June 5, 1934. G. H. HUTTON 1,962,075

BUCKET ELEVATOR

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Fig. 7.

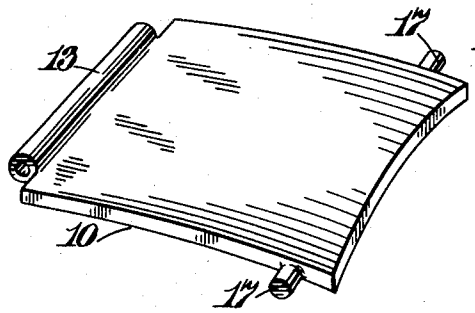


Fig. 1.

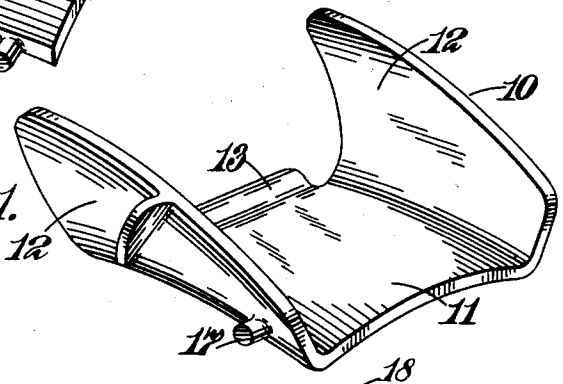
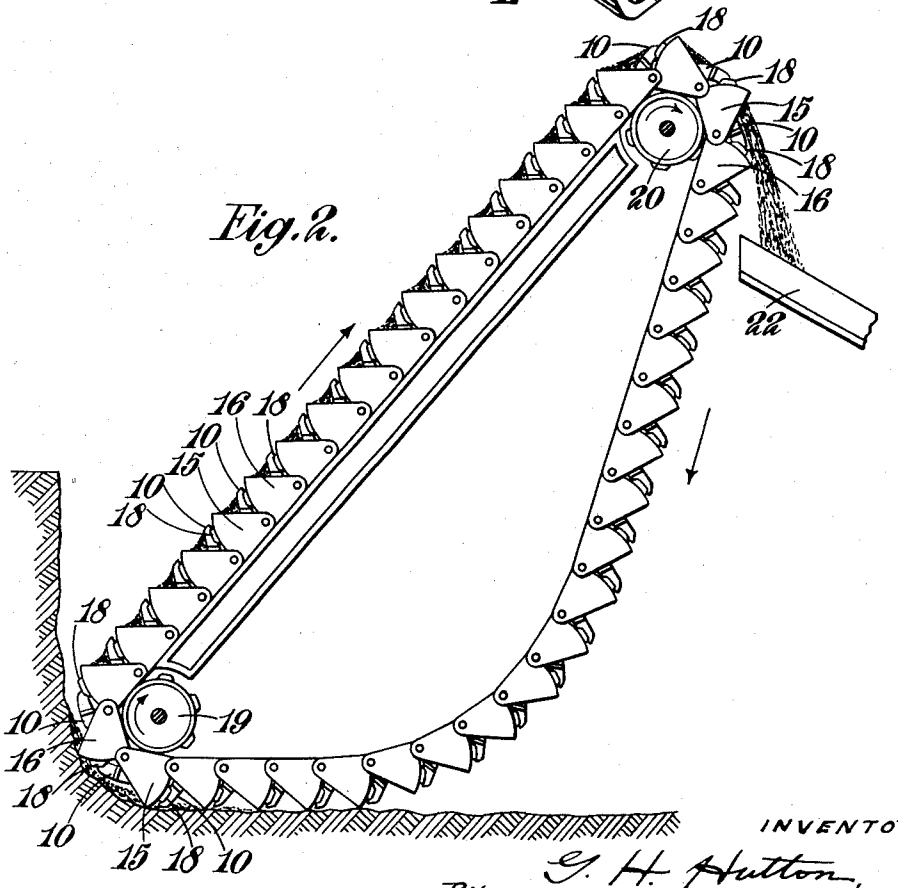


Fig. 2.



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Fig.3.

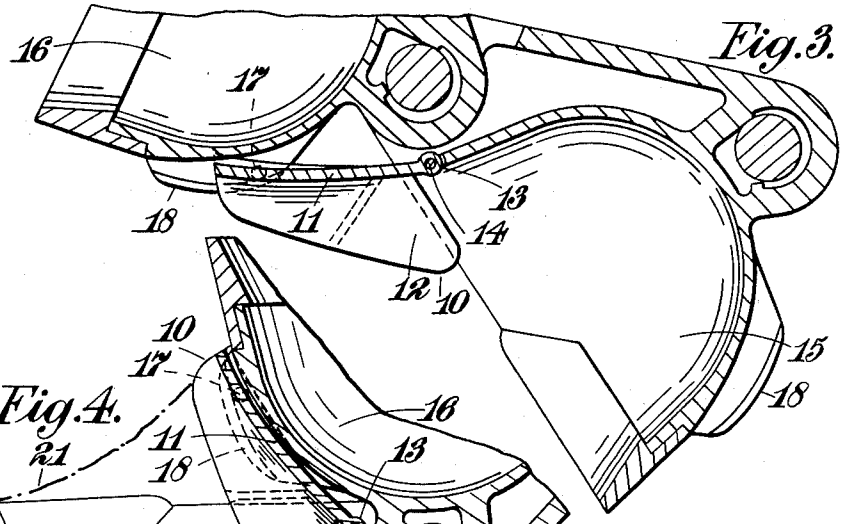


Fig.4.

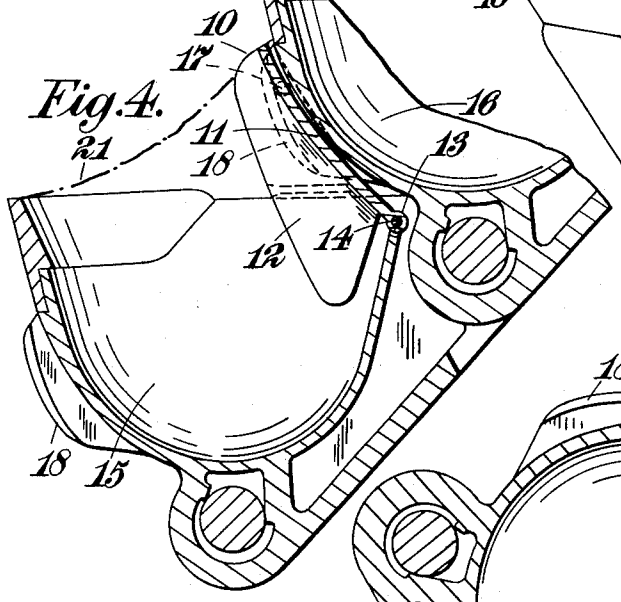


Fig.5.

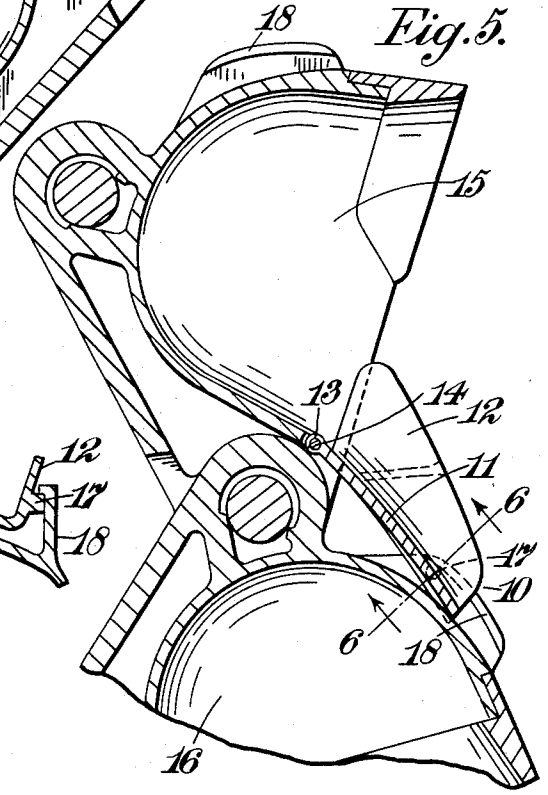
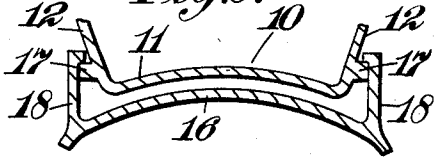


Fig.6.



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BUCKET-ELEVATOR

Gerald Hillsdon Hutton, London, England

Application July 7, 1933, Serial No. 679,427
In Great Britain May 4, 1933

11 Claims. (Cl. 37—191)

This invention relates to bucket-elevators of the endless conveyor type, and is particularly concerned with bucket-elevators for dredging-machines.

One object of the invention is to provide means whereby loss of material from the buckets while they are being elevated and also when dumping is avoided.

According to a feature of the present invention there is provided in or for a bucket-elevator, a bucket-lip which has at one end means to permit it to be tiltably mounted on the front end of one bucket and at the other end means (for example guide pins) to permit it to be slidably engaged with the preceding receptacle, for example bucket, of the conveyor.

Preferably, the bucket-lip is in the form of a pan or trough which is open at both ends.

The invention also provides in a bucket-elevator, the combination with two adjacent buckets of a bucket-lip (for example a pan-shaped or trough-shaped lip which is open at both ends) which at its back end is tiltably mounted on the front end of the inner wall of one bucket, and a guiding connection between the front end of the bucket-lip and the outer wall of the preceding bucket arranged to permit relative movement between the buckets as they pass around the tumblers and also to limit the movement of the front end of the bucket-lip away from the outer wall of said preceding bucket.

The bucket-lips may be made of any suitable material, for instance steel or other alloy, depending upon the nature of the earth to be excavated. It will be appreciated that when the earth to be excavated contains boulders or timber, the bucket-lips and the connections between them and the buckets will require to be of greater strength than if the earth is composed mainly of loose material such as sand, owing to the greater resistance that will be offered in the former case to the passage of the bucket-lips. If desired, renewable wearing pads or plates may be provided wherever required on the buckets or bucket-lips, and in the case of pan-shaped bucket-lips the side walls thereof may be riveted or otherwise fixed to the bottom so that they can be renewed should they become crumpled or otherwise damaged in use.

The guiding connection aforesaid between the front end of the bucket-lip and the outer wall of the preceding bucket may be of any convenient form. For example, the bucket-lip may be provided with two guide pins projecting laterally one from each side of the lip and arranged to engage guides extending along the outer wall of the preceding bucket. These guides may be integral with or be made separately and riveted or otherwise fixed to the bucket.

According to a feature of the invention the bottom and side walls of a pan-shaped or trough-shaped bucket-lip at its back end are shaped to conform substantially with the shape of the mouth of the bucket on which the lip is tiltably mounted so as to hold the maximum amount of excavated material without leakage when the bucket is ascending. The front end of the bucket-lip should also be shaped so as to serve when dumping as a chute to guide the earth from the bucket over the irregular outer wall of the preceding bucket.

In the accompanying drawings:—

Figure 1 is a perspective view of a pan-shaped bucket-lip according to the invention,

Figure 2 is a diagrammatic elevation of a bucket-elevator embodying the invention,

Figure 3 shows two buckets and an associated bucket-lip in the position which they occupy when passing around the lower tumbler of the elevator,

Figure 4 shows said buckets and bucket-lip on the ascending side of the elevator,

Figure 5 shows said buckets and bucket-lip passing around the upper tumbler,

Figure 6 is a section on the line 6—6 of Figure 5, and

Figure 7 is a perspective view of a modified form of bucket-lip.

Like reference numerals indicate like parts throughout.

Referring first to Figures 1–6 inclusive, the bucket-lip 10 is a shallow trough-shaped pan open at both ends. The bottom 11 of the pan projects at the back end slightly beyond the side walls 12 and is there provided with a hollow boss 13 to receive a hinge pin 14 carried by the front end of the inner wall of one bucket 15. The pan reaches across the gap between the bucket 15 and the preceding bucket 16 and near its front end, at about the level of the bottom of the pan, is provided with two guide pins 17, one projecting laterally from each side. On the outer wall of the bucket 16, two guides 18 are provided one at each side of the bucket. Each of these guides is of inverted L-shape in cross section and has its shorter limb directed inwardly, see especially Figure 6. The guide pins 17 are arranged to engage the lower faces of the shorter limbs of the guides 18, and said faces

are curved longitudinally of the guides, as will be seen on reference to Figures 3, 4 and 5, to permit the necessary relative movement between the pan and the buckets as they pass around the tumblers 19, 20 of the elevator. The shorter limbs of the guides 18 serve also to limit the movement of the pan 10 away from the bucket 16 as the latter passes around the lower tumbler 19, see Figure 3. When the buckets are passing over the upper tumbler 20, the outer wall of the bucket 16 limits the downward movement of the pan 10, see Figure 5.

It will be understood that there is a pan 10 between each two buckets of the elevator, and that each bucket is provided with a hinge pin 14 and with a pair of L-shaped guides 18.

The arrangement is such that as the buckets pass around the lower tumbler 19, the bottom 11 of each pan 10 (which in that postion is inverted) forms a continuation of the inner wall of the bucket to which the pan is hinged, as will be seen on reference to Figure 3. On the ascending side of the elevator, see Figure 4, the bottom of each pan lies substantially normal to the direction of travel of the buckets which is indicated by the arrows in Figure 2. In this position the back end of each pan 10 lies within the mouth of the bucket to which it is hinged and the pan serves to trap the earth in that bucket. In Figure 4 the approximate level of the earth is indicated by the chain line 21, and it will be seen that by providing the pans 10, the capacity of the buckets is appreciably increased. When the buckets reach the upper tumbler 20 they move apart and the front end of each pan is automatically drawn downwards by the operation of the guide pins 17 thereon with the guides 18 on the preceding bucket and then serves as a chute for the earth in the bucket to which the pan is hinged. Thus the earth from that bucket is guided over the preceding bucket to a delivery chute, such as is indicated at 22 in Figure 2, or to a hopper or other place where it is to be delivered.

Constructions according to the invention present the advantage that a larger part of the earth captured by the buckets is dumped than is possible with known bucket-elevators. In the case of a mining dredge, loss of valuable mineral matter is thus obviated as the leakage of earth from the buckets while they are being elevated is reduced to a minimum. When the buckets dump, loss of material is also obviated. A further advantage is that buckets provided with pans according to the invention will hold more material than ordinary buckets and consequently the digging capacity of the dredge is increased. Hitherto, various devices provided for catching spillings or droppings from the buckets have been provided but the invention enables such devices to be dispensed with or considerably simplified. Further advantages which may be mentioned are that the bucket-lips do not interfere with the operation of a clay extractor when one is used in connection with the buckets, and that the side walls of pan-shaped or trough-shaped bucket-lips will serve to guide jets of water sprayed into the buckets for cleaning.

It is not essential that the bucket-lips shall be pan-shaped or trough-shaped as described above although that form is preferred. For instance, they may be of plate form as shown in Figure 7. These plate-like lips, while not possessing all the advantages of the pan-shaped lips, nevertheless increase the effective capacity of the buckets to some extent and lessen the spillings.

The invention can be applied to any forms of bucket-elevators and readily, if desired, to buckets already made or in use.

I claim:—

1. A bucket-lip for attachment to a bucket of a bucket-elevator, which lip has at one end means to permit it to be tiltably mounted on the front end of one bucket and at the other end means to permit it to be slidably engaged with the preceding receptacle.

2. A pan-shaped bucket-lip for use in a bucket-elevator, which pan-shaped lip is open at both ends and has at one end means to permit it to be tiltably mounted on the front end of one bucket and at the other end means to permit it to be slidably engaged with the preceding receptacle.

3. A bucket-lip for attachment to a bucket of a bucket-elevator, which lip has at one end a hollow boss whereby it can be mounted on a pivot pin at the front end of one bucket, and guide pins projecting laterally from each side of the lip at its front end for engagement with guides on another bucket.

4. A shallow trough-shaped bucket-lip for use in a bucket-elevator, which trough-shaped lip is open at both ends and has its bottom projecting at one end beyond the side walls of the lip and arranged to permit it to be pivotally mounted on a pivot pin at the front end of one bucket, with guide pins projecting laterally from each side of the lip at its front end for engagement with guides on another bucket.

5. In a bucket-elevator, the combination with two adjacent buckets of a bucket-lip which at its back end is tiltably mounted on the front end of the inner wall of one bucket, and a guiding connection between the front end of the bucket-lip and the outer wall of the preceding bucket arranged to permit relative movement between the buckets as they pass around the tumblers of the elevator and also to limit the movement of the front end of the bucket-lip away from the outer wall of said preceding bucket.

6. In a bucket-elevator, the combination with two adjacent buckets, of a shallow trough-shaped bucket-lip which is open at both ends and at its back end is tiltably mounted on the front end of the inner wall of one bucket, and a guiding connection between the front end of the bucket-lip and the outer wall of the preceding bucket arranged to permit relative movement between the buckets as they pass around the tumblers of the elevator and also to limit the movement of the front end of the bucket-lip from the outer wall of said preceding bucket.

7. In a bucket-elevator, the combination with two adjacent buckets of a bucket-lip which at its back end is tiltably mounted on the front end of the inner wall of one bucket, guide pins projecting laterally one from each side of the bucket-lip near the front end thereof, and guides extending along the outer wall of the preceding bucket for engagement by said guide pins.

8. In a bucket-elevator, the combination with two adjacent buckets of a pan-shaped bucket-lip which is open at both ends and at its back end is tiltably mounted on the front end of the inner wall of one bucket, guide pins project-

ing laterally one from each side of the bucket-lip near the front end thereof, and L-shaped guides extending along the outer wall of the preceding bucket and arranged with the shorter limbs directed inwardly towards each other and so that their lower faces will provide tracks for said guide pins.

9. In a bucket-elevator, the combination with two adjacent buckets, of a shallow trough-shaped bucket-lip which is open at both ends and at its back end is tiltably mounted on the front end of the inner wall of one bucket, the bottom and side walls of which bucket-lip at its back end are shaped to conform substantially with the shape of the mouth of the bucket on which the lip is tiltably mounted, and a guiding connection between the front end of the bucket-lip and the outer wall of the preceding bucket arranged to permit relative movement between the buckets as they pass around the tumblers of the elevator and also to limit the movement of the front end of the bucket-lip away from the outer wall of said preceding bucket.

10. A bucket-lip for attachment to a bucket of a bucket-conveyor, which lip has at one end means whereby it can be pivotally connected to a bucket and at the other end means forming part of a sliding connection between that end of the lip and the next preceding receptacle of the conveyor.

11. In a bucket-conveyor, the combination with two adjacent receptacles, of a lip which at its back end is pivotally mounted on one receptacle and at its front end is slidably connected to the preceding receptacle.

GERALD HILLSDON HUTTON.