Sheet 1-2 Sheets.

G. Williams,

Elevator,

No. 56,481 Patented July 17, 1866.

Fig. 1.

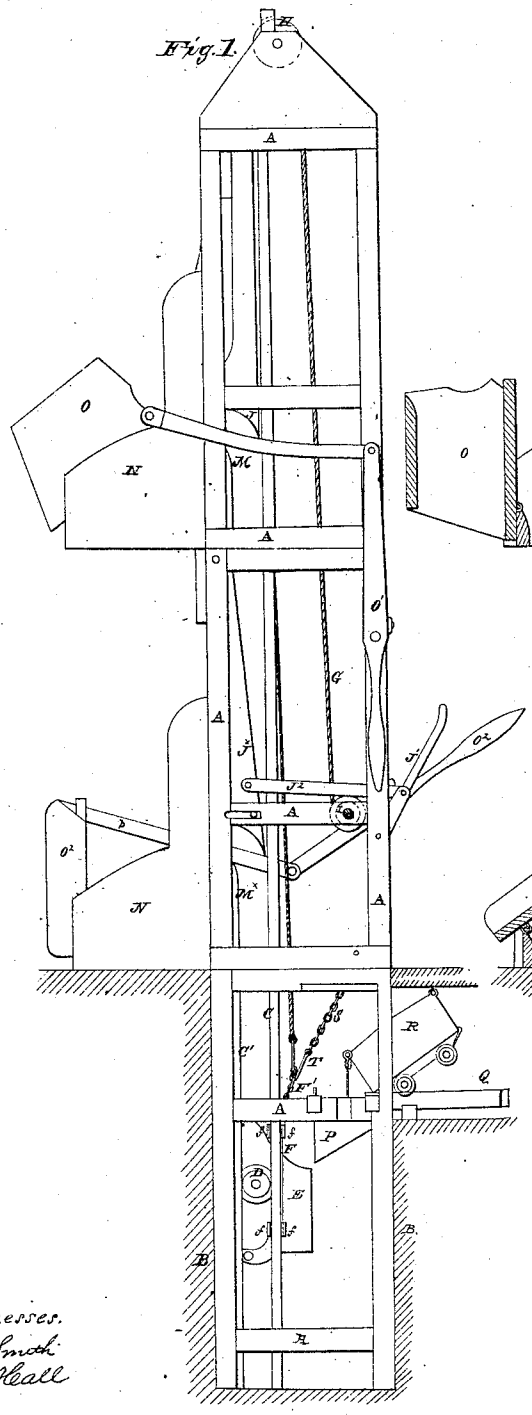
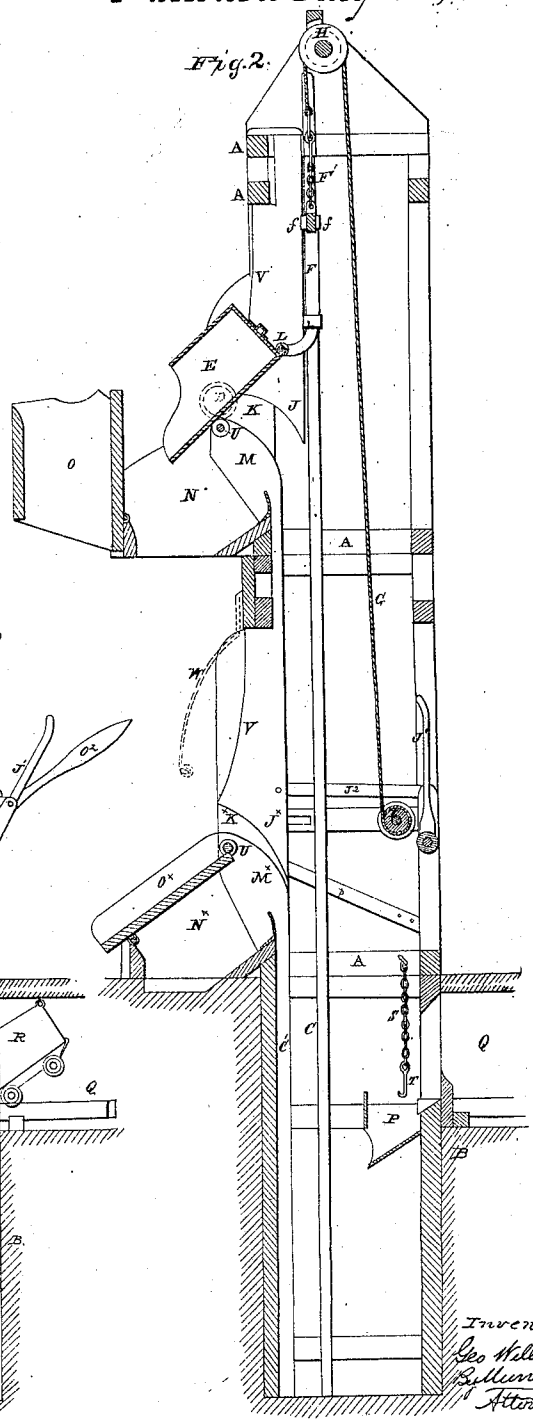


Fig. 2.



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Sheet 2 2 Sheets

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Fig. 3.

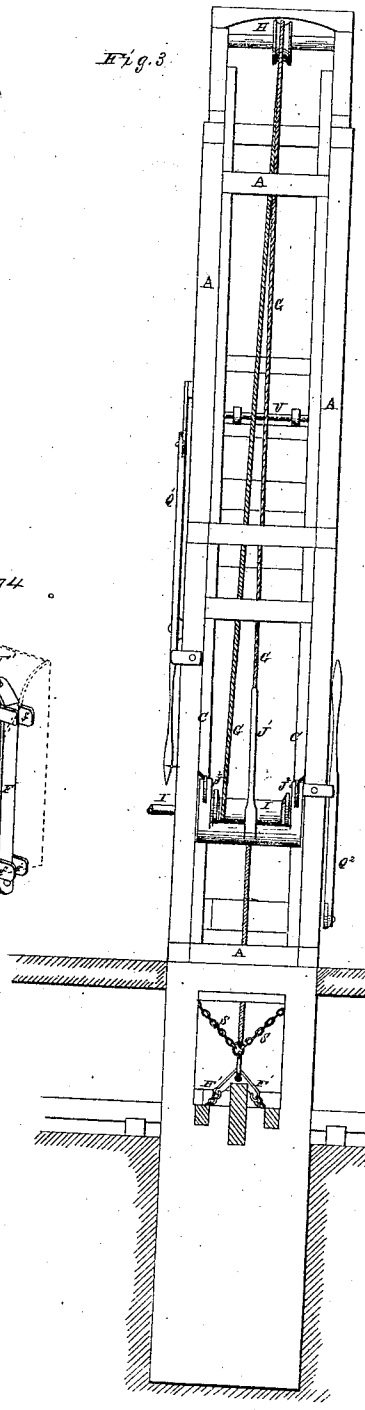


Fig 4

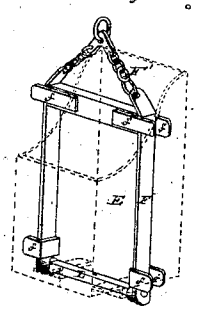
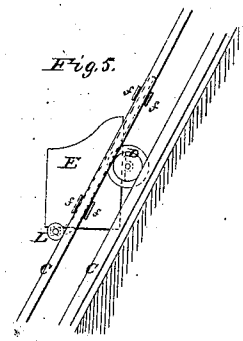


Fig. 5.



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UNITED STATES PATENT OFFICE.

GEO. WILLIAMS, OF STERLING, COLORADO TERRITORY.

IMPROVEMENT IN ELEVATORS.

Specification forming part of Letters Patent No. **56,481**, dated July 17, 1866.

To all whom it may concern:

Be it known that I, GEORGE WILLIAMS, of Sterling, in the county of Park and Territory of Colorado, have made a new and useful Improvement in Elevators for Mines; and I do hereby declare the following to be a full, clear, and exact description of the nature, construction, and operation of the same, sufficient to enable one skilled in the art to which it appertains to construct and use the same, reference being had to the accompanying drawings, which are made part of this specification, and in which—

Figure 1 is a side elevation. Fig. 2 is a vertical section. Fig. 3 is also a vertical section, the plane of which is at right angle to the plane of Fig. 2. Fig. 4 is a detached view of the elevating-bucket and the bail upon which it is suspended and by which it is attached to the elevating-rope. Fig. 5 is a detached view, showing the mode of applying the bail to the bucket when the latter is working in an inclined shaft.

Similar letters of reference indicate corresponding parts in the several figures.

The improvement consists of an arrangement of an ascending and descending bucket operated by cord and windlass, and so supported as to be readily discharged by the deflection of the guide-wheels from their normal line of travel onto inclined ways, the axis of the guide-wheels forming a transverse line of support upon which the bucket is vibrated or tipped as it is raised by the bail attached to its lower end. By this means there is no additional power required to empty the bucket, as in ordinary cases, in which the bucket is suspended at a point between its upper and its lower end and upset by an obstacle which arrests its motion at one point—as, for instance, tipping it over by grasping and detaining the rim of the mouth.

Any obstacle placed in the way to tip the bucket increases the resistance at that point, and should be avoided, as the power must necessarily be equal to overcome the greatest resistance which under ordinary circumstances immediately precedes the emptying and causes great disturbance in the engine.

The arrangements permit the bucket to be loaded or discharged at various points in the shaft, so as to answer in turn for a number of drifts at different depths, and also to discharge water into an adit or ditch for carrying it off, to discharge ore at the surface, or to receive timber for transportation into the mine.

In the drawings, A A are the timbers of the frame, and B the wall-rock of the shaft. C C′ are guide-timbers, between which the wheels D of the bucket E traverse. The bucket is lifted by the discharging-levers F F, to which the rope G is attached. The latter runs over the pulley H, and is wound upon the drum I of the hand-winch I′.

Power being applied to the winch I′, the bucket rises until the wheels D of the bucket E meet an oblique deflecting-guide, which causes it to depart from its normal course, which is still maintained by the discharging-levers F F. This departure causes the bucket to vibrate on its axis L, where it is attached to the bail. It tips forward, the wheels D resting upon the curved track M, and as the discharging-levers still ascend in a direct line under the guidance of the timber C, the bucket is eventually tipped up, as in Fig. 2, sufficiently to discharge its contents into the chute N, or the trough O, if the latter be placed in the required position.

The curved deflector J in the upper section, Fig. 2, is a fixture, as it is the highest in the series; but in the case of those at a lower level, such as $J^{\times}$, it is necessary to adjust it to the occasion which requires it. This is done by means of a lever, J′, connecting-rods J^{2}, or equivalent devices, which vibrate the piece $J^{\times}$ on its upper pivot, so as to cause it to approach the guide C, and thus deflect the wheels D into the track $K^{\times}$, the bucket then resting upon the curve $M^{\times}$ and discharging into the chute $O^{\times}$ or trough $N^{\times}$, as occasion may require.

For each point of discharge a similar arrangement is required, and for each point where the bucket is to be loaded with ore a trough, P, is provided with a hook, T, and chain S, which detains the bucket in the required position for loading by being hooked to the chain F′, which is applied to the top of the discharging-levers F F.

Q may represent a drift or gallery in the mine, and R the car traveling therein, which

is rolled to the side of the shaft and discharged into the trough P, the bucket E being in position, Fig. 1, to receive the ore as it falls through the open bottom of the trough.

Each of the chutes O O^{x} is pivoted within its corresponding adit, and the position of each is varied to permit the bucket to discharge into the chute or through the adit by means of a lever, O$'$ or O^{2}, and suitable connecting-rods.

When the bucket descends the hook T is applied by hand to the chain F$'$ of the discharging-levers F F; but when the bucket begins to ascend the central angular link of the chain F$'$ readily disengages itself from the hook T, and the latter swings over toward the side of the shaft, so as to be entiely out of the way.

As before stated, the discharging-levers F F always maintain an unvarying straight line of travel, and this is effected by the arms *f f* embracing the guide C; but as soon as the wheels D enter either of the ways K K^{x} the bucket E begins to vibrate upon its lower point of support L, and this vibration continues until the bucket assumes the tilted position shown in Fig. 2. Now, it is manifest that when the wheels D enter the curved guideway a portion of the weight is immediately transferred to the curved point M or M^{x}, and the weight of the bucket devolves more and more upon this point as the bottom of the bucket continues to rise. Hence as the bucket approaches a horizontal position the strain upon the elevating-rope G diminishes to such an extent that the operation of tilting the bucket, instead of requiring additional power, as heretofore, is effected with greater facility or less power than the elevation of the bucket from the mine.

This is not the case under the old mode of operation, for in the latter the point on which the bucket is suspended is located between the top and bottom of the bucket, so that when the tilting commences, be the deflecting device of any character whatsoever, the weight of the bucket not only has to be lifted bodily by the elevating-rope, but the resistance of the deflecting device has also to be overcome. Hence it will be seen that an essential feature of my invention consists in having the point of suspension of the bucket located at the bottom of the latter and the deflecting-rollers somewhere between its ends, a central position for said deflecting-rollers being preferable.

By transferring the point of support L of the bucket E from the center of the bottom toward the edge, as shown in Fig. 5, the bucket may be tilted to a greater extent than before, because the pivoted heel of the bucket is made to rise higher relatively to the deflecting-rollers D than in the previous instance.

The point of support of the bucket is also transferred toward the edge of the bottom, for the purpose of adapting the bucket to be held in an upright position in an inclined shaft, as represented in Fig. 5. The detail in Fig. 4 shows the point of support applied to the center of the bottom of the bucket.

When the deflecting-rollers D of the bucket reach the upper extremity of the curved guides M or M^{x} the mouth of the bucket, together with the rollers D, would be free to move inward and downward under the continued ascent of the pivoted heel of the bucket, and therefore I employ a fixed roller, U, upon which the bucket rests when the rollers D reach the upper extremity of the deflecting-guides, in order to prevent said rollers D from running back or downward in the ways K K^{x}. If the rollers were thus allowed to run back in the grooves they would become wedged or jammed within the same, and this sudden arresting of the parts would produce injury to the machinery and interfere with the operation of the engine. The roller U supports the bucket till the rollers run upon the guides V, and the rollers D may traverse upward upon those guides until the engine can be conveniently reversed. Then the rollers D, of course, move freely downward, traveling in the same guides as those in which they ascended.

The arm W (shown in Fig. 2) is fixed to the frame A, and by catching the lowest side of the rim at the top of the bucket may be made to answer the purpose of the roller U.

Having thus described my invention, the following is what I claim as new and desire to secure by Letters Patent:

1. The elevating-bucket E, with the discharging-levers F F applied to the bottom of the bucket, substantially as described.

2. In combination with the above, the deflecting-rollers D and curved guideways K K^{x}, arranged and operating substantially as described.

3. The adjustable sections J^{x}, employed to enable the bucket to be discharged at different heights, substantially as described.

4. The hinged chute O^{x}, in combination with the levers O^{2} and *p*, operating substantially in the manner and for the purpose described.

5. The bucket E, in combination with the hook W, or its equivalent, the roller U, substantially as described.

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