No. 788,015. PATENTED APR. 25, 1905.

O. BERGMAN.

DOOR AND OPERATING MEANS THEREFOR.

APPLICATION FILED JULY 30, 1904.

Fig. 3.



Fig. 4.

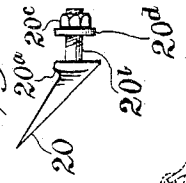


Fig. 2.

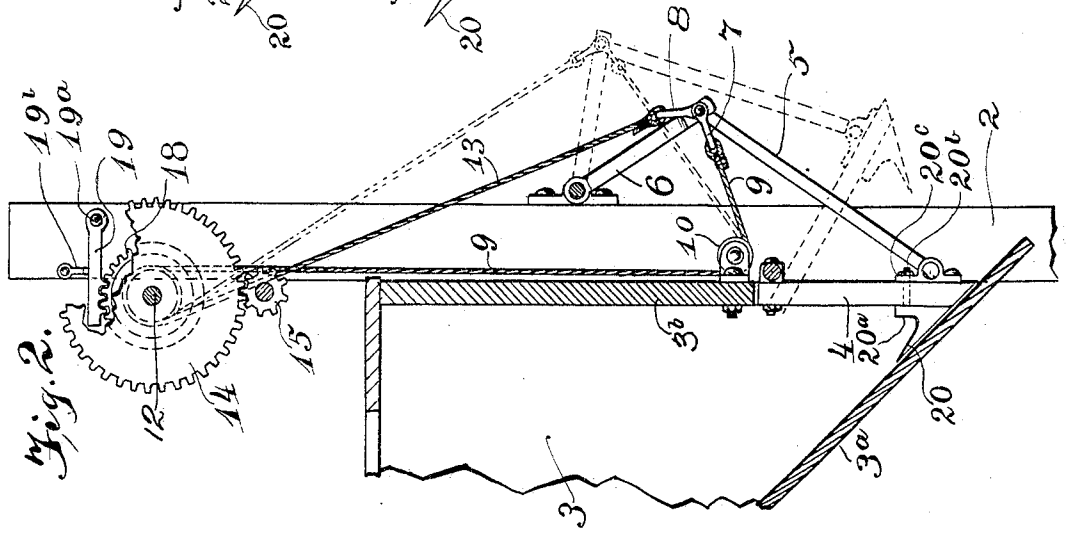
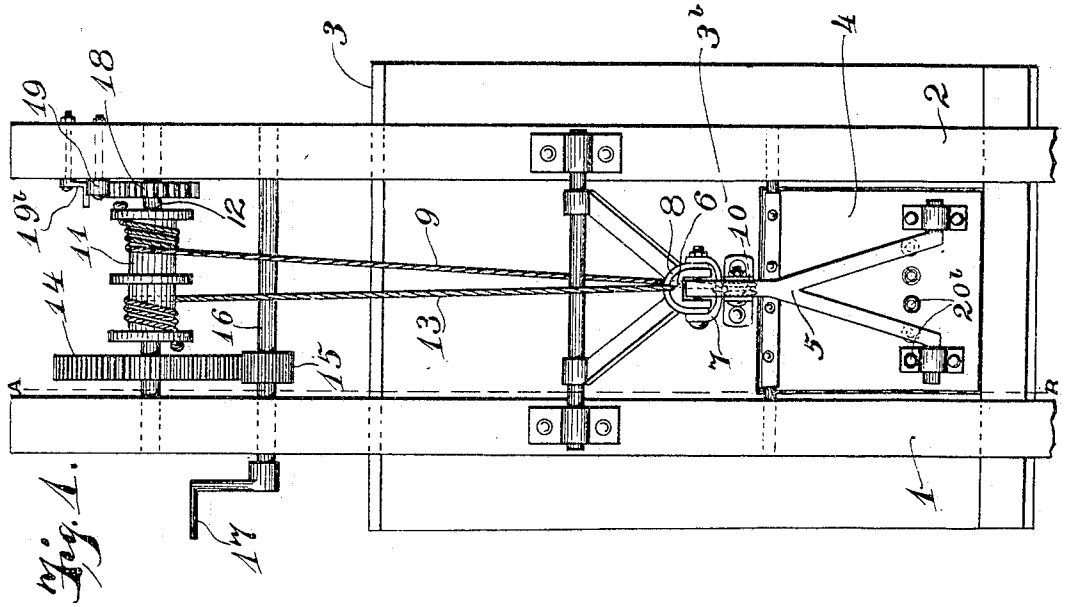


Fig. 1.



WITNESSES:

Wellington. W. Blewett

Pearl Martin.

INVENTOR.

Oscar Bergman

BY

James T. Watson

ATTORNEY.

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No. 788,015 Patented April 25, 1905.

UNITED STATES PATENT OFFICE.

OSCAR BERGMAN, OF TWO HARBORS, MINNESOTA.

DOOR AND OPERATING MEANS THEREFOR.

SPECIFICATION forming part of Letters Patent No. 788,015, dated April 25, 1905.

Application filed July 30, 1904. Serial No. 218,858.

To all whom it may concern:

Be it known that I, OSCAR BERGMAN, a citizen of the United States, residing at Two Harbors, in the county of Lake and State of Minnesota, have invented certain new and useful Improvements in Doors and Operating Means Therefor; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to doors and operating means therefor, and has for its object the provision of a convenient door for ore-dock pockets, which door may be opened to release the ore from such pocket or closed to retain the ore therein.

It has for its further object the provision of convenient means for opening or closing said door.

With this and other objects in view it consists, in combination with an ore-pocket provided with an opening, of a door hinged at one edge and adapted to close said opening, a lever for opening and closing said door, flexible means for operating said lever, and means for operating said flexible means.

It also consists of certain other constructions, combinations, and arrangements of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a front elevation of said invention. Fig. 2 is a vertical transverse section thereof on the line A B of Fig. 1, partly broken away to disclose the structure and showing said invention in retracted position in dotted lines. Fig. 3 is an enlarged detail view of one of the teeth secured to the pocket-door. Fig. 4 is an enlarged detail side elevation of a modified form of one of said teeth.

While I will describe my said invention as applied particularly to ore-pockets, I do not wish to be understood as limiting it to such use, as it is obvious that it may be applied to grain-pockets or other uses within its spirit and scope.

In the drawings, 1 and 2 are vertical supports or legs, upon which is supported in part a pocket 3, preferably open at the top and provided with an inclined floor 3^a, dipping toward the front of said pocket. In the front wall 3^b of said pocket, at the lower edge thereof, is formed an opening adapted to be normally closed by a door 4, which is hinged or pivoted at its upper edge to any convenient part of said structure, as to the opposing faces of said legs 1 and 2. Pivotally secured to the outer face of said door near its lower edge is a bar 5, which is preferably forked at its door-engaging end, and said bar is pivotally connected at its upper end to the lower end of a second bar, 6, which second bar has preferably a forked upper end and is pivoted at said upper end to any convenient part of said structure, as to the front faces of said legs 1 and 2. Pivotally secured to said bars at their contiguous ends are the clevises 7 and 8, to one of which clevises is secured any suitable flexible operating means, as a cable 9, which cable is led rearwardly under a roller or guide-sheave 10, journaled on said structure, and upward to and around a spool 11, which is keyed to a shaft 12, journaled on any suitable portion of said structure, as on the legs 1 and 2. Secured at one end to the other of said clevises is a cable 13, which is led directly upward to said spool or a similar spool keyed on said shaft 12, said cable 13 being carried around said spool in the opposite direction to the direction of the first said cable. If desired, said cables 9 and 13 may be united or integral with each other; but I preferably use separate cables and attach their upper ends to said spool or spools. Keyed to said shaft 12 is a gear-wheel 14, adapted to engage a pinion 15, which is keyed to a shaft 16, journaled in suitable bearings secured to any convenient part of said structure, as to said legs 1 and 2. Said shaft 16 is preferably provided with a crank 17 or its equivalent, by which said shaft may be rotated. The shaft 12 also has keyed thereon a toothed wheel 18, adapted in operation to engage a suitable dog, as 19, which dog preferably is adapted to move pivotally on the pin 19^a and may be held in engagement by the pivotal stop 19^b, secured to one of said legs. If desired, said wheel 18 may be omit-

ted and said dog positioned so as in operation to engage said wheel 14, or either or both of said shafts 12 and 16 may be locked against rotation by any suitable means well known to the art and not thought necessary to be particularly described herein. Extending along the lower edge of said door and projecting inwardly and upwardly at about the same inclination as the floor of said pocket I preferably provide a row of separate teeth, each comprising the point 20, the flange or offset 20^a, and the bolt portion 20^b, which latter portion extends through the door and is secured by a nut 20^c, preferably bearing against a washer 20^d, mounted on said bolt portion. Thus it will be seen that any one of said teeth may be readily removed, if broken, and a new one substituted and that said teeth are so formed that they cannot easily be displaced or accidentally turned sidewise by the load upon them. It will be observed that said bars 5 and 6 coöperate to form a lever.

In operation, the door being closed and the shaft 12 locked against rotation, the pocket is filled with ore. To release said ore or any part thereof into any suitable receptacle placed beneath said door, as a chute, (not shown,) said dog 19 or such other locking means as may be employed is disengaged and the crank 17 operated to open said door by drawing on the cable 13, thus bending said lever farther outward at the meeting-point of its component links or bars and increasing their angle with respect to each other and shortening the most direct distance between the horizontal line of its connection with the standards 1 and 2 and that of its connection with said door 4, which operation will be assisted by the thrust of the ore against the inner face of the door. Said door will thus be opened, as shown in dotted lines in Fig. 2. To close said door, said spool is rotated in the opposite direction by means of said crank-gears, thus drawing upon the cable 9, thus spreading said lever or decreasing the angle of its component bars or links with relation to each other and increasing the most direct distance between the horizontal line of the connection of said lever with said standards 1 and 2 and that of its connection with said door 4 and causing the lever formed by the bars 5 and 6 to exert a powerful downward and inward thrust on said door, sufficient, if need be, to close the same against the opposite thrust or weight of ore. Heretofore it has been impractical to close such pocket-openings during the discharge of ore, and therefore it has usually been necessary to take all the ore from the pocket or none of it. Furthermore, the closing of the pocket-door has heretofore, even when the pocket was empty, been a laborious and time-consuming task, a large proportion of which time and labor my invention is designed to save. Said teeth are designed to break up the mass of ore in opening and closing the door or even when the door is partly open.

I do not claim invention in the idea of providing pins or teeth in such structure, but in the special structure of said teeth and method of securing the same.

While I have described certain details of said construction, it is obvious that it may be altered or modified in minor matters within the spirit and scope of my invention and still preserve the essential characteristics of the same.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a door-lifter, the combination with a relatively fixed support containing a hinged door, of a lever comprising two link-bars hinged together and having one of its ends pivoted to said door and the other of its ends pivoted to said support, a guide, a windlass, flexible means engaging said windlass and in part loosely engaging said guide and connected to said lever and adapted by the operation of said windlass in one direction to bend said lever at its hinge and by the operation of said windlass in the opposite direction to spread said lever, and means for operating said windlass.

2. In a door-lifter, the combination with a suitable support containing a door, of a lever comprising two bars hinged together and pivoted at one end to said door and at the other end to said support, a guide, a windlass, flexible means secured at one end to said lever and led rearwardly and deflected in its course by said guide and thence led to and around said windlass and secured in engagement therewith, flexible means secured at one end to said lever and led to and around said windlass by a different course than the first said flexible means and secured in engagement with said windlass, means for operating said windlass, and means for locking the same against operation.

3. The combination with the discharge-floor of a bin or pocket, of teeth secured to the free end of said door and directed inwardly and each comprising a point, a flange adapted to bear against the inner face of said door, a bolt portion projected through said door and a nut mounted on the outer end of said bolt portion, substantially as described.

4. A tooth, comprising a point, a flange, and a bolt portion joining said flange at the side opposite to said point and at a higher plane than the plane of junction of said point with said flange, substantially as described.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

OSCAR BERGMAN.

Witnesses:
W. S. ANDREWS,
M. O. AUBOLEE.