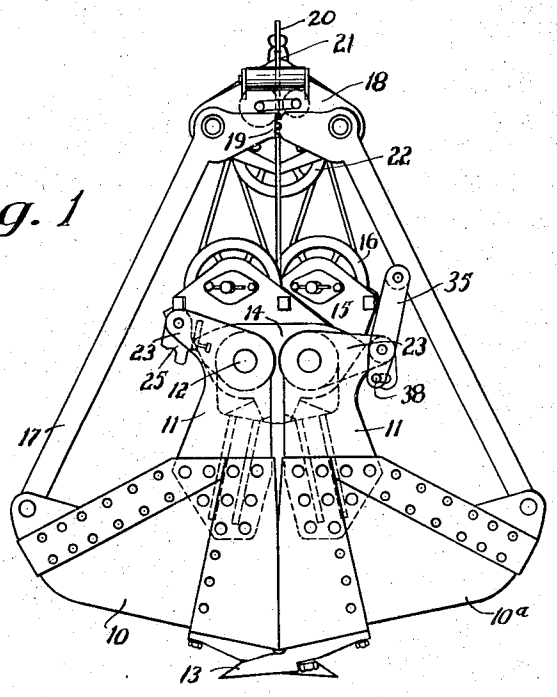
June 17, 1947. H. W. BOTTEN 2,422,523

BUCKET LOCKING MEANS

Filed Nov. 7, 1945

Fig. 1



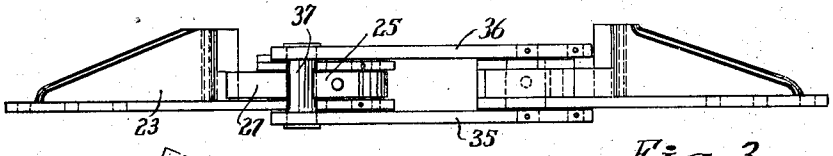


Fig. 3

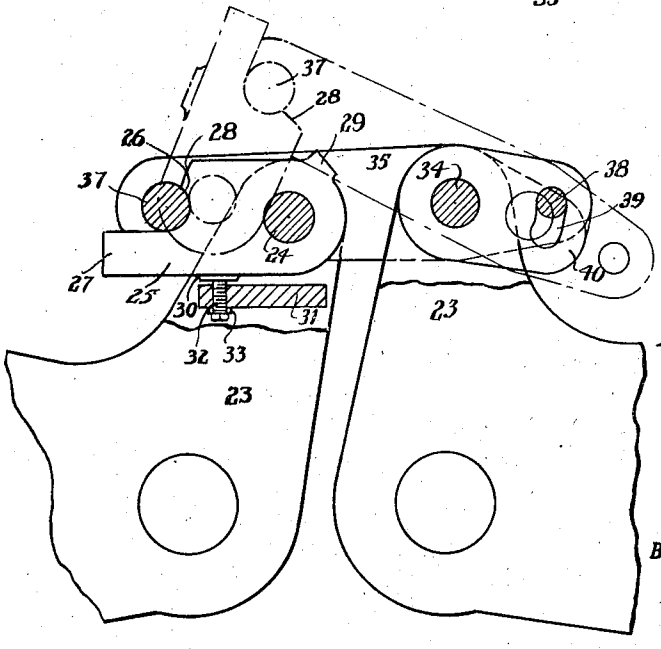


Fig. 2

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Patented June 17, 1947 2,422,523

UNITED STATES PATENT OFFICE

2,422,523

BUCKET LOCKING MEANS

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Application November 7, 1945, Serial No. 627,195

5 Claims. (Cl. 37—186)

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This invention relates to digging buckets, and more particularly to locking means therefor.

One object of the invention is to provide improved means for locking the bucket open to insure that upon impact with the ground the digging teeth or the lips of the bucket members will extend vertically and not at an angle, thus avoiding bending or distorting them.

Another object is to provide bucket locking means of the character described which is of simple form, easily fabricated and applied to new or old buckets, and which operates automatically, requiring no attention from the operator.

Still another object is to provide locking members of the character described which are attached more or less directly to the bucket members themselves, rather than to their ssupension links or other operating parts, thus simplifying the construction.

Further objects of the invention in part are obvious and in part will appear more in detail hereinafter.

In the drawings, which represent one suitable embodiment of the invention,

Fig. 1 is a side elevation, showing the bucket closed;

Fig. 2 is a detail elevational view, somewhat diagrammatic and on a larger scale, illustrating the operation of the locking parts, shown in their bucket-open positions; and

Fig. 3 is a detail view, looking down on the parts at one side of the bucket, in the same position shown in Fig. 2.

The invention may be applied to any form of digging bucket including cooperating members hinged together for movement back and forth between open and closed positions, and equipped with any form of operating devices. The bucket members also may have plain lips or edges, or be provided with teeth. For convenience of illustration and in no sense of limitation the drawings show a bucket including two cooperating members 10, 10a, each provided with two hinge members 11. These hinge members turn upon parallel horizontal shafts 12. The bucket members shown are provided with digging teeth 13 along their meeting lips or edges, as is usual. Upon the hinge shafts are mounted the counterweight 14 and lower frame 15 in which rotate the lower pulleys 16.

The outer corners of the bucket members are pivotally attached to links 17 pivoted at their upper ends in the head 18, said links being shown as provided with intermeshing gear teeth 19 to synchronize their movements, although this is

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not essential. The holding line 20 is connected to the head, while the closing line 21 is reeved around pulleys 22 in the head and the lower pulleys 16, being dead-ended on either the head or the lower frame or counterweight member, as is usual.

Each of the four hinge members is provided beyond its shaft 12 with a lateral arm or extension 23, these extensions providing two pairs of supports extending vertically and lying above the side plates along one side of the bucket when it is closed, as in Fig. 1.

On the supports of each pair are mounted one set of the locking devices of the present invention. Since both sets are alike only one will be described.

One of the extension supports 23 of each pair has its end bifurcated to provide two parallel plates connected by a cross pin 24 on which is pivoted a latch dog 25 provided with a latch recess 26 bounded on one side by a tongue or arm 27 and on the other by a nose 28. On the hub of the dog is a stop pad or abutment 29 and on its long face another abutment 30. Between the plates of the extension is a cross bar 31 in which is mounted an adjustable abutment screw 32 secured by lock nuts 33.

On a similar cross pin 34 on the other extension support of the pair is pivoted a latch lever 35 including parallel side plates 36, a latch pin 37 at one end of the lever, and a stop pin 38 at its other end, the latter having limited motion along a slot 39 in a rigid ear 40 of the support.

Fig. 1 illustrates the locking or latching parts in the positions they occupy when the bucket is closed. The two extensions 23 extend generally horizontally in opposite directions away from each other. Dog 25 hangs down straight, while lever 35 extends upwardly in any position of its pin 38 in slot 39.

When the bucket is opened the parts move to the positions shown in full lines Fig. 2.

Here the dog 25 is resting on the end of abutment screw 32 in a horizontal position with its arm 27 extending outwardly. The pin 37 of lever 35 is in the latch recess 26 while pin 38 is at or near the upper end of slot 39. Dog 25 and lever 35 in effect form a toggle, the two members of which are pivoted upon the pins 24, 34 with the toggle knuckle at the pin 37.

As the bucket opens, the two pins 24, 34 approach each other. Dog 25 is coming up on the left, Fig. 1, and lever 35 is swinging to the left and downwardly. The parts are so proportioned that when the lever and dog actually engage, pin

37 is slightly at the left of and rides over the nose 28 until finally said pin engages the stop arm 27. Then, when the bucket is dropped by lowering the holding line on which it is supported, the drag of the closing line causes the bucket parts to move a very short amount in the closing direction (about 2° or so), which causes the pin 37 to enter the recess 26.

It will be observed that in the final position of the parts, the pin 24 is slightly below a line joining the centers of pins 37, 34. In other words it is short of dead center, rather than beyond dead center. The exact position is predetermined by adjustment of abutment screw 32, both in the original set-up, and later, from time to time, as the parts wear. This abutment screw limits the downward motion of the toggle knuckle pin 37 and the dog pin 24, as the bucket opens.

Should pin 24 be permitted to move further, say to actual dead center between pivots 37 and 34, or beyond, it would be difficult or impossible to close the bucket without manual release of the locking parts. Therefore, in the initial set-up of the parts, screw 32 is backed off until such a dead center position can be reached. The bucket is then opened and while suspended (or partly so) by the closing line, screw 32 is adjusted in (upwardly in Fig. 2) until the toggle parts reach such position that the weight of the head and bucket members is sufficient to break the toggle and enable the parts to move toward bucket closed position.

As the bucket closes, the extensions 23 swing apart, pin 37 moving upwardly and to the right, or clockwise in Fig. 2, until finally the position shown in dotted lines Fig. 2 is reached, where the nose 28 has moved down out of the way of pin 37. The lever and dog are now entirely free and can separate, the bucket parts closing in the usual manner.

Pad 29 engages the end of bar 31, which serves as a limit stop.

With the arrangement described, the bucket is operated in the usual manner, by operation of the holding and closing lines, without other or special attention by the operator. Nevertheless, when it is open, it is releasably locked against any closing effect which otherwise might occur in the act of dropping it to dig the lips or teeth into the ground. Drag on the closing line, due to the necessity of overcoming the momentum of rest of the closing line winding drum, when its brake is released, has no effect other than to cause the pin 37 to enter the recess 26, as described, to complete the locking effect, and the teeth and lips engage the ground while vertical, without liability of bending or breaking them. At the same time the bucket is readily closed by the ordinary operation for that purpose. Adjustment of screw 32 takes care of any wear and at all times insures maximum locking effect or insurance against closing, without so pronounced a locking effect as to interfere with normal closing.

As a general rule two sets of locking devices are employed, one set on each side of the bucket, as before referred to, because this arrangement equalizes the stresses and strains and avoids torsional or twisting strains during bucket operation, but in some cases but a single set will be sufficient. Also, where two sets are used, they may be attached in either of two positions. That is to say, each bucket part may carry a dog on one of its side plates and a lever on the other, or the two dogs may be placed on one bucket part and the two levers on the other, with advantages in either arrangement.

The construction is also quite simple involving but few parts, and is durable and not likely to get out of order in service.

Other advantages of the invention will be apparent to those skilled in the art.

What I claim is:

1. A bucket of the character described, including head and counterweight members, bucket members pivoted to the counterweight member, links connecting the head and bucket members, and cooperating latching devices mounted on the bucket members and arranged when the bucket opens to engage each other and releasably lock them in open position, said latching devices including two parts pivotally connected respectively to the two bucket members and provided with a knuckle by means of which they engage each other, said parts operating as a toggle and advancing toward dead center position of the knuckle as the bucket opens.

2. A bucket of the character described, including head and counterweight members, bucket members pivoted to the counterweight member, links connecting the head and bucket members, cooperating latching devices mounted on the bucket members and arranged when the bucket opens to engage each other and releasably lock them in open position, said latching devices including two parts pivotally connected respectively to the two bucket members and provided with a knuckle by means of which they engage each other, said parts operating as a toggle and advancing toward dead center position of the knuckle as the bucket opens, and stop means for limiting advancing motion of the toggle members to a position short of dead center.

3. A bucket of the character described, including head and counterweight members, bucket members pivoted to the counterweight member, links connecting the head and bucket members, cooperating latching devices mounted on the bucket members and arranged when the bucket opens to engage each other and releasably lock them in open position, said latching devices including two parts pivotally connected respectively to the two bucket members and provided with a knuckle by means of which they engage each other, said parts operating as a toggle and advancing toward dead center position of the knuckle as the bucket opens, stop means for limiting advancing motion of the toggle members to a position short of dead center, and means for adjusting said stop means to thereby predetermine the final position of the toggle members.

4. A bucket of the character described, including head and counterweight members, bucket members pivoted to the counterweight member, links connecting the head and bucket members, each of said bucket members being provided with a hinge arm by which it is pivoted to the counterweight member, each arm having a lateral extension, and cooperating latching devices mounted on said extensions and arranged when the bucket opens to engage each other and releasably lock them in open position, said latching devices including two parts pivotally connected respectively to the said arm extensions and provided with a knuckle by means of which they engage each other, said parts operating as a toggle and advancing toward dead center position of the knuckle as the bucket opens.

5. A bucket of the character described, including head and counterweight members, bucket

members pivoted to the counterweight member, links connecting the head and bucket members, each of said bucket members being provided with a hinge arm by which it is pivoted to the counterweight member, each arm having a lateral extension, and cooperating latching devices mounted on said extensions and arranged when the bucket opens to engage each other and releasably lock them in open position, said latching devices including two parts pivotally connected respectively to the said arm extensions, one part being in the form of a recessed dog, and the other part being

a lever having a knuckle pin arranged when the bucket opens to enter the dog recess and thereby releasably lock the bucket open.

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