B. L. WORTHEN.

AUTOMATIC DUMPING CAR.

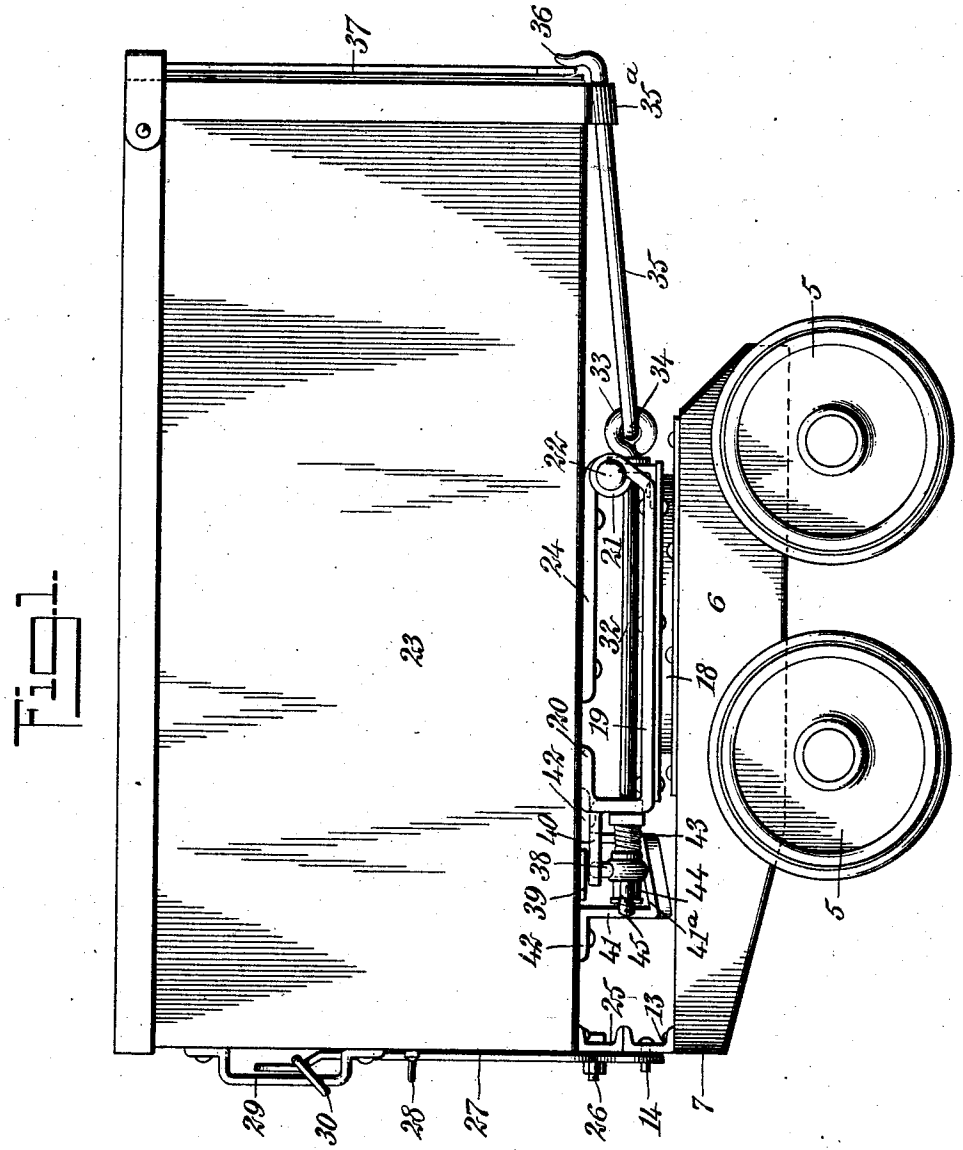
APPLICATION FILED OCT. 22, 1907.

974,009.

Patented Oct. 25, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



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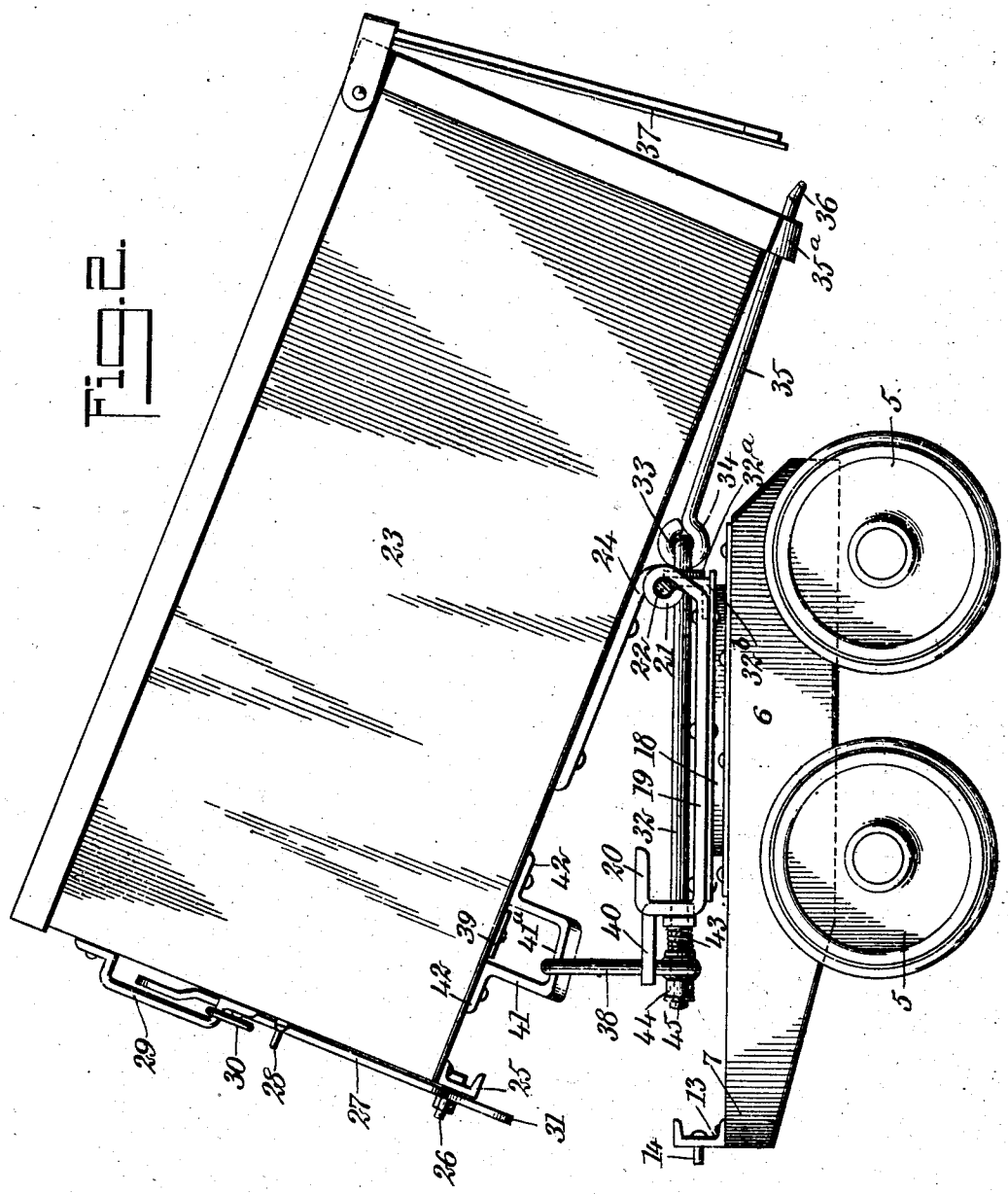
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

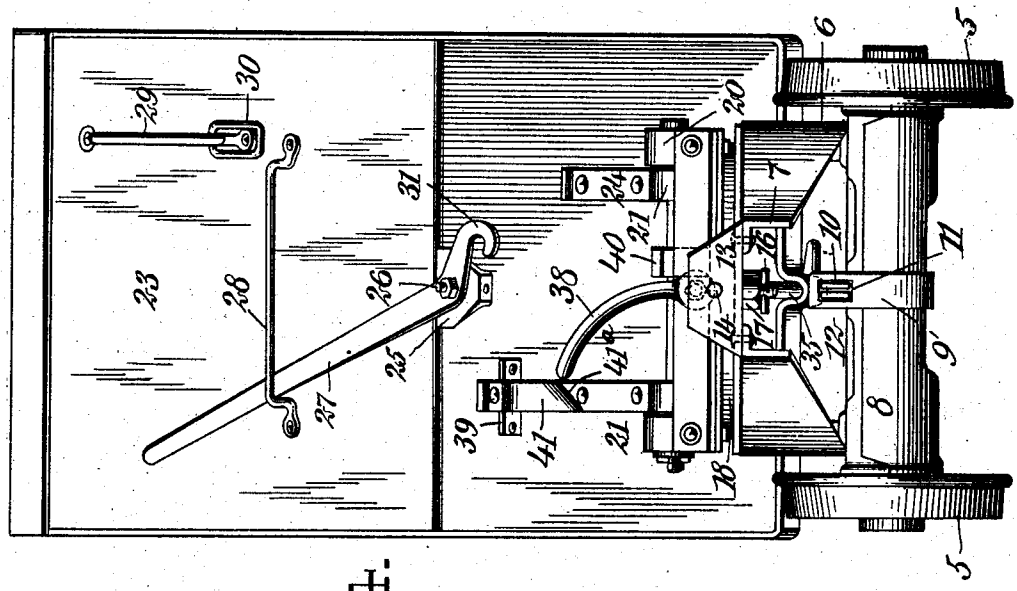

Fig. 4.

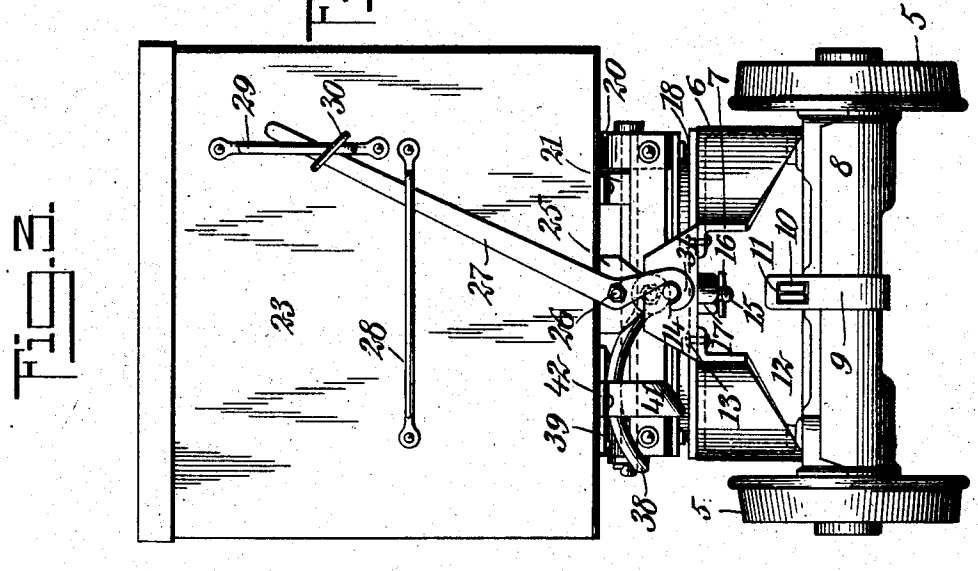

Fig. 5.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC DUMPING-CAR.

974,009. Specification of Letters Patent. Patented Oct. 25, 1910.

Application filed October 22, 1907. Serial No. 398,565.

To all whom it may concern:

Be it known that I, BURT L. WORTHEN, a citizen of the United States, and a resident of Tucson, in the county of Pima and Territory of Arizona, have invented a new and Improved Automatic Dumping-Car, of which the following is a full, clear, and exact description.

My invention relates to automatic dumping cars, my more particular purpose being to provide mechanism for keeping the door of the car locked while the car body occupies a normal position, and unlocking the car door whenever the car is tilted into its abnormal position.

My invention further relates to mechanism controllable by the return of the car body into its normal position for closing and locking the car door.

My invention may be used upon vehicles of any kind, but is of peculiar service in relation to the dumping cars used in mining.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the complete device showing the car body provided with a swinging door, a hook for holding the door normally closed, and mechanism controllable by the tilting of the car body for causing the hook to engage or to release the car door according to the movements of the car body; Fig. 2 is a side elevation (the pivot pin appearing in section) showing the car body as tilted for the purpose of dumping a load, the car door being temporarily released by its hook, and further showing the means controllable by the tilting movements of the car for actuating this hook; Fig. 3 is a rear elevation showing the car body occupying its normal position and fastened downward by the hooked end of the hand lever, this view also showing the normal position of the arcuate arm used for turning the hook; Fig. 4 is a view somewhat similar to Fig. 3, but showing the car body as released and tilted, and the arcuate arm as raised.

The car wheels are shown at 5 and the vehicle frame at 6. This frame is provided at its rear with ends 7 approaching each other, as indicated in Figs. 3 and 4. A rear axle is shown at 8 and is provided with a strap 9 having an aperture 11 receiving fastenings 10 for holding the axle rigid in relation to the frame 6 and cross beams 12 mounted within it.

Riveted upon the ends 7 of the frame 6 and connecting the same together is a plate 13, and mounted centrally of this plate is a pin 14. A king bolt is shown at 15 and is provided with a pin 16 for holding upon it a nut 17.

Upon the top of the frame 6 is a turntable 18 supporting a frame 19 whereby this frame is rendered revoluble in relation to the frame 6. The frame 19 is provided with hooks 20 consisting simply of upturned portions integral with its main body portion. The frame 19 is further provided with bearings 21 and extending through these bearings is a pivot pin 22. The car body is shown at 23 and is provided with bearings 24 engaging the pivot pin 22. The car body may be rocked, as indicated in Fig. 2. A plate 25 is mounted centrally under one end of the car body and is adapted to engage the plate 13. Disposed in the middle of the plate 25 and projecting rearwardly therefrom is a pivot pin 26 mounted upon which is a hand lever 27. A guide bar 28 is mounted upon the rear end of the car body and is bent outwardly therefrom so as to give room for the hand lever 27 to pass through it and to have a limited amount of play (see Figs. 3 and 4). Another guide bar 29 is disposed vertically and mounted upon the rear end of the car body. A link 30 encircles the guide bar 29 and is adapted to serve as a fastening for the hand lever 27 in order to hold it in the position indicated in Fig. 3. By raising the link 30, the lever 27 may be liberated. The lower end of the hand lever 27 terminates in a hook 31 which is adapted to engage the pin 14 and hold the car body in its normal position.

A rocking shaft 32 is provided at its front end with an eye 33 and linking with this eye is another eye 34 integral with a rod 35. The rod last mentioned terminates in a hook 36 which is adapted to engage and disengage a door 37 which is mounted upon the front end of the car body and is adapted to swing outwardly, as indicated in Fig. 2. The rod 35 passes through a sleeve 35^a disposed centrally of the car body, this sleeve thus serving as a bearing.

An arcuate arm 38 is mounted rigidly upon the rocking shaft 32. A wearing plate 39 is mounted upon the under side of the

car body 23 and adapted to engage the upper surface of the arcuate arm 38. A lug 40 serves as a limiting stop for preventing excessive movement of this arcuate arm in one direction (see Fig. 4). A stirrup 41 is provided with feet 42 which are secured rigidly upon the under surface of the car body. This stirrup is provided with an inclined portion 41ª. A compression spiral spring 43 encircles the rocking shaft 32. A nut 44 is mounted upon the rocking shaft 32 which is provided with a threaded end 45 for this purpose.

An annular bead 32ª encircles the rocking shaft 32 and is rigid therewith, this bead lodging against an angel plate 32ᵇ. The purpose of the spiral spring 43 is to press the rocking shaft 32 to the left, according to Fig. 2, so that the bead 32ª bears against the angle plate 32ᵇ. Owing to the pressure of the bead 32ª against the angle plate and to the friction of other parts immediately associated with the rocking shaft 32, this rocking shaft tends to remain in any position in which it may be placed.

The operation of my device is as follows: The parts being in normal position, as indicated in Fig. 3, the car body is filled and the vehicle is drawn to the place where the car is to be emptied. During all this time the link 30 prevents the hand lever 27 from being moved. The operator next moves the link 30 upward, thereby releasing the hand lever 27 and he turns this hand lever to the left, as indicated in Fig. 4. This releases the hook 31 from the pin 14, and the operator next raises the rear end of the car body. This car body is so nearly evenly balanced upon the pivot pin 22 that no extraordinary effort is required in order to tilt it. As the step of tilting proceeds, the inclined portion 41ª of the stirrup 41 engages the arcuate arm 38 and turns it upward. This causes the rocking shaft 32 to turn.

It will be noted that the car tilts a little before the portion 41ª of the stirrup is brought into engagement with the arm 38. This is for the purpose of allowing the center of gravity of the car body to be shifted a little so that the operator, in beginning the step of tilting, does not find it necessary to lift any great amount of weight. As the arm 38 is turned, and consequently the rocking shaft 32 rotates a portion of a revolution, motion is transmitted through the eyes 33, 34 and rod 35 to the hook 36. This releases the door 37 and allows the contents of the car to be ejected. The car remains in this position until the operator, by hand, depresses the rear end of the car body. When this occurs (see Fig. 2) the plate 39 descends upon the top of the arm 38 and this arm is turned down into the position indicated in Fig. 3.

When the car body first begins to move from its position indicated in Fig. 2, the plate 39 does not immediately rest upon the arm 38, and consequently the hook 36 at first does not move. When, however, the car body reaches such position that the door 37 is completely closed by its own weight, the plate 39, by engaging the arm 38 and turning the rocking shaft 32, causes the hook 36 to turn, and this locks the door 37. The car body being restored to its normal position, the hand lever 27 is moved over to the right, according to Fig. 3, and secured in position by aid of the link 30. The car is now ready for another charge to be filled into it.

As will readily be seen from the above description, the rod 35 and its hook 36 are so arranged that when the car is in its normal or loading position, the hook 36 firmly engages the door 37 so as to prevent outward swinging movement of the latter. When, however, the body of the vehicle is tilted for the purpose of dumping the load, the various points at which the door and hook were in contact now diverge upon the arcs of intersecting circles described respectively by the revolution of said points upon their fixed centers.

It will be noted that the eyes 33, 34 together constitute a type of universal joint. I regard this part as very essential for the reason that it is desirable to have great freedom of movement at the point where the rocking shaft 32 connects with the rod 35. This is because the car body must tilt and yet in tilting should not unduly disturb the various parts supported by the frame 19 and employed for the ultimate purpose of turning the hook 36 automatically.

If the arcuate arm 38 should become somewhat loose upon the shaft 32, the inclined portion 41ª of the stirrup will, on coming into contact with the under side of the arm 38, impart to the arm an upward swinging movement, thereby bringing it into a nearly upright position which it has more or less tendency to retain. When, however, the vehicle body is depressed so as to restore it to its normal position, the arm is forced over the portion 41ª of the stirrup 41, and the weight of the vehicle thereupon brings the arm back into its normal position. It follows, therefore, that the arm 38 has a positive movement controllable by the movement of the vehicle independent of whether the arm be tight or loose upon the shaft which it controls for the purpose of liberating the hook from the vehicle door.

As may be seen from Fig. 1, the eyes 33, 34 are so located relatively to the pivot pin 22, that the tilting movement of the car body causes the rod 35 to protrude and thus push the hook 36 a little away from the door 37. This facilitates the opening of the

door. Any packing of the load against the door, causing the latter to jam against the hook, is unable to hold the hook and prevent it from turning whenever the car is tilted, for the reason that, as the car body tilts, the hook recedes outwardly from the door and is thus free to turn in the manner above described.

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

1. The combination of a vehicle body, a frame supported thereover, a rocking shaft mounted within said frame and provided with an eye, a rod provided with an eye engaging said eye of said rocking shaft, said rod being free to swing in a plane and upon said first-mentioned eye as a center, said rod being provided with a hook, a door to be engaged by said hook, a car body to be closed by said door, said car body being mounted to tilt, and means controllable by the tilting of said car body for turning said rocking shaft.

2. A device of the character described, comprising a frame, a rocking shaft mounted thereupon, an arcuate arm connected with said rocking shaft, a car body for turning said arcuate arm in one direction, a stirrup mounted upon said car body and adapted to turn said arm in the opposite direction, said stirrup being larger than said arm for the purpose of allowing a limited play of said stirrup relatively to said arm before turning the latter, a door to be locked and unlocked, and a member connected with said rocking shaft and controllable by tilting of said car body for engaging and disengaging said door.

3. In a device of the character described, the combination of a frame, a vehicle body journaled thereupon and adapted to tilt for the purpose of ejecting a load, a door mounted upon said vehicle body and adapted to open and close, means including a rocking shaft and controllable by tilting movements of said vehicle body for releasing said door, so as to allow it to open, an arm normally rigid in relation to said rocking shaft for actuating the same, and a stirrup mounted upon said vehicle body and provided with a portion for turning said arm should the latter accidentally become loose relatively to said rocking shaft.

4. A device of the character described, comprising a frame supported upon wheels, a car body mounted upon said frame and adapted to tilt relatively thereto, a door for said car body, a rod provided with a hook for engaging said door so as to normally keep the latter closed, said rod being journaled relatively to said car body, a rod journaled upon said frame, said last-mentioned rod being connected with said rod first mentioned by a joint, and means controllable by the tilting of said car body for turning the rod journaled upon said frame.

5. The combination of a frame provided with wheels whereby it is supported, a vehicle body journaled upon said frame and adapted to tilt, a door for said vehicle body, a rod provided with a hook for engaging said door, said rod being revoluble for the purpose of releasing said hook from said door, and a joint connecting said rod with said frame, said joint being located at a point concentric to the point where said vehicle body is journaled for the purpose of disengaging said hook from said door when said vehicle body is tilted.

6. The combination of a vehicle body, a door therefor, a frame provided with wheels whereby it is supported, said vehicle body being journaled upon said frame and adapted to tilt relatively thereto, a rod connected with said vehicle body and provided with a hook for holding and releasing said door, a second rod journaled relatively to said first-mentioned rod and also relatively to said frame, a hook mounted upon said second-mentioned rod, and a stirrup for turning said hook positively in case it should become loose.

7. The combination of a vehicle body, a door therefor, a rod slidably connected with said vehicle body and provided with a hook for holding and releasing said door, said rod and hook being so connected with frame of vehicle, that when car is in the act of dumping, the points at which said door and hook normally come into contact, when car is in loading position, diverge upon the arcs of intersecting circles described by the revolution of said points upon their respective fixed centers, and mechanism controllable by the movements of said vehicle body for turning said rod in order to further disengage said hook from said door.

8. The combination of a car body adapted to be tilted, a door for said car body, a rocking shaft disposed adjacent to said car body and occupying a general position independently of movements of said car body, a member connected with said rocking shaft and normally engaging said door so as to keep the latter closed, an arm connected with said rocking shaft for turning the latter upon its own axis, and a stirrup mounted upon said car body and movable therewith relatively to the general position occupied by said rocking shaft, said stirrup having a bearing face disposed at an angle to said arm at the point where said arm comes into engagement with said stirrup in order to confer upward movement upon said arm.

9. The combination of a frame provided with wheels whereby it is supported, a vehicle body journaled upon said frame and adapted to tilt, a door for said vehicle body, mechanism for operating said door, said

mechanism including a rocking shaft mounted upon said frame, and an arm connected with said rocking shaft for the purpose of actuating the same, said arm being of substantially arcuate form, and a stirrup mounted upon said vehicle body and adapted to encircle said arm, said stirrup being movable toward and from said rocking shaft and disposed in a position favorable to permit said arm to pass through said stirrup when said vehicle body engages said arm.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

BURT LINCOLN WORTHEN.

Witnesses:
CHAS. F. SLACK,
D. C. GRIFFIN.