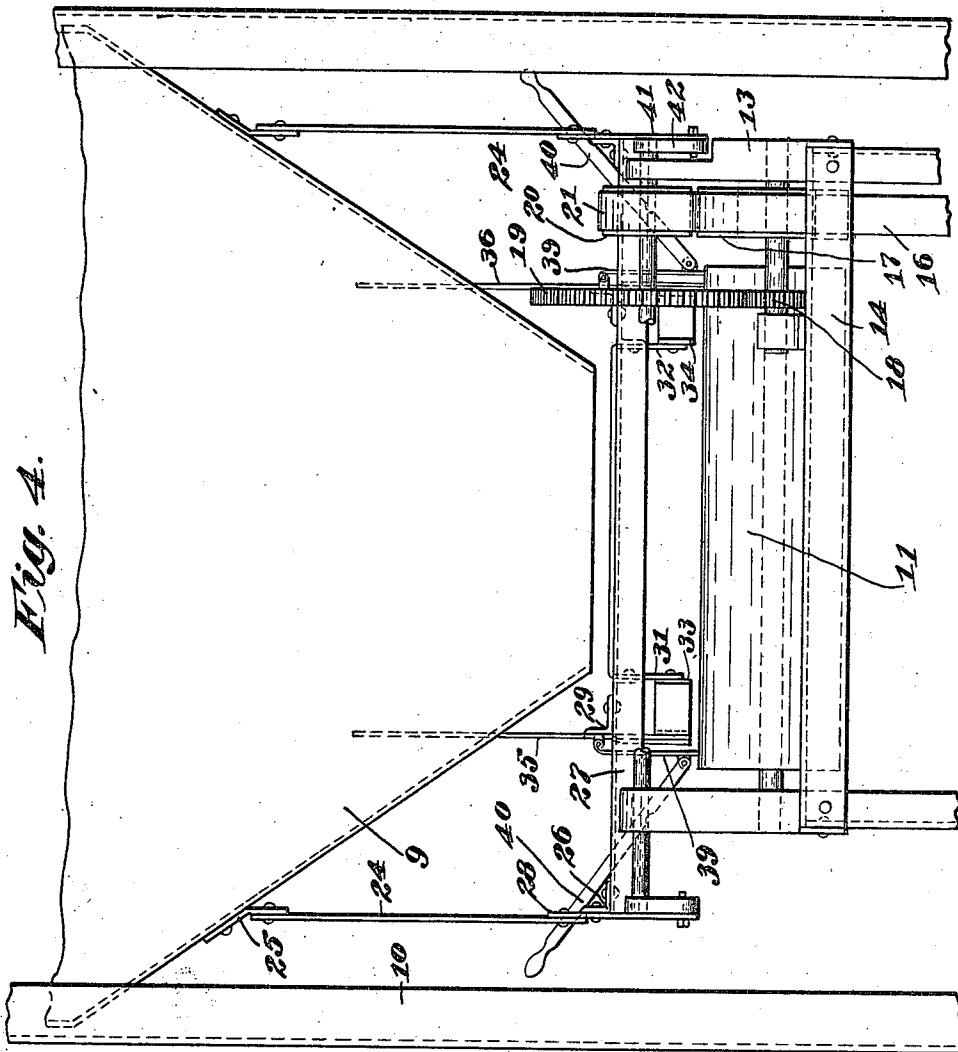
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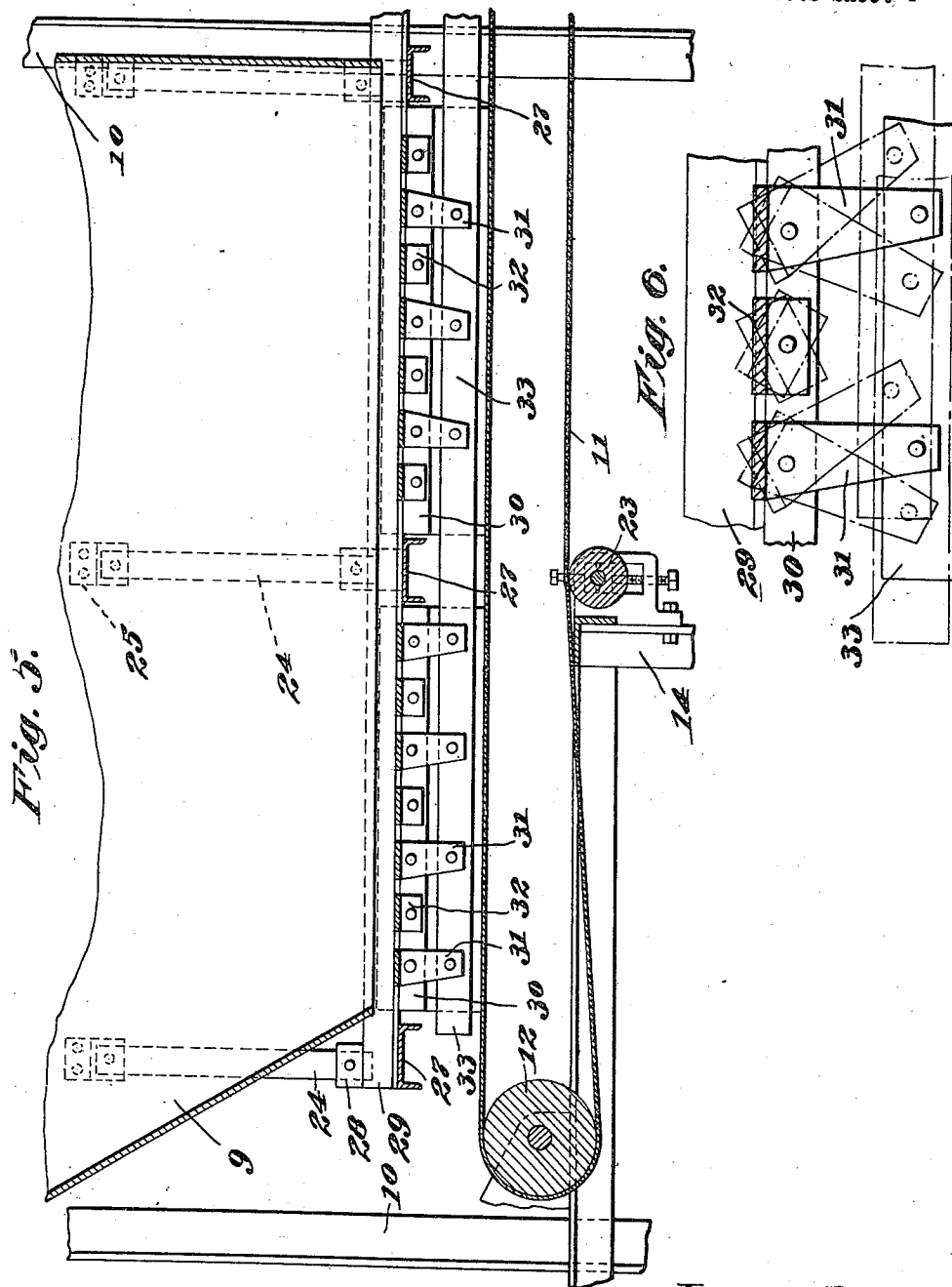
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5 Sheets-Sheet 4



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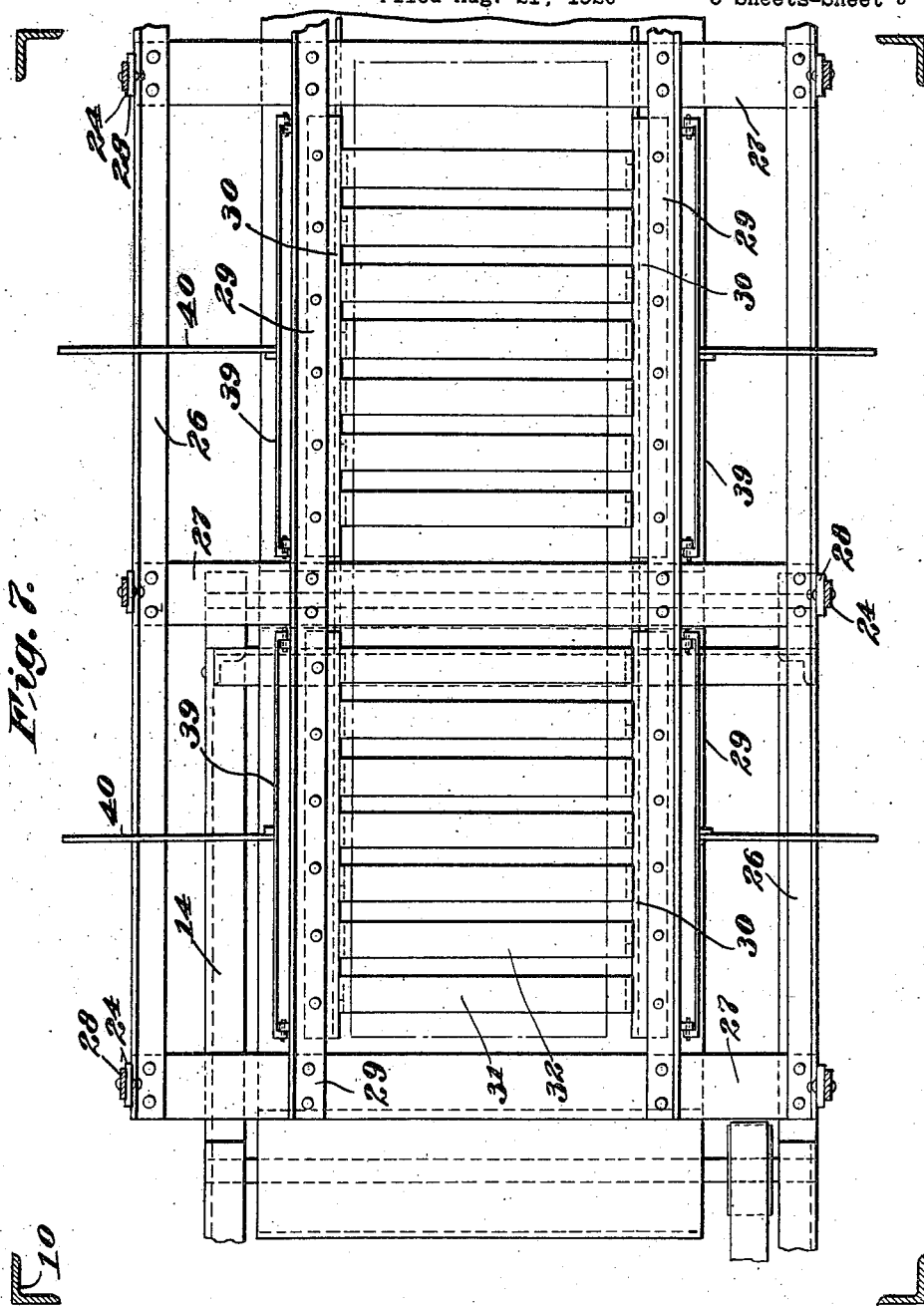
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ADJUSTABLE FEEDER

Filed Aug. 21, 1920

5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE.

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ADJUSTABLE FEEDER.

Application filed August 21, 1920. Serial No. 405,156.

To all whom it may concern:

Be it known that I, CHESTER S. JENNINGS, citizen of the United States of America, and resident of Wellesley Farms, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Adjustable Feeders, of which the following is a specification.

This invention relates to a new and improved means for regulating the flow of comminuted material and more specifically for regulating the flow of sand or other similar material from a storage hopper or bin onto a moving conveyor.

In order to transfer by gravity foundry sand or similar material from a hopper to a moving belt or similar conveyor it is necessary to regulate the flow of sand by some means adapted to render the flow uniform and prevent clogging of the conveyor. The flow of sand or similar material is dependent upon the size and shape of the sand particles and in any given sand will vary widely depending upon the moisture content of the sand, which latter may be affected by atmospheric conditions. It is therefore necessary that the flow regulating means be adjustable to adapt itself to varying conditions. Moreover sand under certain conditions of moisture content is likely to clog and fail to pass through a mesh or grating if the latter is stationary and means should therefore be provided to reciprocate or otherwise put in motion the flow control means.

It is an object of the present invention to provide sand flow regulating means which may be adjusted to meet varying conditions and may have motion imparted to it to prevent the sand from clogging or coming to rest upon the device. It is an object to provide a device which will insure an even and regular flow of sand and consequently assure a continuous and uniform distribution upon a belt or similar conveyor. It is a further object to provide means of the character described which are simple in construction, easy of adjustment, effective in operation and relatively inexpensive of manufacture and installation. Other and further objects will appear as the description proceeds.

I have illustrated certain preferred embodiments of my invention in the accompanying drawings, in which,—

Figure 1 is a side elevation of the machine, certain parts being broken away;

Figure 2 is an end elevation of a modified form of the machine with certain parts omitted;

Figure 3 is a partial side view of the modified form of the device;

Figure 4 is an end elevation of the main portions of the machine on an enlarged scale;

Figure 5 is a longitudinal section of Fig. 4;

Figure 6 is an enlarged detail of a portion of Fig. 5;

Figure 7 is a plan view showing the grating with the upper portions of the apparatus removed; and

Figure 8 is a section showing the details of the grating assembly.

As shown in the drawing the apparatus comprises the sand hopper 9, supported upon the standards 10, the lower portion of the hopper being contracted and having an open bottom or discharge opening.

Referring now particularly to Fig. 1, the conveyor belt 11 passes below the discharge opening of the hopper 9 and passes around the drive roller 12 which latter is supported by a journal frame 13 carried by the support table or frame 14. The conveyor is driven by the motor 15 through the belt 16, pulley 17, reduction gearing 18 and 19, pulley 20, belt 21 and pulley 22, the last named pulley being upon the same shaft as the drive roller 12. The pulleys and reduction gearing are all carried by the journal frame 13. The conveyor belt 11 is, of course, continuous and its opposite end and intermediate portions (not shown) are carried by the customary rollers. The tension of the conveyor belt may be varied by the adjustment of the idler roller 23 carried by the table 14.

The feeder grate is suspended below the hopper delivery opening by means of the swinging arms 24, the upper ends of which are pivoted to the lugs 25 carried by the hopper 9. The grating comprises a rectangular frame consisting of longitudinal angle irons 26 and cross channel-bars 27. The lower ends of the swinging arms 24 are pivoted to clips 28 attached to the side members 26. The angle irons 29 extend parallel to the side members 26 and are attached to the channel bars 27, being spaced apart a distance slightly greater than the delivery opening of the hopper. As best shown in Fig. 8, the small angle irons 30 are riveted to the lower side of the horizontal leg of

the members 29, and in the reverse position.

The grate bars 31 and 32 are pivoted between these members 29. The grate bars are in the shape of an inverted U, with one leg longer than the other. The bars are alternately placed so that the bars 31 have a longer leg on the left side as seen in Fig. 8, the longer legs having a pivoted connection with the adjusting bar 33, and the bars 32 are similarly connected to the adjusting bar 34 on the right.

The right ends of the adjusting bars 33 and 34 are bent out into the plane of the adjacent angle iron 29 and as shown in Fig. 1 have pivoted to their ends connector members such as 34'. The adjusting levers 35 and 36 are pivotally connected to the connector members, the lever 35 connecting one member 34' and its adjacent member 29, and the lever 36 similarly connecting the other member 34' and its member 29. The adjustable lock bars 37 are pivoted to the bars 29 and are provided with a plurality of openings 38 adapted to register with similar openings located in the levers 35 and 36 between their respective pivots and to be connected to the levers by passing a pin through these openings when in registration. The bars 33 or 34 and their adjacent bars 29 are thereby maintained in fixed relation in any one of a number of predetermined positions, and the adjustment may be readily varied by removing the pin, actuating the lever 35 or 36 or both until the desired position is reached for each set of grate bars and again inserting the pin or pins. The series of bars 31 may be adjusted entirely independently of the series 32, being connected to different adjusting bars and levers. Side shutters 39 are provided and are pivoted to the side bars 29. They are operated by the pivoted handles 40 which have notches adapted to engage the upper edge of the side member 26, so as to maintain the shutters either vertical or horizontal as desired.

The grate frame is connected by the rod 41 to the arm 42 on the shaft of the gear 19 and pulley 20 and is thereby given a short reciprocating movement by the rotation of this shaft during the operation of the apparatus.

The modified form of the device shown in Figs. 2 and 3 is similar to that just described with the exception of the device for adjusting the grate bars. The adjusting bar 24 as shown in Fig. 3 has its left end turned outward and perforated to permit the end of the bolt 43 to pass through, the bolt end being retained in place by nuts either side of the member 34. The bolt extends through a slot in the member 44 as seen in Fig. 2 and has a threaded connection with the bearing plate 45. By turning the head of the bolt 43 it is screwed in

or out relative to the plate 45 and the adjusting bar is moved accordingly to vary the grate adjustment. The other adjusting bar 33 is similarly provided with adjusting means.

In the use of the apparatus the sand is placed in the hopper and the motor set in motion, the conveyor being moved and the grate reciprocated. If the sand is dry and fine, sufficient may pass through the grating with the bars in the position shown in full lines in Fig. 6, but if the sand is moist or coarse one or both of the adjusting bars may be moved to bring one or both of the sets of bars into angular position such as indicated in broken lines in Fig. 6. This position of the bars not only affords a greater space between adjacent bars, but due to the reciprocation of the whole grate, each bar has a scooping action upon the sand above the grate in the hopper. Obviously the adjustment of the grate bars may be utilized to vary the amount of any given sand to be delivered as well as to cause a uniform delivery of differing sands or the same sand under differing conditions.

With the form shown in Fig. 1, the adjustment of the grate bars may be made more quickly than with the form of Figs. 2 and 3 but the latter has the advantage of permitting a greater delicacy of adjustment.

The side shutters 39 prevent the sand from spilling over the side of the conveyor belt and are capable of being swung up by the handles 40 to permit inspection or cleaning of the mechanism.

While the apparatus has been defined in connection with sand it is obviously capable of use with any pulverulent or granular substance as for example sugar, salt, grain or other material.

I claim:

1. In combination with a hopper having a downwardly directed discharge opening, a horizontally reciprocable frame arranged below said opening, a series of substantially parallel spaced bars pivotally mounted in the frame, means for turning said bars about their respective pivotal axes, and means also mounted upon the frame for retaining said bars in the position to which they may be turned.

2. In a device of the class described, a hopper and an adjustable grate composed of a plurality of flat bars located adjacent the outlet opening of the hopper, the grate bars being pivoted to a movable frame and having downwardly extending legs connected to adjusting bars whereby the relation of the bars to the opening may be adjusted, there being a plurality of independent adjusting bars and each grate bar being connected to one such bar whereby the grate is divided into independently adjustable series of bars.

3. In a device of the class described, a

hopper and an adjustable grate composed of a plurality of flat bars located adjacent the outlet opening of the hopper, the grate bars being pivoted to a frame and having downwardly extending legs the legs of alternate bars being connected respectively to one or the other of a pair of adjusting bars whereby the relation of the bars to the opening may be adjusted, and means adapted to reciprocate the grate frame relative to the outlet opening of the hopper.

4. In a device of the class described, a hopper and an adjustable grate composed of a plurality of flat bars located adjacent the outlet opening of the hopper, the grate bars being pivoted to a frame and having downwardly extending legs connected to adjusting bars whereby the relation of the bars to the opening may be adjusted, the grate frame being suspended by swinging arms whereby the grate may be reciprocated relative to the outlet opening of the hopper.

5. In a device of the class described, a hopper and an adjustable grate located adjacent the outlet opening of the hopper, the grate comprising a plurality of bars pivoted in a frame, the bars having angularly extending legs pivoted to adjusting bars and a lever connecting each adjusting bar to the grate frame, and means adapted to hold each lever fixed in any one of a plurality of positions.

6. In a device of the class described, a hopper and an adjustable grate located adjacent the outlet opening of the hopper, the grate comprising a plurality of bars pivoted in a frame, the bars having angularly extending legs pivoted to adjusting bars and a lever connecting each adjusting bar to the grate frame, and a second lock lever adapted to be connected to each first mentioned lever to maintain it in any one of a plurality of positions.

7. In a device of the class described, a hopper and an adjustable grate located adjacent the outlet opening of the hopper, the grate comprising a plurality of flat bars pivoted in a frame, the bars having angularly extending legs pivoted to adjusting bars and adjustable means connecting the grate and the adjusting bars whereby the

relation between the grate and adjusting bars may be varied to change the angular relation of the bars to the grate, and means adapted to reciprocate the grate relative to the outlet opening in the hopper.

8. In a device of the class described, a hopper and an adjustable grate located adjacent the outlet opening of the hopper, the grate comprising a plurality of bars pivoted in a frame, the bars having angularly extending legs pivoted to adjusting bars and a lever connecting each adjusting bar to the grate frame, and a second lock lever adapted to be connected to each first mentioned lever to maintain it in any one of a plurality of positions, the grate frame being suspended by swinging arms whereby the grate may be reciprocated relative to the outlet opening of the hopper.

9. In a device of the class described, a hopper having an outlet opening for the discharge of material upon a conveyor disposed adjacent to such opening, and a grate composed of a plurality of independently adjustable series of grate bars, normally fixed relatively to each other, interposed between said hopper and conveyor for regulating the flow of material from the hopper to the conveyor, alternate bars of the grate being disposed in different series whereby adjacent bars of the grate are independently adjustable.

10. In a device of the class described, a hopper and an adjustable grate composed of a plurality of flat bars located adjacent the outlet opening of the hopper, the grate bars being pivoted to a frame and having downwardly extending legs connected to adjusting bars whereby the relation of the bars to the opening may be adjusted, there being a plurality of independent adjusting bars and each grate bar being connected to one such bar whereby the grate is divided into independently adjustable series of bars, alternate grate bars being in differing series whereby adjacent bars are independently adjustable.

Signed by me at Boston, Massachusetts, this twelfth day of August, 1920.

CHESTER S. JENNINGS.