

(No Model.)

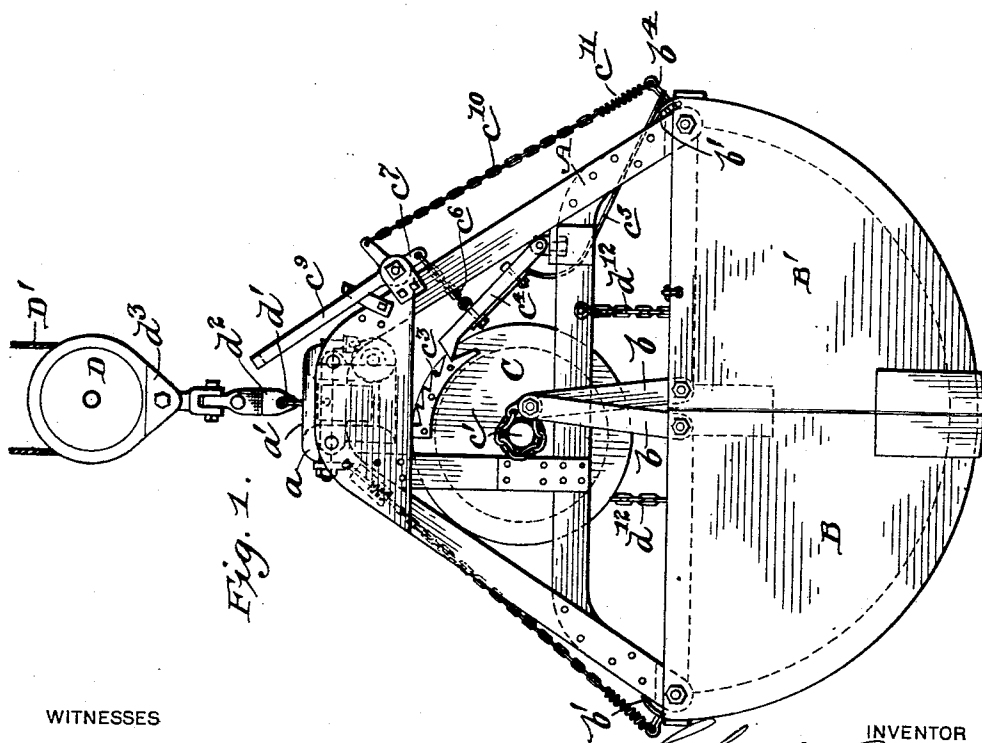
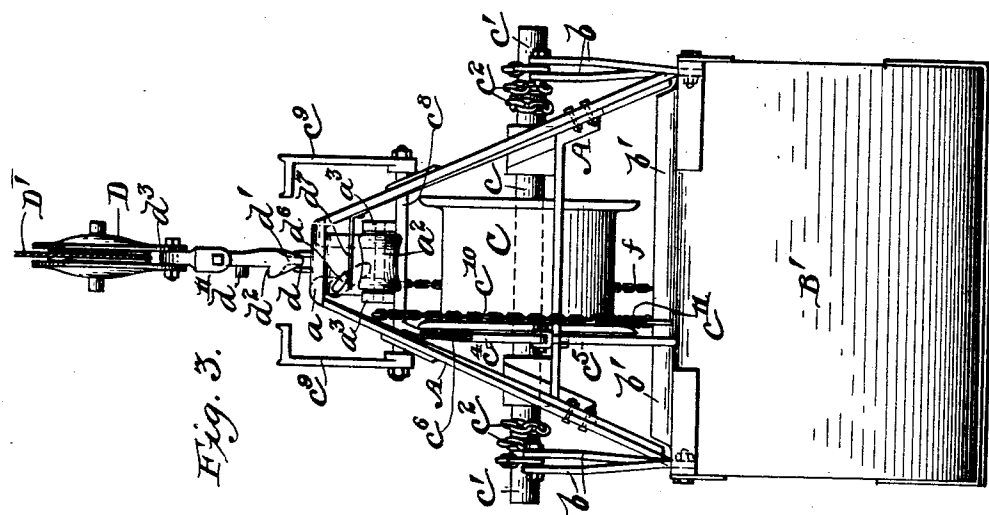
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C. P. DOLE.

CLAMSHELL HOISTING OR DREDGING APPARATUS.

No. 586,536.

Patented July 13, 1897.



WITNESSES

Everance
W. S. Hockman

INVENTOR

Charles P. Dole
by his Atty
Wm. F. Fennick

(No Model.)

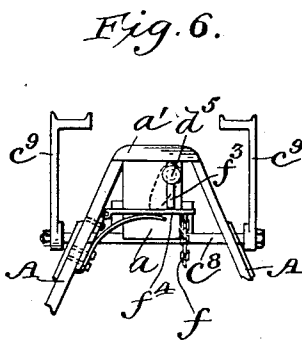
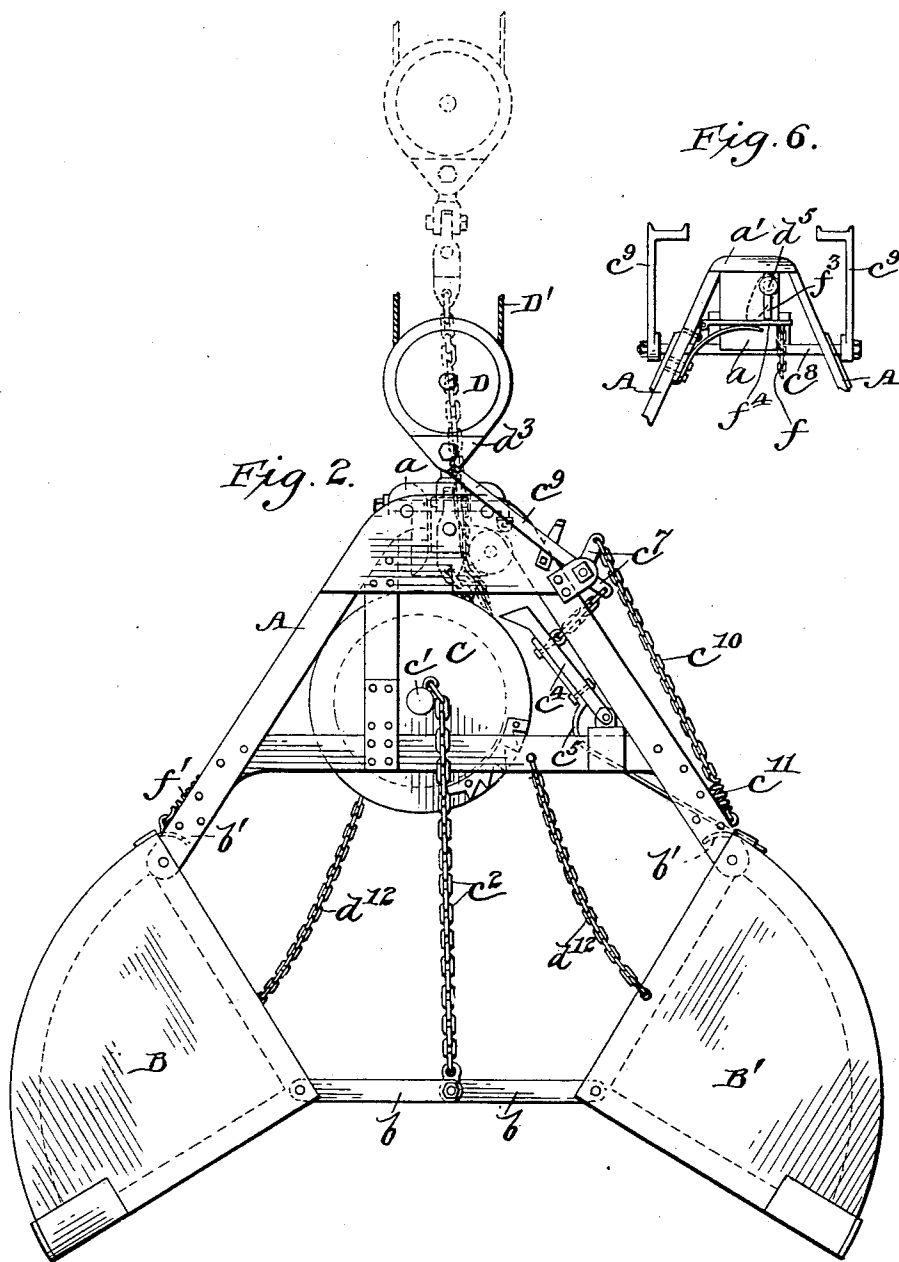
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WITNESSES

Reverence.
 W. S. Fockman

E. S. Hockman

INVENTOR

INVENTOR
Charles P. Dole
By his Att'y,
Mason Fernald & Lamont.

By his atty.
Mason French Chamberl.

Mason F. French Lawrence.

(No Model.)

3 Sheets—Sheet 3.

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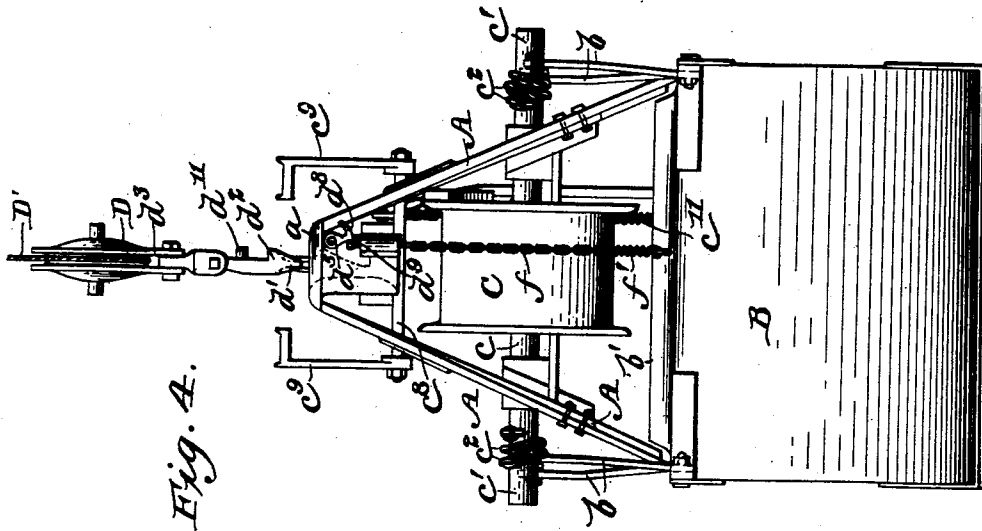


Fig. 4.

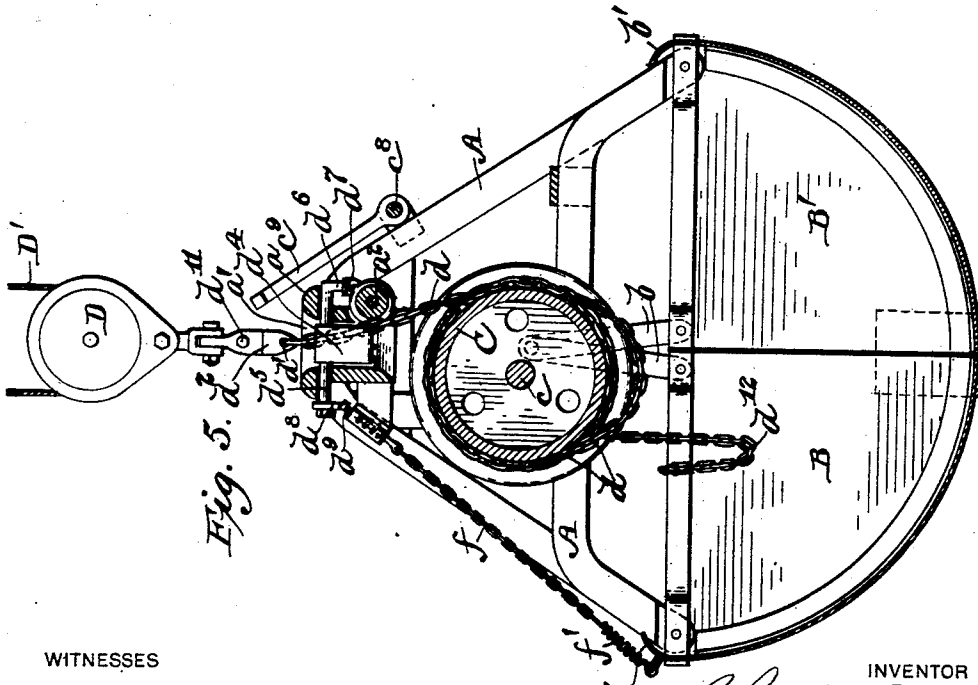


Fig. 5.

WITNESSES

Everance.
W. S. Hockman.

INVENTOR

Charles P. Dole
by his Atty
Mass. Fennick Lawrence

UNITED STATES PATENT OFFICE.

CHARLES P. DOLE, OF DULUTH, MINNESOTA, ASSIGNOR OF ONE-HALF TO
CHARLES R. HENEAGE, OF SAME PLACE.

CLAM-SHELL HOISTING OR DREDGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 586,536, dated July 13, 1897.

Application filed November 20, 1895. Renewed November 21, 1896. Serial No. 613,045. (No model.)

To all whom it may concern:

Be it known that I, CHARLES P. DOLE, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Clam-Shell Hoisting or Dredging Apparatus; 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 improvements in clam-shell dredging or hoisting and conveying buckets, and has particular relation to such buckets as are automatic in their operations and are designed for hoisting and conveying coal from the dock or vessel to cars, pockets, carts, or the like into which said coal is to be loaded.

The invention consists of the combination, with a suitable frame, of clam-shells pivoted thereon; a fixed rotatable drum mounted in said frame, an operating-chain adapted to be wound about said drum and connected to the hoisting-rope, and means for connecting said drum with the clam-shells whereby the latter are closed by the rotation of the same by the hoisting-chain.

It also consists of certain other novel constructions, combinations, and arrangements of parts, all of which will be hereinafter more particularly set forth and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 represents a side elevation of the apparatus embodying my invention, the clam-shells being shown in their closed position. Fig. 2 represents a similar view with the clam-shells open. Fig. 3 represents an end elevation of said apparatus with the clam-shells closed. Fig. 4 represents a similar elevation taken from the opposite end. Fig. 5 represents a central vertical section through my said apparatus, and Fig. 6 represents a detail side elevation of a modified construction of spring-catch for holding the pawl d^4 out of the hook-passage.

A in the drawings represents the frame of my apparatus; B B', the clam-shells, pivoted to the same; C, the winding-drum, and D the hoisting-sheave.

The frame A is preferably pyramidal in form and is provided at its apex with a casting a , having an approximately round passage or guide way a' formed therein for the passage of an operating-chain d . The winding-drum C is journaled in the frame A and has its shaft c , to which it is rigidly secured, extended to each side of the frame to form winding-drums c' for chains c^2 , which are connected on the respective sides of the frame to links $b b$, which are pivoted together and to the clam-shells B B'. These shells B B' are pivoted to the frame A and when together form a semicylindrical receptacle closed at both ends. They are each pivoted to the respective ends of the frame A and are provided, respectively, with upwardly-curved lips or extensions $b' b'$, that serve to retain the coal on each side as the shells are being closed.

The operating-chain d has one end attached to an eye d' , formed in the end of a hook d^2 , which is pivoted to the sheave-casing d^3 , the chain passing downward through the passage a' and over a guide-roller a^2 , journaled in suitable lugs a^3 on the frame A. The office of this roller is to guide the chain in a vertical direction and prevent it from binding and scraping against the sides of the passage a' when under strain.

The winding-drum is provided upon the side of one of the flanges near the periphery with a short segmental rack c^3 . When the chain d is fully unwound from the drum, this rack is engaged by a pawl c^4 , pivoted to the frame and provided with a spring c^5 , that bears upon the top of one of the shells and thus keeps the pawl normally in engagement with said rack. The said pawl is disengaged from said rack to allow the drum to revolve backward, the chains c^2 to unwind, and the clam-shells open to discharge their load by a chain c^6 , that connects said pawl with a bell-crank lever c^7 , mounted on a horizontal shaft c^8 , which is journaled in the frame. This shaft c^8 is provided at each end with a trip-lever c^9 , said levers being adapted to be engaged by any suitable trip located above the dump and thus raise the pawl through the aforesaid devices and permit the shells

to open because of the gravity of the load within them. The outer end of the bell-crank lever c^7 is connected to a projection b^4 on one of the shells by a chain c^{10} and spring c^{11} .

5 This construction is to counterbalance the weight of the levers c^9 and permit the chain c^6 to remain loose when the shells are closed and the pawl engaging the rack on the drum.

When the hook d^2 passes down into the
10 passage a' , it is engaged by a pawl d^4 , which is mounted on a shaft d^5 , and said hook is thus secured in said passage. The shaft d^5 is provided at one end with a short lever d^8 , that is engaged by a flat spring d^7 , secured to
15 the frame A. The action of this spring and lever is to hold the pawl d^4 normally projecting into the passage a' , through a slot formed in the wall of the same, so as to be engaged by the ascending hook. The opposite end of
20 the shaft d^5 is provided with a lever d^3 , which has an enlarged segmental end that acts as a catch by its engagement with a spring-actuated sliding bolt d^9 . This bolt is connected by a chain and spring f and f' , respectively,
25 with one of the shells, so that the bolt is alternately drawn and shot by the movement of said shell. The hook d^2 is provided with a projection d^{11} , that is adapted to press the pawl back out of the passage a' , as will be
30 hereinafter described.

As shown in Fig. 6, I employ a similar construction of spring-catch which answers the same purpose as the sliding bolt d^9 , but in a
35 same. In this construction I do away with the lever d^3 and sliding bolt d^9 and provide this end of the shaft d^5 with a lever f^3 . This lever is engaged by a bar f^4 , which is hinged to frame A. A spring f^5 is attached to said
40 frame A and bears with its free end against the under side of the bar f^4 and thus forces it up against the lower end of the lever f^3 . The chain f is connected to the outer free end of the bar f^4 . When the buckets are open,
45 the chain f is loose and allows the bar f^4 to ascend and firmly hold the lever f^3 in any of its adjusted positions. When the bar f^4 is pulled down by the closing of the buckets, the lever f^3 is freed and allows the shaft d^5
50 to revolve under the action of the spring d^7 .

It will be observed that the shell-operating chains, &c., are on the outside of the frame and also that the winding-drum is fixed in relation to the frame and does not rise and fall,
55 and thus allows the shells to be completely filled. If the drum were movable, the tendency would be to throw the buckets open too violently because of its additional weight; but with the drums stationary, as in the present case, the opposite effect is produced, as
60 the unwinding of the chains from the stationary drum and the winding up of the hoisting-chain have a tendency to retard the opening of the shells. Stop or checking chains d^{12} are
5 secured to said frame and to the clam-shells, respectively, to prevent shells swinging open too far or too violently. A suitable hoisting-

rope D' is passed about the sheave D and is connected to any suitable operating mechanism.

The operation of the apparatus is as follows: When the descending open shells strike the coal or other substance, the lower edges of said shells are forced into the same and the
70 hook d^2 descends in the passage a' until the projection d^{11} strikes the pawl d^4 and presses it outward. This operation of the pawl rotates the shaft d^5 and the lever d^8 , carried thereby, until the spring-actuated bolt d^9
75 passes behind one end of the enlarged segmental portion of the lever d^8 . This locks the shaft d^5 against a backward rotation and holds the pawl d^4 out of the passage a' . The hoisting-rope D' is now operated, which results in
80 the hook d^2 passing out of the passage a' and carrying the operating-chain d with it. As said chain d is unwound from the drum the same is rotated and the chains c^2 wound on its shaft c , thus closing the shells upon the
85 load. As the drum reaches the limit of its rotation the pawl c^4 engages the rack c^3 on said drum and prevents any backward rotation of the same. As the shells are closed the
90 bolt d^9 is drawn backward by the chain f , so that the lever d^3 is free and permits the shaft d^5 to be rotated and the pawl d^4 to be projected into the passage a' by means of the
95 spring d^7 and lever d^8 , as before described. The hook d^2 is again lowered in the passage a' and engages the pawl d^4 , the chain d passing through said passage a' and resting loosely
100 upon the top of the load. The rope D' is now operated and raises the clam-shells, with their load, upward. When the shells have been
105 swung to the desired dumping-point, the trip-levers c^9 are engaged by any suitable projection above the dump and disengage the pawl c^4 from the rack c^3 , as before described, and thus permit the drum to rotate and the shells
110 to open by the weight of the load within them. As the shells open the drum is of course rotated by the unwinding of the chains c^2 and the chain d is again wound upon the drum, and the apparatus is again ready for the
115 above-described operation.

One important feature of the present invention is that the shells are closed and the whole
120 apparatus lifted and carried by the one operating-rope from engine to sheave. This is not ordinarily the case, and two or more ropes are usually employed to effect the several operations.

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

1. The combination with a suitable frame, of clam-shells pivoted therein, a relatively-fixed drum rigidly mounted on a shaft journaled in said frame, a single operating-chain
130 adapted to be wound upon said drum and connected to the hoisting-rope, means for connecting the hoisting-rope to the frame independent of the operating-chain, chains adapted to be wound about said shaft and

connected directly to links pivoted on the shells whereby said shells are opened or closed according to the direction of rotation of said shaft, substantially as described.

5 2. The combination with a suitable frame, of clam-shells pivoted thereon, a relatively-fixed drum rotatably mounted in said frame, an operating-chain adapted to be wound about said drum, a hoisting-hook connected to said
10 chain, a pawl pivoted in said frame and adapted to engage said hook, devices for locking said pawl in or out of operative position according to the position of the shells, and means for connecting said drum with the
15 clam-shells whereby the latter are opened or closed by the rotation of the same, substantially as described.

3. The combination with a suitable frame, of clam-shells pivoted thereon, a fixed rotatable drum mounted in said frame, a pawl for engaging said drum, an operating-chain about said drum, a hoisting-hook connected to said chain, a pawl pivoted in said frame and adapted to engage said hook, means connect-
25 ing said latter pawl with one of the shells whereby when the shell is open the pawl is drawn out of the path of the hook, and devices for connecting said drum with the clam-shells whereby the latter are closed by the
30 rotation of the same, substantially as described.

4. The combination with a suitable frame, of clam-shells pivoted thereon, a fixed rotatable drum mounted in said frame, a pawl
35 engaging said drum, an operating-chain adapted to be wound about said drum and connected to the hoisting-rope, means connecting said drum with the clam-shells whereby the latter are allowed to open when the
40 drum is free to rotate, and a trip-lever connected to the pawl and adapted to disengage the latter from the drum to permit of its rotation, substantially as described.

5. The combination of a suitable frame, of
45 clam-shells pivoted thereon, a fixed rotatable

drum mounted on a shaft journaled in said frame and extending beyond the drum at each end, a pawl engaging said drum, chains connected to the said shells and said extended ends of the shaft, an operating-chain adapted
50 to be wound about said drum and connected to a hoisting-chain, and a trip-lever for disengaging the pawl from the drum, substantially as described.

6. The combination with a suitable frame, 55 of clam-shells pivoted thereon, a fixed rotatable drum mounted in said frame, a pawl engaging said drum, devices connecting said drum with the shells whereby the latter are allowed to open or are drawn together by the
60 action of said drum, a chain adapted to be wound about said drum, a hoisting-hook connected to said chain, a pawl mounted in the frame and adapted to engage said hook, and a trip-lever connected to the pawl engaging
65 the drum for throwing said pawl out of engagement with the drum, substantially as described.

7. The combination with a suitable frame, of clam-shells pivoted thereon, a fixed rota- 70 table drum mounted in said frame an operating-chain adapted to be wound about said drum, a hoisting-hook provided with a lateral projection above its hook portion and connected to said chain, a spring-pressed pawl
75 in said frame and adapted to engage said hook and be pressed out of engaging position with the hook by the projection upon the same, means for holding said pawl out of the engaging position, and means for connecting
80 the drum with the shells whereby the latter are permitted to open or are drawn together by the operation of the former, substantially as described.

In testimony whereof I hereunto affix my 85 signature in presence of two witnesses.

CHARLES P. DOLE.

Witnesses:

JAMES T. WATSON,
JOHN H. BRIGHAM.