T. E. BURKE & J. R. A. LINDHOLM.

SUBMARINE LIFE SAVING AND OBSERVATION DEVICE.

APPLICATION FILED JAN. 15, 1916.

1,215,905. Patented Feb. 13, 1917.

3 SHEETS—SHEET 1.

Fig. 1.

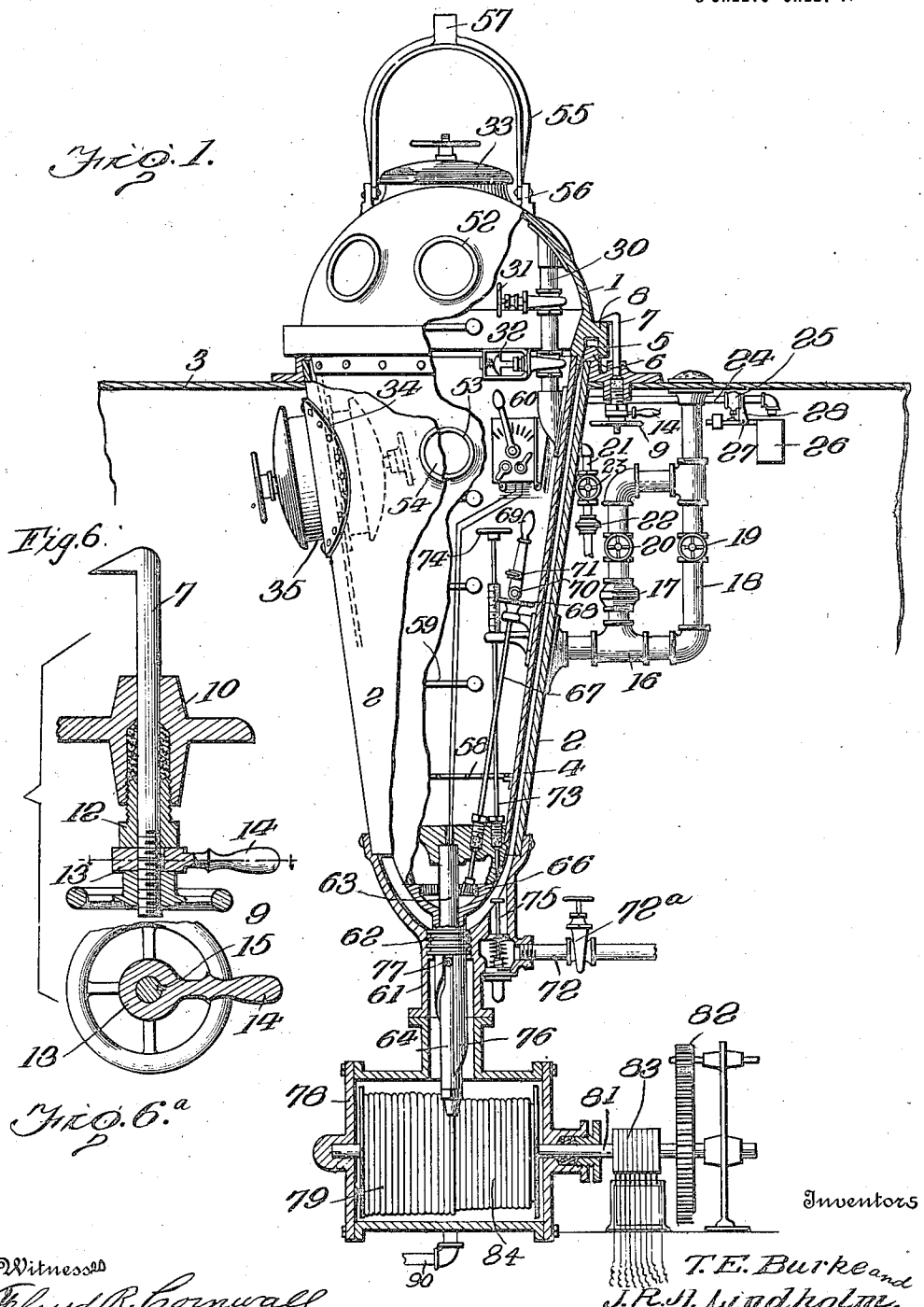


Fig. 6.

Fig. 6.a

Witnesses

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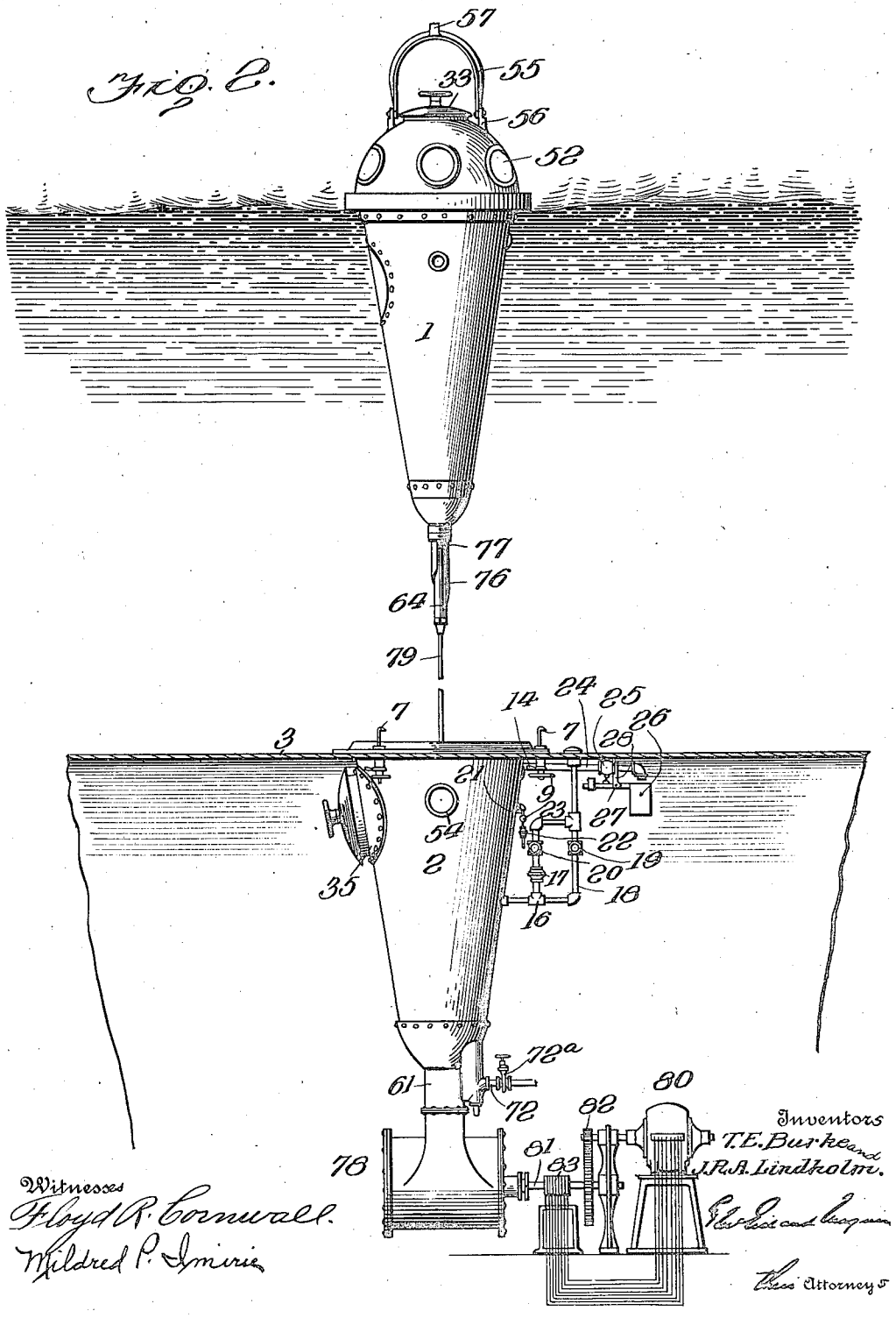
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

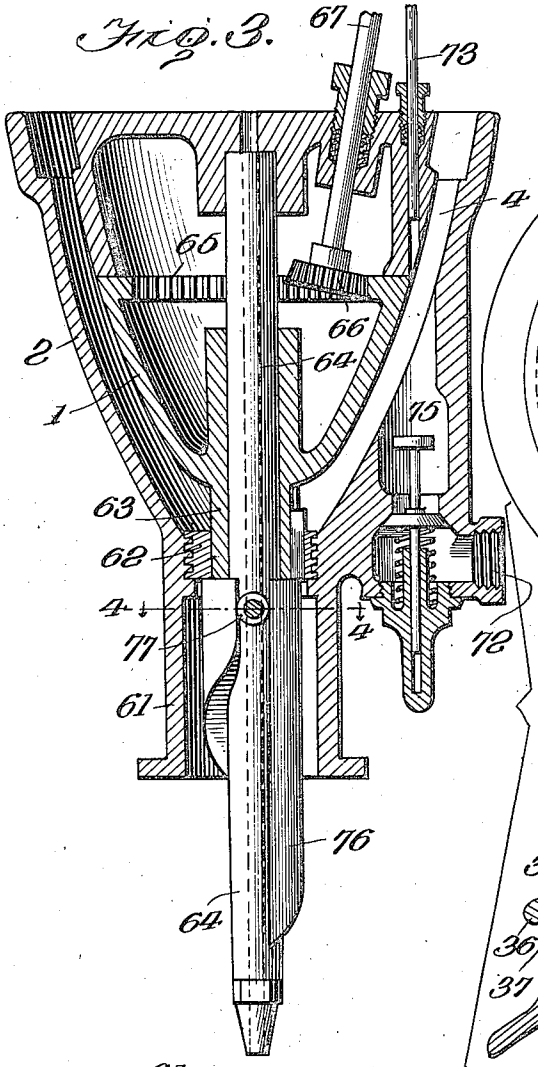
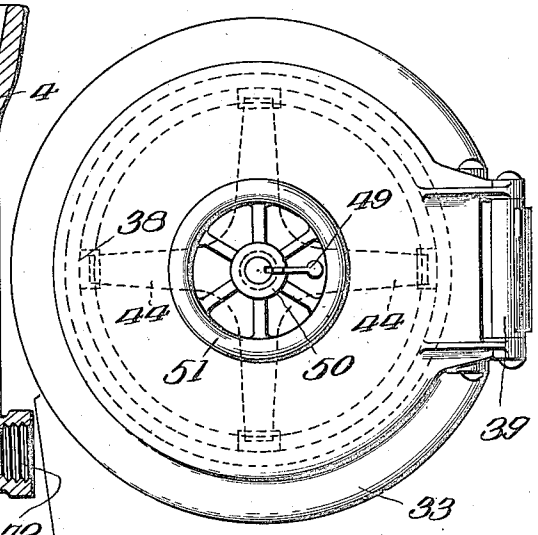


Fig. 5.ª



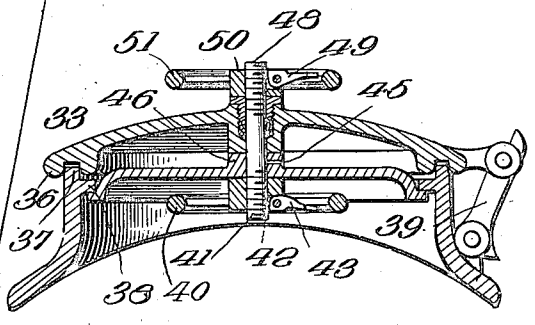


Fig. 5.

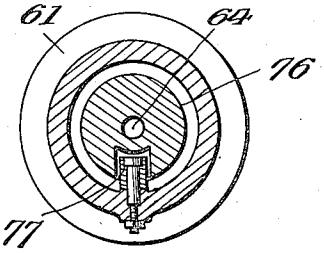


Fig. 4.

Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS E. BURKE AND JOEL R. A. LINDHOLM, OF CHICAGO, ILLINOIS.

SUBMARINE LIFE-SAVING AND OBSERVATION DEVICE.

1,215,905. Specification of Letters Patent. Patented Feb. 13, 1917.

Application filed January 15, 1916. Serial No. 72,253.

To all whom it may concern:

Be it known that we, THOMAS E. BURKE and JOEL R. A. LINDHOLM, citizens of the United States, and residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Submarine Life-Saving and Observation Devices; and we 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.

Our invention relates to submarine vessels and contemplates improvements in that type of vessel having passenger carrying means which may be released from the submerged vessel and allowed to rise to the surface either to permit of observation and signaling or the escape of the crew in the event of accident.

In the accompanying drawings Figure 1 is a view partly in vertical section and partly broken away showing a submarine attachment constructed in accordance with our invention. Fig. 2 shows the buoy released from the submerged vessel. Fig. 3 is an enlarged sectional detail showing the connection between the buoy and its inclosing casing when it is seated within the latter. Fig. 4 is a section on line 4—4, Fig. 3. Fig. 5 is a detail sectional view of one of the manhole covers, Fig. 5ª a plan view thereof and Fig. 6 is a sectional view of one of the binding clamps by which the buoy is held within its receptacle and Fig. 6ª a plan view thereof.

Referring to the drawing the buoy 1 is shown in Fig. 1 contained within a casing 2 vertically disposed in the deck 3 of a submarine vessel. When the buoy is thus seated a space 4 is provided between the buoy and its casing. We have shown the buoy provided with an angular flange 5 adapted to receive a rim 6 at the outer edge of the casing 2. While the weight of the buoy tends to hold it downward in the casing, yet we provide means for positively holding the buoy downward to prevent leakage and at the same time permit of its ready release. As shown this means comprises a plurality of clamping hooks 7 which engage a shoulder 8 on the buoy. These clamping hooks are operated from within the vessel by means of hand wheels 9. As shown in detail in Fig. 6 the stem of the hook passes downward through a suitable hub 10 mounted on the deck 3 and through a stuffing box 12 and is threaded in the hub of the operating wheel 9. A collar 13 intermediate the stuffing box and the hub of the wheel 9 is shown formed with a handle 14 and is keyed by a sliding key 15 on the stem of the hook. When the wheel is turned to release the engagement of the hook upon the flange of the hub, the handle 14 may be operated to turn the clamping hook axially and remove its outer extremity from the flange.

We have shown a water outlet pipe 16 leading from the space 4 to the deck of the vessel and provided with a check valve 17. This pipe is also formed with a by-pass 18 having a valve 19 therein. An emergency valve 20 may be used in the event of the check valve becoming inoperative. An air pipe 21 is shown leading from the space 4 having a check valve 22 therein and a manually operated valve 23.

Also extending from the space 4 we have shown a pipe 24 having a valve 25 therein. This pipe empties into a receptacle 26 mounted on a rod fulcrumed as at 27 and having a weight at its other end. A valve governor 28 is actuated by the turning of this receptacle 26 on its fulcrum by reason of the weight of the water therein to move the stem of the valve 25.

Extending downward from the top of the buoy to the space 4, we have shown a water inlet pipe 30 having an emergency valve 31 and a self closing valve 32.

The buoy is formed with a manhole at its top closed by a cover 33. It also has a side opening 34 which, when the buoy is within its casing, is adapted to register with an opening 35 in the casing. We provide for these covers being operated either from within or without the buoy. One of the covers is indicated in Fig. 1 and a detail showing thereof is found in Fig. 5. As illustrated the doors have double ribs 36 at their peripheries adapted to seat on flanges 37 surrounding the manhole. Extending inward from these flanges are lugs 38. The cover is provided with a suitable hinge 39. The hand wheel 40 has a threaded hub through which turns a threaded stem 41. By turning the hand wheel 40 the pressure may be increased or released. We provide for locking the hand wheel 40 to the stem so that

the latter will turn with the hand wheel. To this end the stem is formed with a groove 42 adapted to receive a pivotally mounted key 43 on the hub of the hand wheel. When this key is turned to engage the groove the rotation of the hand wheel will cause the stem to rotate and cause the spider arms 44 to turn out of engagement with the lugs 38, there being a sliding key 45 for locking the hub 46, on which the spider arms are mounted, to the stem 41. The described construction of the stem and operating wheel is repeated on the outside of the cover 33, the stem being threaded and formed with a groove 48 adapted to be engaged by a key 49 on the hub 50 of a hand wheel 51.

By the described construction the person within the buoy may release the door, as previously described, and after having passed out of the manhole may close it and lock the key 49 to the stem and turn the hand wheel until the spider arms have engaged the lugs 38. The key is then released and the further rotation of the hand wheel will bind the cover to the manhole. We have shown the buoy formed with observation ports 52. Port 53 is marked with lines upon the glass surface thereof so that by its register with a similar port 54 in the casing 2 the correct position of the buoy within the casing can be determined. The top of the buoy is shown provided with an arched holder 55 pivoted to the buoy as at 56 and having a socket 57 at its top in which a signaling mast or wireless aerial may be placed. The buoy is also shown provided interiorly with a flooring 58, a ladder 59 and an electric controller 60.

The mechanism by which the buoy is held to, and released from, its casing is as follows:

The casing has a depending portion 61 in which is threaded a collar 62. As illustrated in detail in Fig. 3 a hub 63 extends into the collar and is keyed thereto. A hollow post 64 is rigid with and extends downward from the buoy and through the hub. The hub is shown formed with an internal gear 65 which is adapted to be rotated so as to turn the collar 62 for the entrance or release of the buoy. To rotate the hub through the medium of this gear we have shown a pinion 66 on a rod 67 mounted at its upper end in a suitable bracket on the inner wall of the buoy and having a hand wheel 68. To facilitate the turning of this hand wheel we have shown a handle 69 pivoted to the rod 67 above the wheel as at 70. The top of the wheel is formed with a rack surface which may be engaged by a pawl 71 on the handle when the latter is turned down.

At its lower end the casing 2 is provided with an outlet pipe 72 having a valve therein which is controlled by a rod 73 shown vertically disposed within the buoy and having a hand wheel 74 at its upper end and passing downward through a suitable stuffing box in the lower portion of the buoy in alinement with the valve stem 75 which controls the passage through the outlet pipe 72. The pipe 72 is also equipped with a manually operated valve 72^a.

The post 64 depending from the buoy is shown provided with a spiral surface 76 adapted, when the buoy is being inserted in its casing, to pass over a roller 77 mounted in the depending portion 61 of the casing. See Fig. 4. By this means the buoy is turned axially in its descent so as to effect the register of the openings 34, 35. A housing 78 is shown attached to the depending portion 61 of the casing 2 adapted to contain, and form bearings for, a reel on which the cable 79 is wound. This cable is attached to the post 64 and is carried upward with the buoy when the latter rises. The reel upon which the cable is wound may be operated by a suitable motor 80, Fig. 2, and the shaft 81, through which power is transmitted from the gearing 82, may carry a commutator 83. The cable 79 may contain electric conductors 84 leading from this commutator to controller 60. 90 is the outlet pipe through which water may be conducted from the housing 78.

The operation is as follows: Assuming the parts to be in the position shown in Figs. 1 and 3, and it is desired to set the buoy afloat, the crew of the vessel release the hand wheels 9 and turn handles 14 to remove the hooks 7 from flange 8. The emergency valve 20 is then opened and also the valve 23 of the air vent 21. These valves provide against the contingency that their respective check valves 17 and 22 will not operate properly. The outlet valve 72^a is then opened. The doors 34 and 35 being open, a member of the crew enters the buoy and these doors are closed. The operation is then conducted by the person in the buoy. Lever 69 is turned down so that its pawl 71 is placed in engagement with the ratchet in the wheel 68 and it is turned to rotate the pinion 66 and gear 65, resulting in withdrawing plug or collar 62 from the portion 61 of the casing 2, and removing the buoy from all mechanical connections to the casing 2.

At this stage the buoy will not rise owing to the water pressure upon it holding flange 8 to seat 6 and preventing water from entering the space 4. The water is admitted through pipe 30 by opening the emergency valve 31 and then valve 32 is opened. Water passes from pipe 30 into the space 4 and pipe 24 carries the air compressed in this space to the interior of the submarine vessel. When the water in space 4 rises to the height of pipe 24 and fills the receptacle

26, the latter swings on its pivot and causes arm 28 to close valve 25. The buoy being now entirely surrounded by water is free to rise and carries the cable 79 upward in its ascent.

To return the buoy to its casing the motor 80 is operated to wind the cable 79 upon its reel and draw the buoy downward. The spiral 76 turns on the roller 77 to give the proper axial turn to the buoy in order to seat it properly in its casing. As the flange 8 approaches the rim 6 water is confined and compressed within the space 4 and is relieved through the check valve 17, passing out through pipe 16. The hooks 7 are then placed in position as before described. As the water is withdrawn air enters the space 4 through pipe 21. The receptacle 26 is then emptied which opens the valve 25. After the buoy is seated the pinion 66 may be turned to turn the collar 62 tightly into place. Then the rod 73 may be operated to unseat the valve 75 to allow any water remaining in the lower portion of the space 4 to pass out through pipe 72.

We claim as our invention:—

1. In a submarine device, the combination with a buoy, of a casing in the vessel adapted to receive said buoy, a space being formed intermediate said buoy and casing, a water outlet leading from said space and having a check valve therein, and a valve admitting air to said space.

2. In a submarine device, the combination with a buoy, of a casing in the vessel adapted to receive said buoy, a space being formed interemdiate said buoy and casing, an outlet leading from said space and having a valve therein and a governor for said valve, a pivotally mounted receptacle into which said outlet empties, and means operated by said receptacle for controlling said governor.

3. In a submarine device, the combination with a casing having a transparent port, of a buoy adapted to be seated in said casing and having a transparent port adapted to register with said former port when said buoy is seated.

4. In a submarine device, the combination with an upright casing having a depending portion, of a buoy adapted to be seated in said casing, said buoy having a hub, a collar keyed to said hub and threaded in said depending portion, and means for rotating said hub to remove it from said casing.

5. In a submarine device, the combination with an upright casing having a depending portion and a roller therein, of a buoy adapted to be seated in said casing and having a hub in threaded engagement with said casing, said buoy having a depending post formed with a spiral surface adapted to engage said roller and turn said hub axially when said buoy is being seated.

6. In a submarine device, the combination with an upright casing having an outlet pipe near its lower portion and a check valve therein, of a buoy adapted to be seated in said casing, a space being provided between said buoy and said casing, and means operated within said buoy for unseating said check valve.

In testimony whereof, we have signed this specification in the presence of two subscribing witnesses.

THOMAS E. BURKE.
JOEL R. A. LINDHOLM.

Witnesses:
JOHN R. ALPINE,
W. M. YOUNG.