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TRANSFER OF MATERIALS

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This invention relates to the transfer of materials of a loose or irregular type, such as ore, coal, and other minerals, or grain, foodstuffs, powdered materials and the like, which are to be transferred in suitable quantities from a bin, chute, storage hopper or other storage or collecting receptacle. The object of this invention is to provide suitable means, where in many instances it is required, to transfer such materials in predetermined quantities into another receptacle, such as a conveyor bucket, skip, or movable container.

To provide such an apparatus which will effect the transfer in a satisfactory manner whether the receiving conveyor bucket, skip or container is stationary at the instant of filling, or whether it is continuously travelling, such as obtains in a continuous elevator.

To effectively transfer the material without spillage and where dust is present, to collect this or contain it to prevent it from being suspended in the surrounding atmosphere or deposited around. This being an important consideration where, for instance, coal is being transferred for raising or lowering.

To provide a bucket, skip, or movable container of such a shape and construction, that it can receive the contents of the transfer chamber, in a manner which produces the minimum amount of breakage and disturbance.

According to this invention, a transfer chamber and associated mechanism comprises a suitable receptacle to receive the material, means to move the chamber from its receiving position, to the place, and in a suitable manner to effectively discharge its contents, and means for returning the transfer chamber to the loading or filling position.

The means for moving in each case is effectively controlled and timed so that the movements synchronise with the predetermined cycle of operations of the handling or conveying system of which the invention forms part.

The invention will be clearly understood from the following description aided by the accompanying drawing which shows one example of carrying the invention into effect.

The invention can be carried into effect in various ways as to detailed construction.

In the example shown in the accompanying drawings, a transfer chamber or receptacle I of a suitable shape and size to receive the quantity of material to be transferred is provided.

The transfer chamber I is so constructed that it has a mouth or opening of a suitable shape from which the contents can be discharged when in the desired position, but in the filling position the contents will not discharge through the mouth or opening 2. A convenient shape for the chamber or receptacle I is a hollow cube inclined in such a manner that one edge or corner is in the lowest position. A filling opening 3 is provided in a lower position to that of the discharge mouth 2. The predetermined quantity of material charging the chamber I being insufficient to rise to the lowest part of the discharge mouth 2.

The transfer chamber I is pivotally mounted on levers 4, 5, which are arranged on each side. These levers 4, 5 are extended in a downward direction and below the bottom level of the chamber I. The lower ends of the levers 4, 5 are pivotally mounted. The rear pair of levers 4, 5, which is to say those located nearest the filling opening 3, while being pivotally mounted are also mounted on a bearing or plate which forms an immovable fulcrum 6. A rigid plate or rigid system of levers 7 connects this fulcrum pin 6 to the pivoted lower ends of the front pair of levers 4. At an intermediate point between the lower ends of these two pairs of levers 4, 5, a further lever 9 is pivotally mounted at one of its ends on the rigid plate or levers 7. The other end of the lever 9 is extended and pivotally mounted to an operating arm 10. One end of the arm 10 is pivotally mounted to an immovable fulcrum 8, while the other end is extended to provide a suitable point at which the system can be operated.

The system of levers described above first produces a radial movement of the discharge mouth 2 until the mouth 2 is in line vertically with a bucket or skip 11 after which the continued movement of the discharge mouth 2 of the transfer chamber I is vertically downwards, while at the same time the bottom of the transfer chamber I is pivotally declined from its upward slope, through the horizontal and further declined until the contents can slide down and out of the mouth 2 into the bucket or skip 11. This motion is continued to the maximum arranged position by which time the contents have gradually and completely been discharged.

This movement as described is operated by the travelling bucket or skip 11 coming into contact with the extended arm 10.

Alternatively, this movement can be effected by the travelling bucket or skip operating an electrical contactor or the like which would actuate
a solenoid or thruster or pressure piston to provide the force to operate as described above.

After the transfer chamber 1 has reached the determined position, the travelling bucket or skip 11 breaks contact with the extended arm 18 and the mechanism is controllably returned to the original position by bias weights 12 or a pressure operated piston.

The travelling bucket or skip 11 is rigidly guided in vertical tracks 13 over that portion of its travel where it comes into proximity with the mouth 2 or aperture of the transfer chamber 1.

Likewise the transfer chamber 1 is rigidly guided in guides 14 near its discharge mouth 2 in such a manner that the mouth 2 or opening descends in a vertical path and by this means the position is maintained to ensure the contents will always be discharged and received without spillage.

The conveyor bucket, skip or movable container 11 preferably has its two sides inclined inwards from the top to the bottom. The object being that when the mouth 2 of the transfer chamber 1 and the bucket, skip or container 11 come into their relative positions just prior to the transfer of the material, a more or less continuous face for the transfer is obtained. The material slides along the bottom of the transfer chamber 1, and when it reaches the mouth 2 the sloping side of the bucket, skip or container 11 receives the material on which it slides down. Thus there is no marked or sudden drop of the material.

The operation is similar whether the bucket or skip 11 travels continuously or whether it travels downwards to such a position to enable the transfer to take place and then stops. In this instance the reversal of the direction of travel of the bucket or skip 11, that is to say, when it commences to ascend on its return journey, such movement can be utilised to operate the lever mechanism to return the transfer chamber 1 to the original position for filling again.

An extractor fan or suction can be arranged so that the dust is collected during the process of transfer. This is made possible by the shaped discharge mouth 2 forming a close fit to the receiving bucket or skip 11 when the contents commence to move and disturb the dust.

What I claim as my invention is:

1. Apparatus for the transfer of materials from a collecting receptacle in predetermined quantities into another receptacle, such as a conveyor bucket, skip or movable container, comprising a transfer chamber in the form of a hollow cube having a curved discharge mouth, a filling opening in the lower portion of the chamber, the transfer chamber being pivotally mounted on two pairs of levers, one pair of levers mounted at their lower ends on an immovable fulcrum and the lower ends of the other pair on a plate or system of levers pivoted on the immovable fulcrum, an operating arm pivotally mounted on an immovable fulcrum with the other end extended to a suitable point at which the system can be operated, a link between the operating arm and the plate or system of levers, so arranged that on depressing the end of the operating arm, a movement is imparted to the transfer chamber so that it produces a radial movement of the discharge mouth of the transfer chamber until same is in line vertically with the bucket, skip or container after which the continued movement of the discharge mouth of the chamber is vertically downwards, while at the same time the bottom of the chamber is pivotally declined from its upwards slope, through the horizontal and further declined until the contents of the chamber can slide down and out of the mouth into the bucket, skip or container, the motion being continued to the maximum arranged position by which time the contents of the chamber have been gradually and completely discharged, and means for returning the chamber to normal position.

2. Apparatus as claimed in claim 1, wherein the operating arm is actuated by the travelling bucket, skip or container coming into contact with the operating arm.

3. Apparatus as claimed in claim 1, wherein means are provided for the transfer chamber near its discharge mouth to guide the mouth in its descent in a vertical path to the discharge position.

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REFERENCES CITED

The following references are of record in the file of this patent:

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