E. L. BURWELL.

MEANS FOR TRANSPORTING VESSELS.

APPLICATION FILED JAN. 31, 1906.

901.589. **Patented Oct. 20, 1908.**

4 SHEETS—SHEET 1.

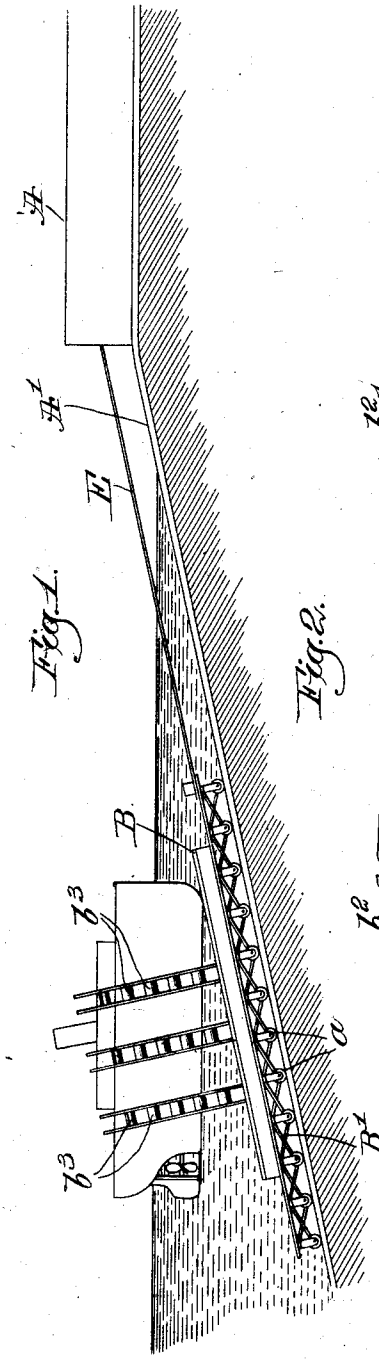


Fig. 1.

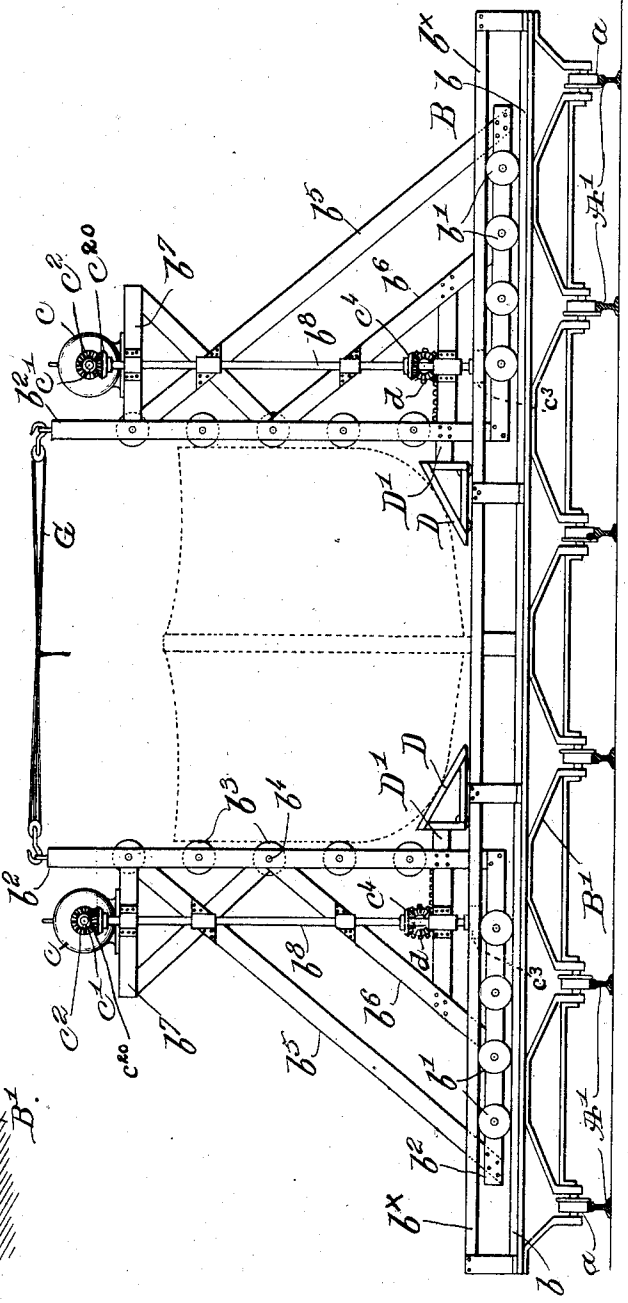


Fig. 2.

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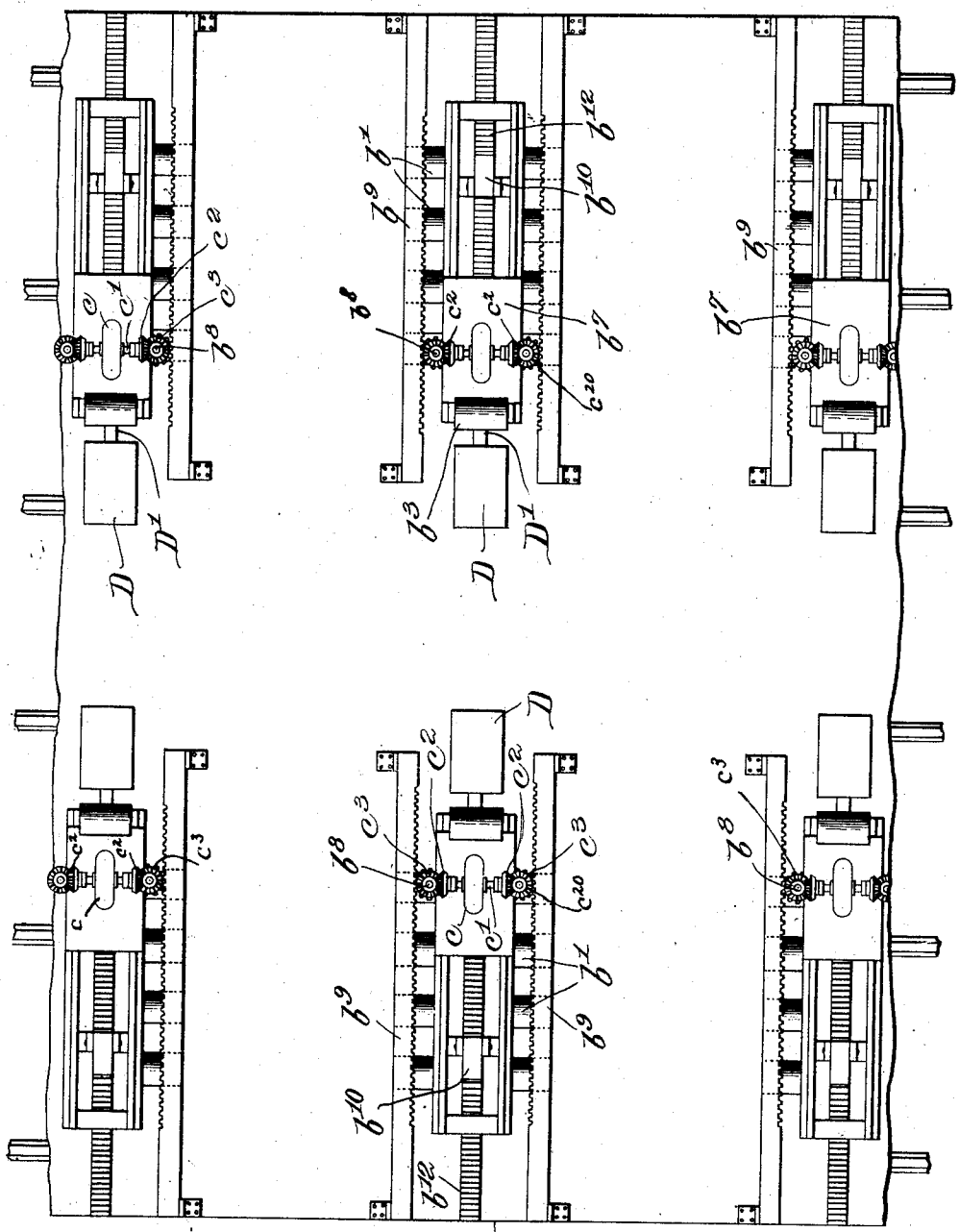
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4 SHEETS—SHEET 2.



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Fig. 2a.

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4 SHEETS—SHEET 3.

Fig. 3.

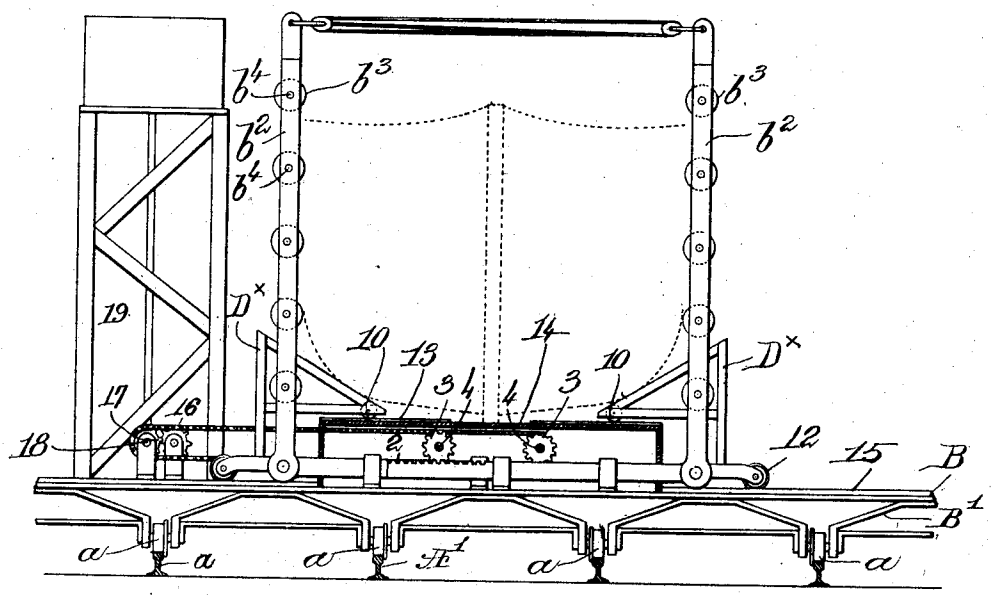
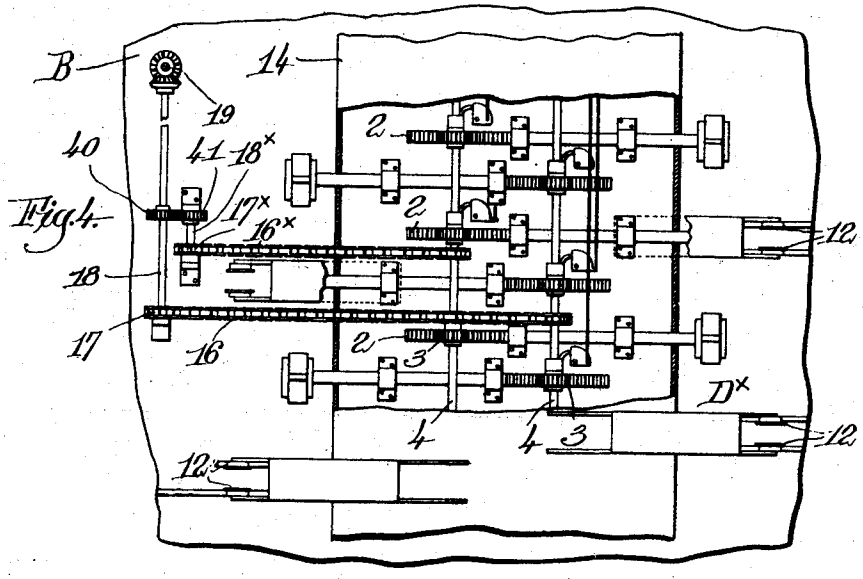


Fig. 4.



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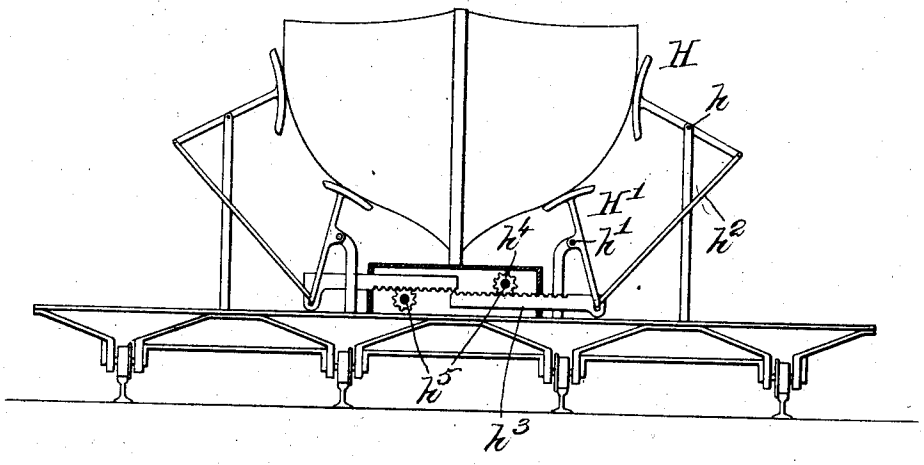
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4 SHEETS—SHEET 4.

Fig. 5.



Witnesses.
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UNITED STATES PATENT OFFICE.

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MEANS FOR TRANSPORTING VESSELS.

No. 901,589. Specification of Letters Patent. Patented Oct. 20, 1908.

Application filed January 31, 1906. Serial No. 298,767.

To all whom it may concern:

Be it known that I, EDWARD L. BURWELL, a citizen of the United States, and resident of Chelsea, county of Suffolk, State of Massachusetts, have invented an Improvement in Means for Transporting Vessels, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawings representing like parts.

This invention has for its object the production of means whereby a vessel or any floating object may be taken from a body of water at one point and be transported to a body of water at any other point, however distant.

My invention may be utilized in transporting ships or vessels of any size overland from one to another point in a cradle, as I shall designate as a whole the means employed to sustain the ship or vessel out of water in its transits from one to another point. The cradle will travel on wheels sustained on a plurality of tracks laid after the manner of land tracks in any usual railway construction.

The cradle referred to may be made to enter the water at one point, receive upon it the ship or vessel, be moved to remove the vessel from the water, travel over rails to any desired point, and then again enter the water that the ship or vessel thereon may be floated off, and the cradle may remain in the second body of water until, for instance, another vessel has been deposited upon it to be transported in the opposite direction.

The cradle in accordance with my invention is provided with a series of supports independently sustained on the base of the cradle on which the bottom of the vessel rests, and these supports are made movable inwardly to contact with the opposite sides of the vessel whatever the beam of the same, and whatever its model or outline from stem to stern, it being understood that vessels vary in breadth of beam and shape of outline, and these supports are necessary chiefly to contact with the contour of the vessel where her lines are straightest, although I may use supports extending more or less about the bow stem or under body if necessity requires, said supports being adjustable in order that they may be made to contact with any line of the vessel.

The cradle for the best and strongest construction may be composed of steel T or I-beams, and the points of the supports to contact with the outer walls of the vessel will be shielded with any non-metallic material to avoid abrasion, and these surfaces will preferably be rotatably mounted on the upright portions of the supports, so that as the vessel settles, the portions of the supports in contact with the vessel will move in unison therewith.

I have provided means by which these supports may be moved out and in by suitable motor driven mechanism, although my invention is not in all cases to be limited to so moving the supports, as part of the movement might be effected by manual power or otherwise, and not depart from my invention.

The supports may be mounted on rollers to obviate friction and enable them to be moved more readily, and the supports will be readily moved while the base of the cradle is under water, the power being applied from suitable engines or other motive force arranged out of the water or on shore.

I believe I am the first to provide a cradle to receive the bottom of a ship, the cradle having laterally movable supports extending upwardly to contact with the sides of the ship, the supports being movable while the cradle is submerged, and I desire to claim my invention broadly irrespective of the particular construction of supports or actuating means therefor.

Figure 1 is a view showing a vessel in a body of water with my novel cradle run into the water below the vessel; Fig. 2 is a detail looking at the end of the cradle, the supports being shown in contact with the sides of the vessel, the latter being represented in dotted outline; Fig. 2^a is a detail showing several of the supports and their actuating means; Fig. 3 shows a modified form of cradle; Fig. 4 is a detail in plan view of part of the cradle Fig. 3 with the ship removed, with the ropes and tackle-blocks connecting the upper ends of the support omitted, and Fig. 5 is yet another modification of my invention showing a different form of support.

Referring to Fig. 1, A may be supposed to represent a land station or suitable power-house, A′ suitable rails, shown in Fig. 2 as six in number, on which run the wheels *a* made preferably as usual car wheels.

The cradle comprises a base B to the under

side of which as represented is connected suitable metal frames or trusses B′ having bearings for sustaining the journals of the wheels *a*.

The base B of the cradle, see Fig. 2 on the larger scale, has a series of tracks *b* that sustain at each side of the base a plurality of wheels *b′*, suitably mounted in the lower ends of the supports b^2 contacting with the vessel's side, or any portion of its exterior, whatever the shape of the vessel.

The supports shown in Figs. 1 and 2 are represented as substantially vertical, and each support has a plurality of contacts b^3 preferably presenting at their surfaces non-metallic material and preferably made as rollers sustained on pivots b^4, so that said contacts may rotate as the vessel settles between the supports which have been brought up in contact, as will be described, with the sides of the vessel.

It will be obvious that as the cradle is moved to the right, Fig. 1, from its position therein shown, after the bow of the vessel has been grounded thereon, the bottom of the vessel must gradually assume the inclination of the top of the base B, and in so doing, as the cradle is moved gradually out of the water toward the shore, the vessel must descend, and its sides will travel over the contacts.

The supports are represented in Fig. 2 as having a series of braces b^5, b^6, and the braces and the supports maintain, as shown in said figure, platforms b^7 on which may be mounted any power-mechanism of whatever construction desired to rotate the upright shafts b^8 that are employed to move the feet of the supports toward and from the exterior of the vessel.

The shafts b^8, as best represented in Fig. 2^a, have at their lower ends pinions c^3 that engage teeth of stationary racks b^9, there being two such racks for each support, so that the rotation of the pinions of the shafts in engagement with the stationary racks, causes the supports to be moved in a right line in one or the other direction according to the direction of rotation of the shafts b^8.

The foot of each support will in practice be provided with a pivoted dog b^{10} that will click into teeth of a rack b^{12} fixed on the top of the base B.

As shown in Figs. 2 and 2^a, *c* represents a type of motor driven in any suitable way and turning a shaft *c′* having at its end bevel gears c^2 that engage bevel gears c^{20} on the upright shafts b^8 to turn said shafts.

Each upright shaft b^8 has a second bevel pinion c^4 loosely splined thereon, so that it may be slid upwardly on said shaft when it is not desired that said pinion be operative.

Referring to Fig. 2, I have represented two chocks, it being supposed that there are a series of them more or less in number according to the length of the vessel, each chock having extended from it a tail-piece D′ suitably racked to be engaged by the teeth of a pinion *d* having a series of connected bevel teeth, the said bevel teeth being adapted to be engaged when desired by the bevel teeth of the pinion c^4, the latter being thrown into operative engagement whenever it is desired to operate the chocks.

It will be understood that the supports and chocks may be moved toward and from the vessel's exterior when the base of the cradle and said supports are submerged, the chocks acting against the bottom.

The cradle is shown as having a connected cable E that may be controlled by a revolving winch or any other usual actuating means, there being it will be understood a cable or winch for each pair of tracks, the power required being more or less according to the weight of the vessel and her cargo.

It will be understood when the cradle with a ship or vessel has been pulled out of the water, that the cradle with its load may be made to travel over tracks which lead from the place where the vessel was taken out of the water to any other body of water into which the vessel is to be discharged, and the motive power or means for causing the movement of the cradle over the tracks may be of any nature known to engineering.

The supports after the vessel has settled between the same on the base of the cradle may, through tackle G, represented in Fig. 2, and connected with opposite supports, be hauled by the sailors and made fast, thus trussing the vessel and more snugly maintaining the same between the supports.

The wheels *b′* of the supports are prevented from leaving the tracks *b* by means of top bars $b^\times$, which come close to but are maintained out of contact with the wheels, said top bars $b^\times$ preventing any upward or backward tipping over of the supports when the pressure of the vessel comes against the same.

In the modification Fig. 3, the uprights are extended upwardly from the bars having rack-teeth 2 at their upper side, which are engaged by pinions 3 on shafts 4 driven by any suitable gear. These pinions may be mounted loosely on the shafts and have co-acting with them suitable clutches whereby the pinions may be made fast on the shafts to be rotated thereby as it may be desired to move one or another of the supports in or out.

The lower portions of the supports in Fig. 3 are free to slide through suitable stands mounted on the base of the cradle and these stands may contain anti-friction devices to prevent friction of the horizontal parts of the supports in their out and in movement.

The crocks $D^\times$ shown in Fig. 3 have anti-friction rollers 10, 12, those 10 running on

tracks 13 mounted on the top 14 of the base while the other rollers 12 run on tracks 15 at a lower lever of the base.

The shafts 4 and pinions 3 are represented in Figs. 3 and 4 as being rotated by or through sprocket chains 16, $16^{\times}$ deriving their motion, but in opposite direction, from sprocket wheel 17, $17^{\times}$ on shaft 18, $18^{\times}$, shaft 18 deriving its movement from shafts 19 corresponding substantially with the shafts b^{8}, Fig. 2, rotated in any usual manner, or as provided for with relation to Figs. 2 and 2^{a}. The shaft $18^{\times}$ is rotated from shaft 18 through two pinions 40 and 41, Fig. 4.

In the modification Fig. 5, the supports H, H′ are represented as curved surfaces carried by levers mounted on fulcra at h, h' and preferably adjustable on said fulcra, so that the acting ends or contact points of the portions H, H′ of the supports may be thrust in or out according to the particular configuration of the vessel in cross-section.

The opposite ends of the levers carrying the contacts H and H′ are shown as connected by a link h^{2}, which in practice will be so constructed that the point of connection of said link with said arms may be adjusted according to the extent of movement desired to give the contacts, that they may be brought snugly against the sides of the vessel. These contacts will be covered with non-metallic material as provided for the contacts in Fig. 2.

The contacts H and H′ derive their movement through rack bars h^{3}, that may be moved out or in through pinions h^{4} on shafts h^{5} which shafts may be substantially the same as shafts 4 in Figs. 3 and 4, and said shafts may derive their rotation as provided for in reference to said figures or in any other usual or suitable manner.

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

1. In an apparatus of the class described, a cradle having slidably sustained supports extending above the ground, means for moving said supports toward and from the vessel to maintain the vessel upright in said cradle, and means operated by tackle for confining said supports in position in contact with the sides of the vessel.

2. In apparatus of the class described, a cradle having slidably sustained supports extended above the gunwale, and means for moving said supports toward and from the vessel to maintain the vessel upright in said cradle.

3. In apparatus of the class described, a cradle comprising a base having three or more longitudinal series of wheels to run on tracks, and metallic slidable supports extended upwardly above the water line, and contacting with the sides of the vessel above its bilge, and means to move said supports automatically toward and from the vessel when the cradle is submerged.

4. In apparatus of the class described, a cradle having slidably sustained supports, and slidably sustained chocks, means for moving said supports toward and from the vessel, and means for moving said chocks under the bottom of the vessel toward and from the keel.

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

EDWARD L. BURWELL.

Witnesses:
GEO. W. GREGORY,
MARGARET A. DUNN.