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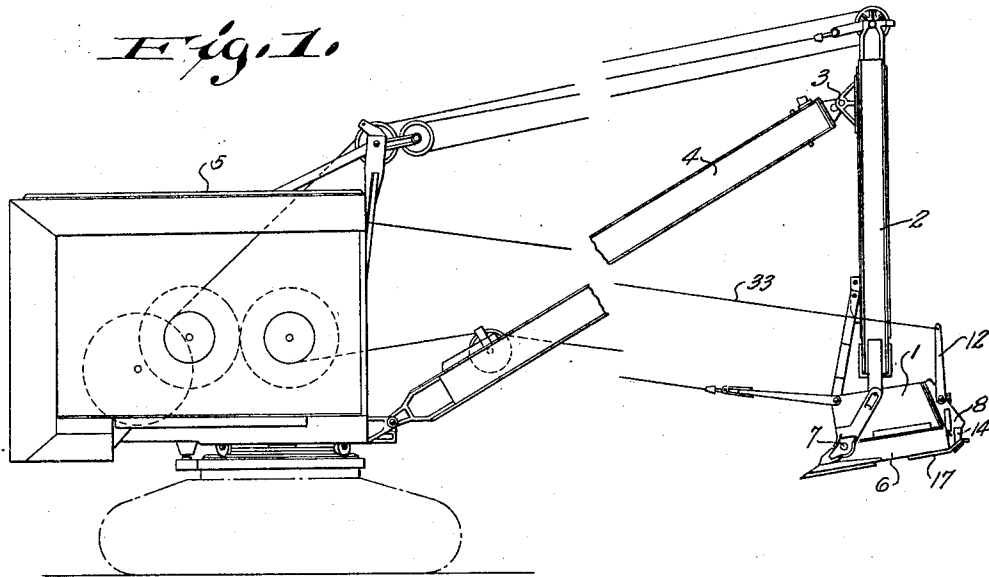
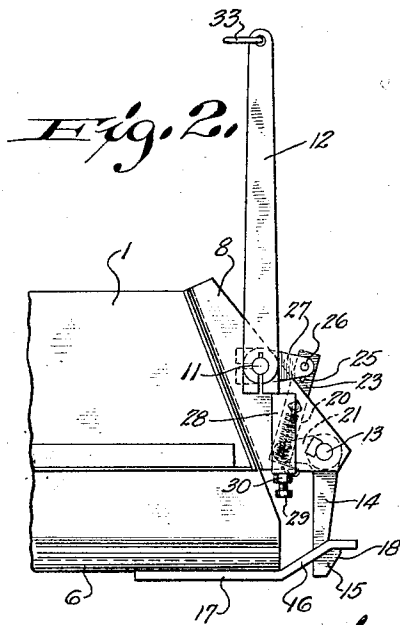
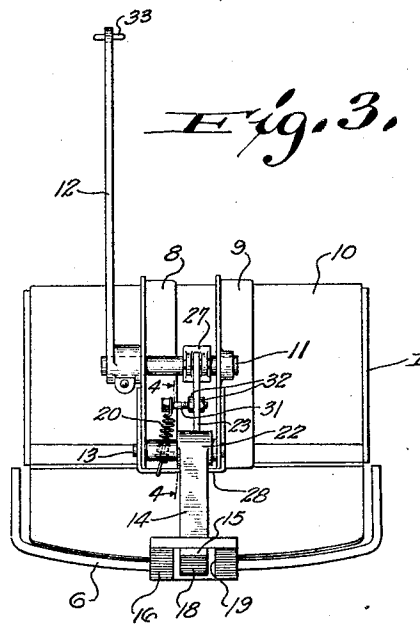
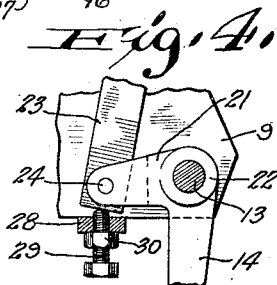
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1,725,858

LATCH

Filed June 11, 1926

2 Sheets-Sheet 1



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Fig. 5.

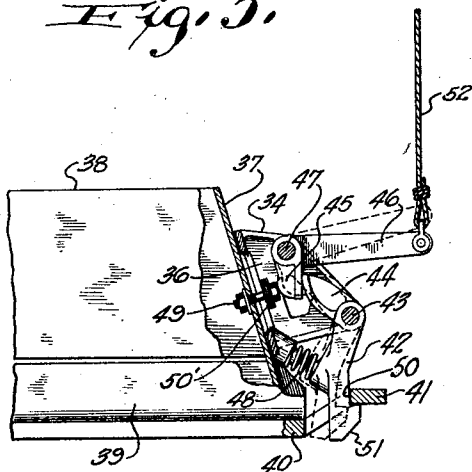


Fig. 6.

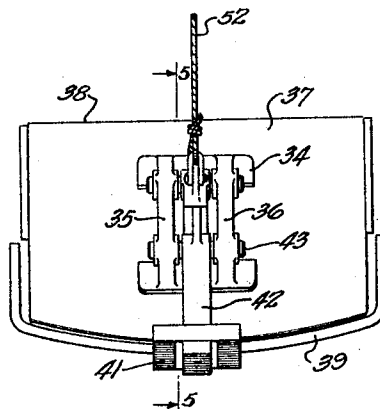


Fig. 7.

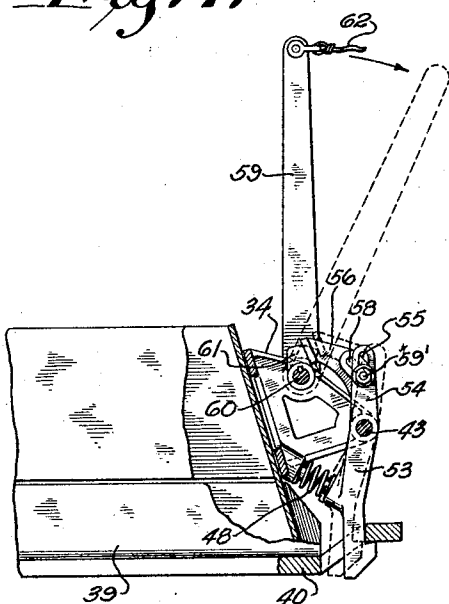
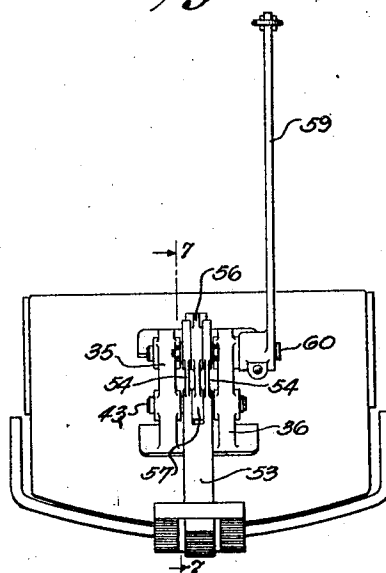


Fig. 8.



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LATCH.

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This invention relates to improvements in latches and more particularly to latches of the type for releasably holding the doors or drop bottoms of excavating buckets in closed position.

In the drawings:

Figure 1 is a side elevational view of an excavator, showing the improved latch applied thereto;

Fig. 2 is an enlarged, fragmentary view, taken from Fig. 1;

Fig. 3 is an end elevation, looking toward the left in Fig. 2;

Fig. 4 is an enlarged, sectional view, taken on the line 4—4 of Fig. 3;

Fig. 5 is a side elevation, partly in section, showing a modification, the section being taken on the line 5—5 in Fig. 6;

Fig. 6 is an end elevation, looking toward the left in Fig. 5;

Fig. 7 is a side elevation, partly in section, showing another modification, the section being taken on the line 7—7 in Fig. 8; and

Fig. 8 is an end elevation, looking toward the left in Fig. 7.

Referring more particularly to the drawings, the improvements have been illustrated as applied to an excavating bucket of the type more especially designed for use in an excavator crane of the so-called back-acting shovel type, but it is, of course, understood and appreciated that the improvements are not limited to this particular adaptation, but on the other hand, are of much broader scope and readily adapted to excavating buckets of many and various other types.

The excavating bucket 1 is shown secured to the lower end of the dipper stick 2, pivotally connected at 3 to the upper end of the boom 4 of an excavator crane, indicated generally by the reference numeral 5, the bucket being provided with a dumping door 6 pivotally connected at 7 to the lower front corner of the bucket.

A pair of vertically arranged spaced angle members 8 and 9 are secured in any suitable manner to the rear end 10 of the bucket, as shown, members 8 and 9 providing bearings for supporting a pin 11 having one end thereof extending beyond member 8 and to which extended end a tripping or actuating lever 12 is fixed, and a second and lower

pin 13 to which is fixed a latch 14 provided at the lower end thereof with a hook 15 adapted to enter into latching relation with the upwardly bent end portion 16 of a latch plate 17 fixed to the bottom of door 6. Hook 15 is provided with a sloping edge 18 which engages the upper rear edge of the latch opening 19 in portion 16 upon upward pivotal movement of door 6 into closed position, edge 18 thus acting to provide a cam action whereby latch 14 is moved in a clockwise direction about pin 13, as viewed in Figs. 2 and 4, until the upper edge of hook 15 passes below the lower rear edge of opening 19, at which time the latch snaps into latching relation with latch plate 17 under the action of spring 20 hereinafter more fully described.

A bifurcated arm 21, which may be formed integrally with the hub 22 of latch 14, receives the lower end of a connecting link 23 to which it is pivotally connected by means of a pin 24, the upper end of link 23 being provided with a longitudinally extending slot 25 and being connected by means of a pin 26 to the outer bifurcated end of an arm 27 arranged between members 8 and 9 and fixed to pin 11, as shown, pin 26 working loosely in slot 25. A U-shaped strap 28 is fitted over the lower ends of members 8 and 9, as shown, and is secured thereto in any suitable manner, an adjusting bolt 29 extending upwardly through the bottom portion of member 28 and being arranged to engage the lower end of link 23, as more clearly shown in Fig. 4, and being provided with lock nut 30.

The lower end of spring 20 is anchored to the bottom portion of member 28, while the upper end of the spring is secured to link 23 in any suitable manner such as by a bolt 31 extending through the link and being held in assembled relation with respect thereto by means of nuts 32 arranged on opposite sides of the link, as shown in Fig. 3.

From the foregoing it will be seen that spring 20, through connecting link 23, acts at all times to urge latch 14 in a counterclockwise direction, as viewed in Figs. 2 and 4, bolt 29 providing a stop and being adjusted so that the latch is in just the right position to snap under the upwardly extending end portion 16 of plate 17 when door

6 strikes against the bottom of the bucket, so that the latch holds the door tightly closed and provides against any loose play thereof about pin 7 as a center.

5 As explained above, upon closing movement of the door, the cam edge 18 of the latch hook 15 engages the upper rear edge of opening 19 in the latch plate whereby the latch is moved clockwise about pin 13
10 against the action of spring 20 until hook 15 snaps under portion 16 of the latch plate into latching relation therewith under the action of the spring, the lower end of link 23 engaging bolt 29 at this time. The purpose
15 of slot 25 is to permit this clockwise movement of the latch upon closing of the door, independently of and without causing movement to the left of the trip or actuating lever 12, the angular relation of arm 27 with
20 respect to lever 12 being such that when the latter is in its normal position of rest, as shown, pin 26 is at the upper end of slot 25 so that the slightest movement of lever 12 to the left upon pulling of the usual trip
25 line 33 connected as shown to the upper end thereof, will be effective in tripping or releasing latch 14 against the action of spring 20, the spring and the stop or bolt 29 providing means for returning and holding
30 latch 14 in latching position upon release of line 33.

By bending the outwardly extending portion 16 of the latch plate upwardly, as more clearly shown in Figs. 2 and 3, the hook
35 or head 15 of the latch, when the latter is in latching position, is above the bottom face of door 6, so that upon forward or digging movement of the bucket through the muck or dirt, the latch and its associated parts will
40 not dig into the latter and foul. It will also be seen that latch 14 closes against the forward or digging movement of the bucket, so that any pressure upon the latch caused by the dirt or muck will have no tendency
45 to release or trip the latch, but, on the contrary, will tend to act with spring 20 to hold the latch in latching position.

In the modification shown in Figs. 5 and 6, a casting 34, provided with spaced side
50 portions 35 and 36, is secured to the rear wall 37 of the bucket 38, the latter being provided with the dumping door 39, to which is fixed the latch plate 40, having the upwardly bend end portion 41 with which
55 the latch 42 interlocks, as shown, to hold the door closed. The upper end of latch 42 fits loosely between side portions 35 and 36 and is mounted for pivotal movement on a pin 43, supported at its ends by these side
60 portions, an arm or lug 44 being formed integrally with the latch and arranged, as shown, for engagement with a second arm or cam 45 which may be formed integrally with the trip lever mounted for pivotal
65 movement on a pin 47, supported at its end

by side portions 35 and 36. A spring 48 is compressed between the casting 34 and latch 42 and normally acts to urge the latter into latching position. For the purpose of holding spring 48 compressed and preventing
70 movement of latch 42 beyond the latching position thereof, in which position the latch is shown in the drawings, a bolt 49 may be passed through casting 34 and the rear wall 37 of the bucket with its head ar-
75 ranged to engage the arm or cam 45. One or more washers 50 may be arranged on bolt 49 between the head thereof and casting 34 to provide for adjustment so that when the dumping door 39 is open, latch 42 is in such
80 position that upon closing of the door edge 50 of plate 40 engages the cam face 51 of the latch to cause the same to snap into latching relation with plate 40 under the action of spring 48. Upon pulling of the trip line
85 52, the parts will be moved to their respective positions, as shown in dotted lines, the cam lug or arm 45 moving to the right about the axis of pin 47 and engaging arm
90 44 to cause movement of latch 42 to the left out of latching relation with plate 40. It will be seen, further, that the arms or parts 44 and 45 are disconnected, so that upon
95 closing of door 39 and engagement of edge 50 of the latch plate with the cam face 51 of the latch, the latter will be moved to the left against the action of spring 48, and the arm or part 44 moved out of engaging rela-
100 tion with arm 45, this action thereby permitting of movement of latch 42 to the left independently of movement of lever 46.

In the modification shown in Figs. 7 and 8, the latch 53 is provided with the upwardly extended spaced arms 54, provided at
105 their upper ends with slots 55, latch 53 being mounted on pin 43 for pivotal movement and normally urged into latching position by the compressed spring 48. An arm 56 is fitted loosely between arms 54 and is supported at its lower end 57 on pin 43 for
110 pivotal movement with respect to arms 54. The arm 56 is provided with the slot 58, a bolt 59' extending through slots 55 and 58 to connect arms 54 and 56, as well as latch 53, for pivotal movement together about the
115 axis of pin 43. A trip lever 59 is fixed on one end of a pin 60 supported at its ends by the side portions 35 and 36 of the casting 34. A cam 61 is keyed on pin 60 and engages the upper end of arm 56 upon pull-
120 ing of the trip line 62 in the direction of the arrow in Fig. 7, to cause pivotal movement of arms 54 and 56 to the right and movement of latch 53 to the left out of
125 latching relation with the latch plate 40, as shown in dotted lines in Fig. 7. Engagement of the upper end of arm 56 with cam 61 and the pin 60 to which the latter is keyed, holds spring 48 in compression when
130 the dumping door 39 is open, and holds

latch 53 in proper position for movement into latching relation with latch plate 40 upon closing of door 39, at which time pivotal movement of the latch to the left before it snaps into latching relation with latch plate 40 under the action of spring 48 causes movement of arm 56 to the right out of engaging relation with cam 61, whereby such movement of the latch takes place independently of trip lever 59.

From the foregoing it will be seen that an improved latch of the character referred to has been provided which is simple in construction and operation, which may be adjusted from time to time, and which is arranged in such manner as to prevent fouling and untimely release by the dirt or muck upon the forward or digging movement of the bucket.

Several embodiments of the invention have been shown and described, but of course various changes, other than those shown and described, may be made in the size, shape and arrangement of the parts without departing from the spirit of the invention or the scope of the claims.

The invention claimed is:

1. A latching device for use with a bucket having a dumping door and comprising a pair of vertically arranged spaced angle members secured to one end of said bucket, an upper pin and a lower pin arranged transversely of and supported by said members, a downwardly hanging latch carried by said lower pin and provided at its lower end with a hook arranged to engage and interlock with said door upon closing movement thereof to hold the same closed, an arm carried by said upper pin, an actuating lever carried by said upper pin, said arm and lever being fixed against relative angular movement with respect to each other, a second arm carried by said lower pin and fixed relatively with respect to said latch, a link connecting said arms and providing with the same an operative connection between said latch and the actuating lever therefor, a spring acting on one of said parts for urging said latch into and holding the latter in latching position, and means arranged for coaction with one of said parts to prevent movement of said latch beyond said position under the action of said spring.

2. A latching device for use with a bucket having a drop bottom and comprising a latch pivotally mounted on the rear wall of said bucket and normally urged away from said wall into latching position, and a trip lever operable in the opposite direction for releasing said latch.

3. A latching device for use with a bracket having a drop bottom and comprising a latch for holding said door closed, said latch being pivotally mounted on the rear wall of said bucket and movable away from the

same into latching position, a spring compressed between said wall and latch for normally urging the latter into said position, means providing a stop to hold said spring in compression and said latch against movement beyond said position, and means for effecting movement of said latch out of latching position against the action of said spring.

4. A latching device for use with a bucket having a dumping door and comprising a latch pivotally mounted on said bucket and engageable with said door for holding the same closed, means normally urging said latch into latching position, an arm fixed relatively with respect to said latch, a trip lever mounted on said bucket, and a second arm fixed relative with respect to said lever, said second arm being disconnected from the first arm and engageable therewith to effect release of said latch upon operative movement of said lever.

5. A latching device for a bucket having a dumping door and comprising a latch pivotally mounted on said bucket and engageable with said door for holding the same closed, an arm fixed relatively with respect to said latch, a second arm supported for pivotal movement with respect to said first arm about the pivotal axis of said latch, means comprising a pin and slot connection connecting said arms and latch for pivotal movement together about said axis, means normally urging said latch into latching position, means operable to effect release of said latch and including a member engageable with said second arm upon operative movement of said means, and means for causing said movement of said last-named means.

6. A latching device for use with a bucket having a drop bottom and comprising a latch for holding said door closed, said latch being pivotally mounted on the rear wall of said bucket and movable away from the same into latching position, a spring normally urging said latch into said position, a trip lever, and means providing an operating connection between said latch and lever whereby the lever is operable upon movement thereof in one direction to release said latch and whereby said latch may move toward said wall independently of movement of said lever in said direction.

7. A latching device for use with a bucket having a dumping door and comprising a latch for holding said door closed, said latch being pivotally mounted on the rear wall of said bucket and movable away from the same into latching position, a trip lever and a slotted link connecting said latch and lever and providing an operating connection between the same, said link permitting movement of the latch into latching relation with said door independently of said lever, and

a spring for urging said latch into latching position.

8. A latching device for use with a bucket having a dumping door and comprising a
5 plate secured to said door and having a portion extending beyond the rear wall of said bucket and upwardly above the plane of the door and provided with an opening, a latch pivotally supported on the rear wall of the
10 bucket and provided with a head adapted upon closing movement of the door to enter said opening, and move away from the rear wall of the bucket into interlocking engage-

ment with the plate to hold said door closed, a spring for urging said latch into latching 15 position, a trip lever, and means providing an operating connection between said latch and said lever whereby the lever is operable upon movement thereof in one direction to release said latch and whereby said latch 20 may move toward said wall independently of movement of said lever in said direction.

In witness whereof, we hereto affix our signatures.

JOE ESTERS.
JOHANNES S. HUBER.

CERTIFICATE OF CORRECTION.

Patent No. 1,725,858.

Granted August 27, 1929, to

JOSEPH ESTERS ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 61, claim 3, for the word "bracket" read "bucket"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of October, A. D. 1929.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)