

Aug. 9, 1966

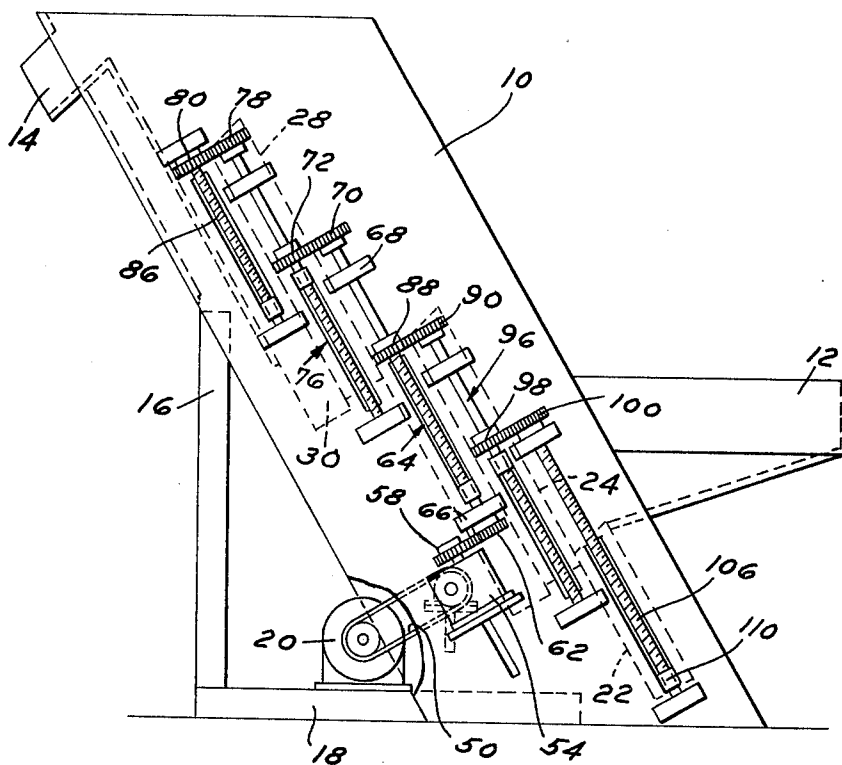
P. A. FORD
TRANSFER MECHANISM HAVING WORM DRIVEN
RECIPROCATING PLATES

3,265,195

Filed Nov. 14, 1963

2 Sheets-Sheet 1

FIG. 1



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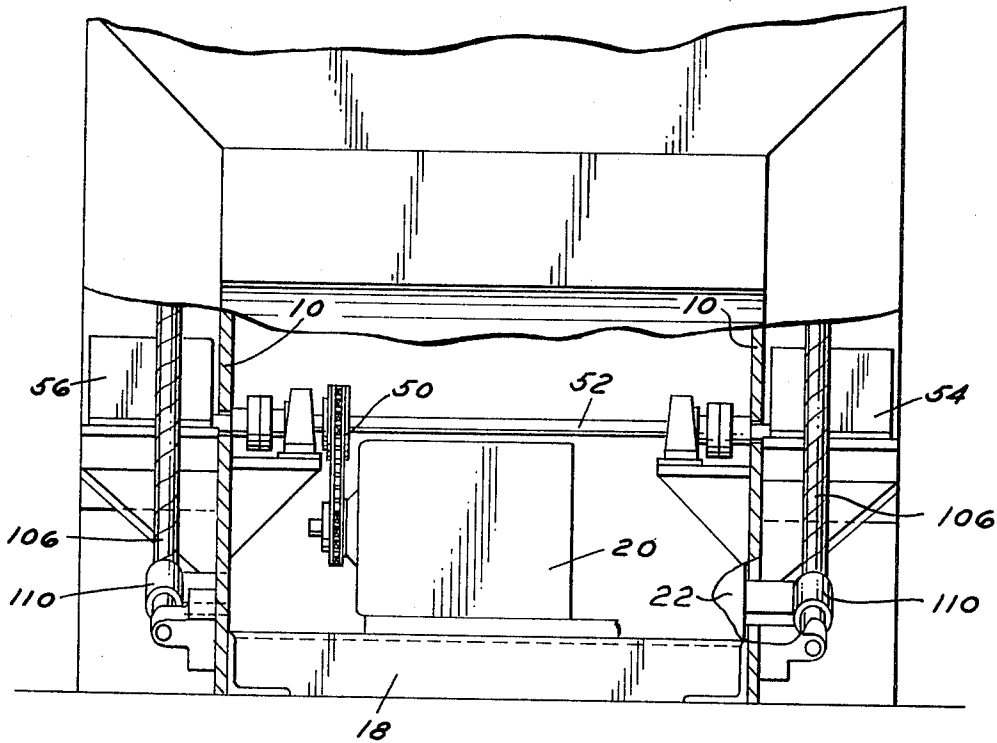


FIG. 2

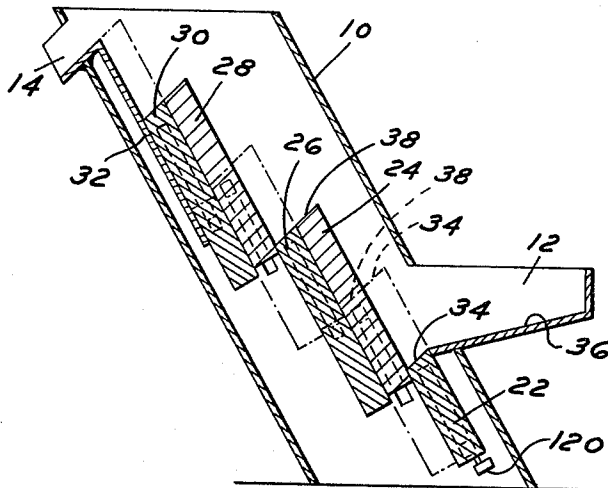


FIG. 3

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1

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TRANSFER MECHANISM HAVING WORM DRIVEN RECIPROCATING PLATES

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3 Claims. (Cl. 198—218)

This invention relates to a transfer mechanism and more particularly to a machine for moving fungible parts from one level to another and also horizontally. This type of device is generally known and the present invention relates to an improvement for driving the moving elements of the transfer mechanism in a simplified and novel manner.

It is an object of the invention to provide a power means for the moving elements of the transfer mechanism which is driven from a single power source and which simultaneously relates all of the parts in a proper sequence and in a manner such that a change of speed of one will reflect in the entire mechanism.

It is another object to provide a device which is simple in construction and economical in operation as well as easy to repair and replace in the event of any breakdown.

Another advantage of the device is that it can be operated completely at floor level without the need for excavation for any working parts.

Other objects and features of the invention relating to details of construction and operation will be apparent in the following description and claims.

Drawings accompany the disclosure and the various views thereof may be briefly described as follows:

FIGURE 1, a side view of the device showing the operating mechanism.

FIGURE 2, a rear view of the device with a portion cut away to illustrate the relationship of the respective side elements.

FIGURE 3, a sectional view showing the general relationship of the moving parts.

Referring to the drawings:

In FIGURE 1, an angled housing 10 has an inlet hopper ray 12 at one side near the bottom and an outlet chute 14 on the other side toward the top. The housing 10 is supported by a frame 16 in a conventional manner and on the bottom 18 of this frame is mounted a motor 20. Within the housing 10, as shown in FIGURE 3, are a plurality of shuffle plates comprising an initial short plate 22, a second plate 24, a third plate 26, a fourth plate 28 and a fifth plate 30. These plates are positioned in close sliding relationship and suitable guide means are provided on the end walls of the housing 10. It will be noted that plate 30 moves against a secondary back wall 32 while the plate 22 moves in tight relationship to a lip 33 at the inner edge of a tray floor 36.

Each shuffle plate has a beveled top edge angled downwardly as shown at 34 on the top of plate 22 in FIGURE 3. With the plates as positioned in FIGURE 3, the short plate 22 has its top surface 34 level with the slanted floor 36 of the tray 12 which is adapted to receive and feed articles or material to be moved. Also, the top surfaces of parts 24 and 26 are aligned with each other and the top surfaces of the plates 28 and 30 are aligned. On the other hand, the dotted line positions shown in FIGURE 2 show the extreme positions of the plates as they shift vertically in the housing 10. It will be seen that the surface 34 of plate 22 will level with the surface 38 of plate 24 and so on such that parts will be moved upwardly through the housing 10 by falling from one plate to the other and then being moved upwardly and falling to the next plate until they finally reach the outlet 14. A device of this kind has been found to be particularly useful in the feeding of continuously operating heat

2

treating furnaces which are handling small parts, these parts being dumped in metered quantities dependent on the speed of the feeding device onto a suitable belt which carries them into the heat treating furnaces.

The drive for the mechanism originates at the motor 20 which through a chain 50 drives a cross shaft 52 leading to gear reducing devices 54 and 56 on opposite sides of the housing 10. The gear reducing device 54 has an output gear 58 (FIGURE 1) which meshes with a gear 62 on the end of a screw shaft 64 which is suitably mounted in bearings 66 and 68 on the walls of the housing 10.

On the other end of the screw shaft 64 is a drive gear 70 which meshes with a drive gear 72 on a screw shaft 76. At the end of the shaft 76 is a drive gear 78 which meshes with a drive gear 80 on a screw shaft 86. Each of these screw shafts are suitably mounted in bearing blocks on the walls of the housing 10. Also on the screw shaft 64 is a drive gear 88 which meshes with a drive gear 90 on a screw shaft 96 and intermediate the ends of the screw shaft 96 is a drive gear 98 which meshes with a drive gear 100 on a screw shaft 106. Thus, all of the screw shafts are driven from the motor 20 and the mechanism shown in FIGURE 1 is duplicated on the opposite side so that through the speed reducing device 66 the screw shafts on the other side of the device are similarly operated. The walls of the housing 10 are suitably slotted so that a nut 110 on each of the screw shafts can be connected to the shuffle plates within the housing 10. Thus, each shuffle plate is driven from each side by a nut on the particular screw related to that block.

It will be noted that block 22 will be traveling upward when block 24 is traveling down. This is accomplished by the reverse action of the meshed gears 98 and 100 so that these blocks are always traveling in opposite directions to each other. Throughout the entire system, which could be multiplied beyond the present showing, each adjacent block is always traveling in a direction opposite to that of its neighboring block due to the gear relationship. The motor 20 is reversible and at the end of each stroke of the shuffle plates a limit switch 120 is suitably connected in a circuit to reverse the motor 20 and cause the blocks to move in the opposite direction. Thus, parts deposited in the tray 12 will move progressively upward in a metered quantity and be dumped out of the outlet 14.

I claim:

1. In a transfer mechanism of the type utilizing a plurality of juxtaposed plates mounted for reciprocation in a housing having an inlet hopper and an elevated outlet to receive metered quantities of articles moved from said hopper by said plates, means for alternately reciprocating said plates whereby articles may be elevated in a step-by-step fashion comprising a plurality of threaded shafts lying generally in the same plane as said plates, power means to rotate one of said shafts, and means connecting said shafts to said plates and said shafts to each other wherein actuation of said power means causes rotation of each of said shafts and alternate reciprocation of said plates.

2. In a transfer mechanism of the type utilizing a plurality of juxtaposed plates mounted for reciprocation in a housing having an inlet hopper and an elevated outlet to receive metered quantities of articles moved from said hopper by said plates, means for alternately reciprocating said plates whereby articles may be elevated in a step-by-step fashion comprising threaded means on each of said plates, a plurality of threaded shafts extending generally in the plane of said plates, one shaft for each plate, said threaded means on each plate engaging a shaft, power means to drive one of said shafts, and a gear on each of said shafts directly meshed with a gear on an

3

adjacent shaft whereby said shafts will alternately rotate in opposite directions causing said plates to reciprocate in opposite directions.

3. In a transfer mechanism of the type utilizing a plurality of juxtaposed plates mounted for reciprocation in a housing having an inlet hopper at an elevated outlet to receive metered quantities of articles moved from said hopper to said plates, means for alternately reciprocating said plates whereby articles may be elevated in a step-by-step fashion comprising a plurality of pairs of rotatable, threaded shafts extending generally in the plane of said plates, one pair for each plate, said shafts of each pair being mounted respectively at opposed edges of said plates to form a group of shafts on each side of said plates, means for mounting said shafts for rotation adjacent said plates, nut means on each side of each plate threadingly engaging a shaft at each side of said plate, power means to drive one of said shafts in each group on

4

each side of said plates in synchronous rotation, and gear means on each of said shafts directly meshed with a gear on an adjacent shaft whereby power rotation of said one of said shafts in each group of shafts will cause rotation of each of said shafts in each group alternately in opposite directions causing alternate plates to reciprocate in opposite directions.

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