

DISCHARGE DOOR OF HOPPER DREDGERS AND BARGES.

APPLICATION FILED MAY 22, 1907.

Patented Dec. 1, 1908.

6 SHEETS—SHEET 1.

905,821.



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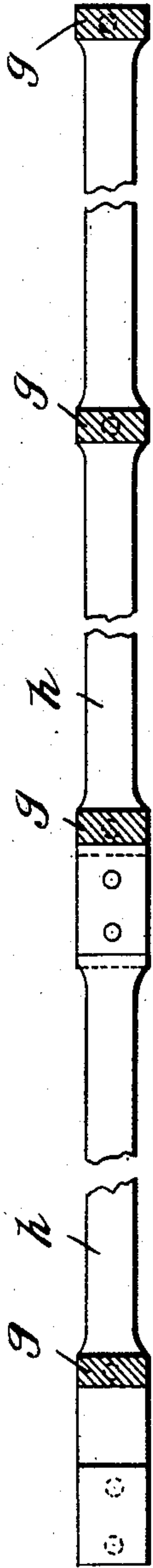


FIG. 3-

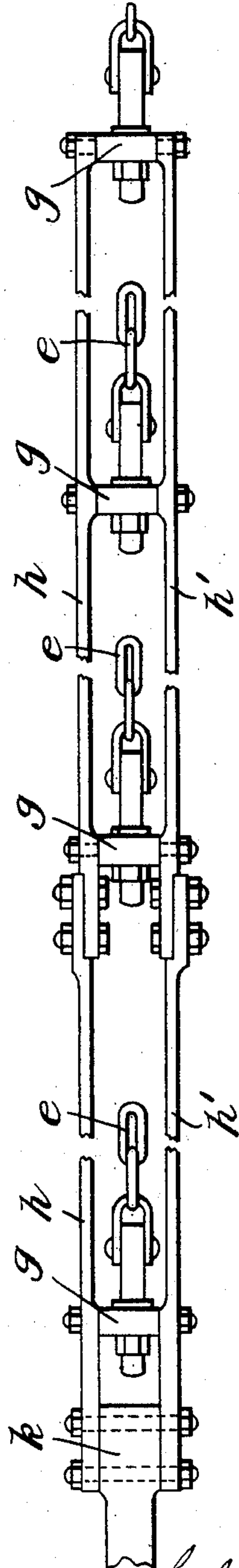


FIG. 4-

Witnesses

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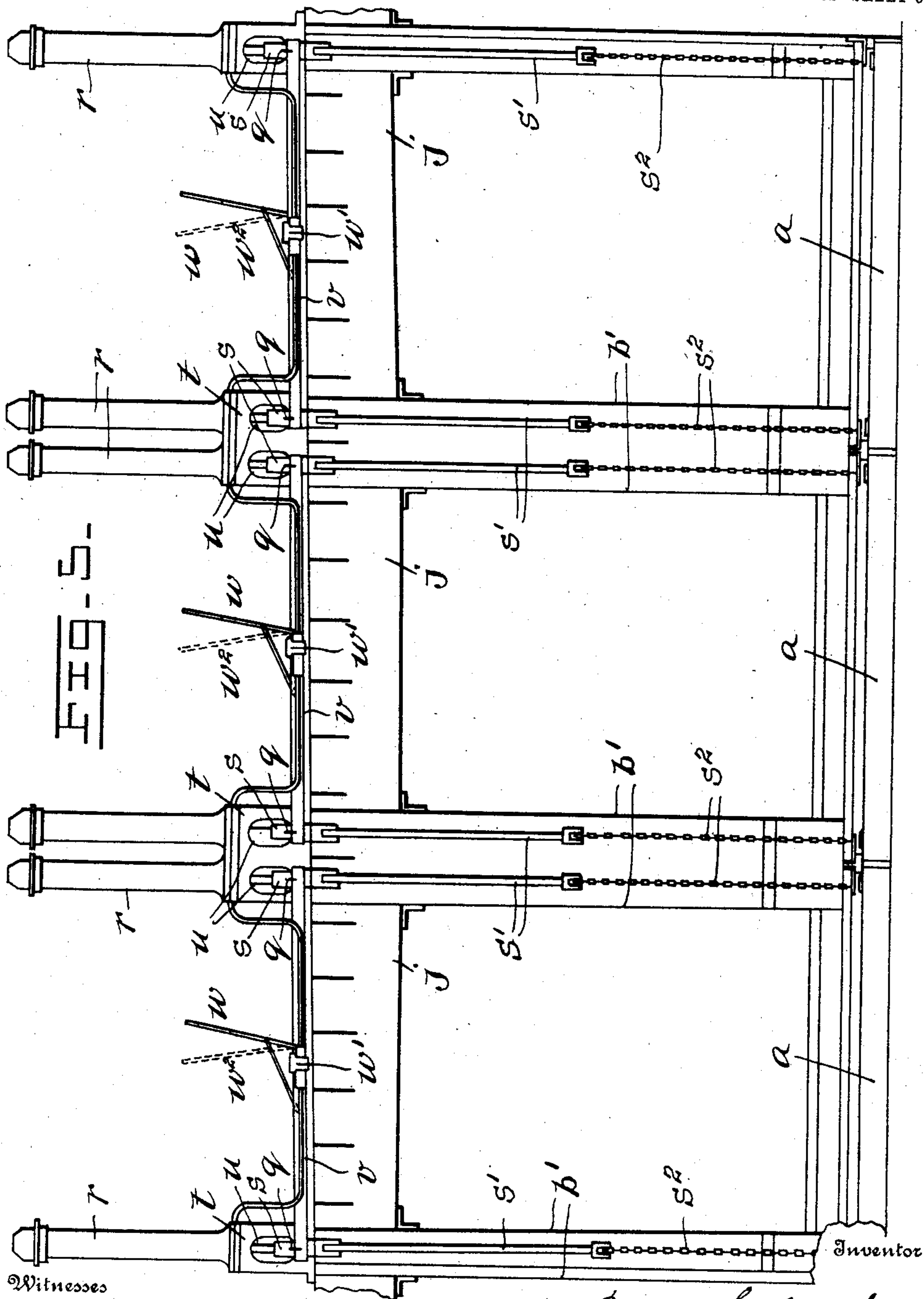
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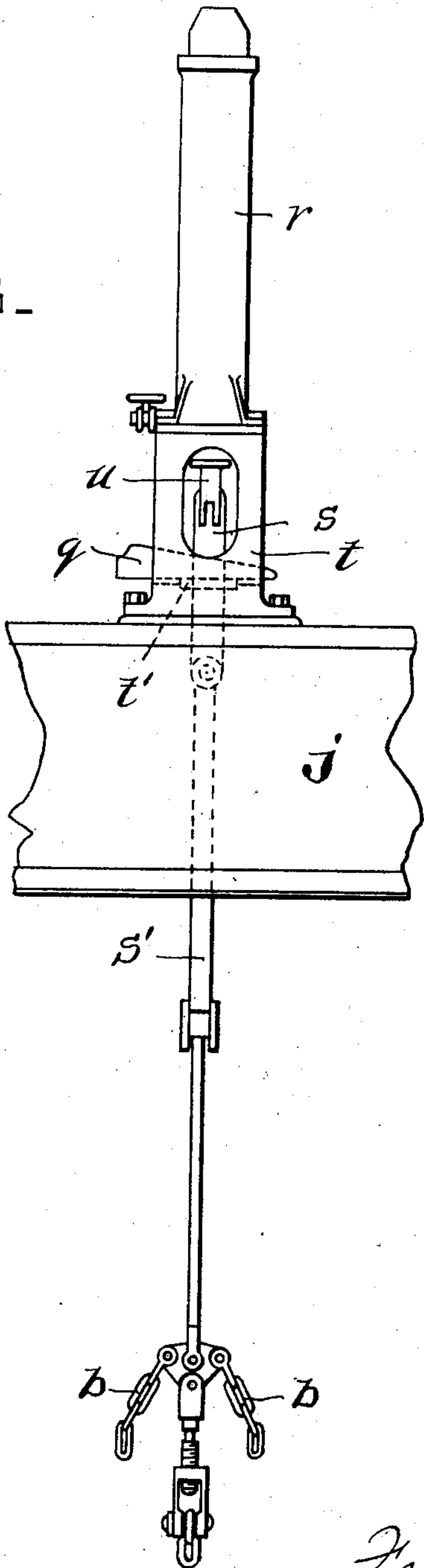
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FIG. 6.



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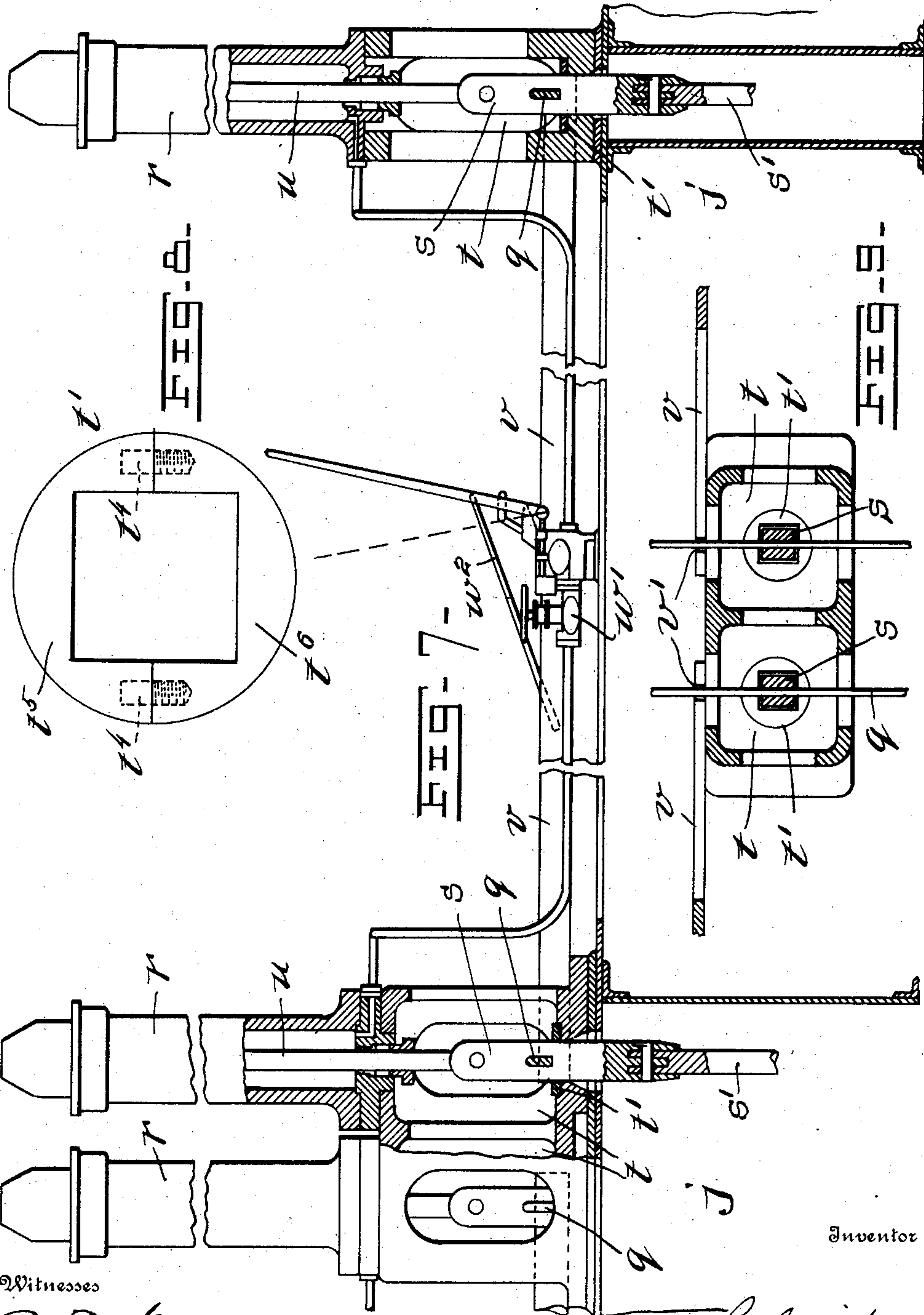
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6 SHEETS—SHEET 5.



Witnesses

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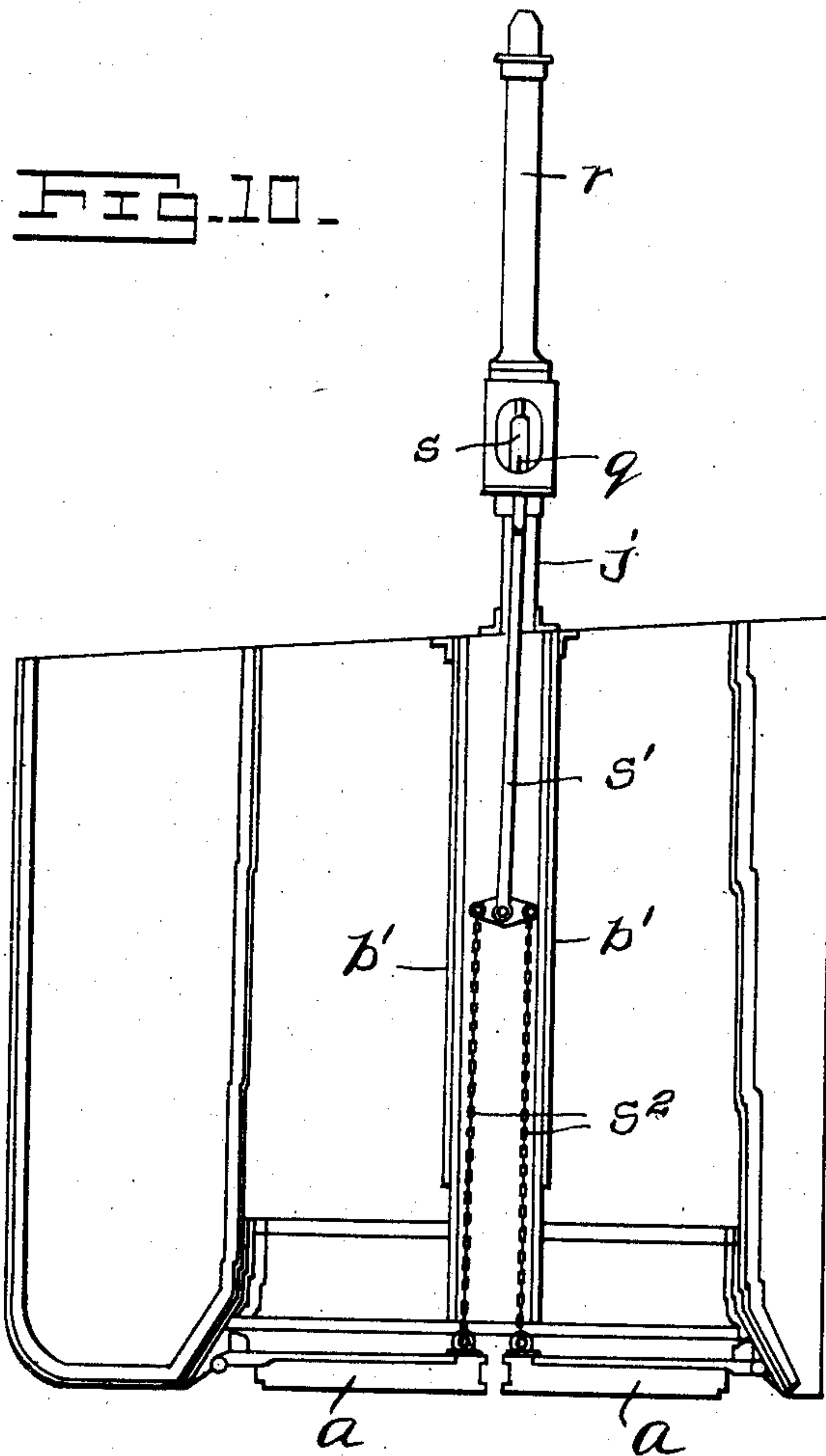
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UNITED STATES PATENT OFFICE.

FRED LOBNITZ, OF RENFREW, SCOTLAND.

DISCHARGE-DOOR OF HOPPER DREDGERS AND BARGES.

No. 905,821.

Specification of Letters Patent.

Patented Dec. 1, 1908.

Original application filed June 29, 1906, Serial No. 324,049. Divided and this application filed May 22, 1907.

Serial No. 375,102.

To all whom it may concern:

Be it known that I, FRED LOBNITZ, a subject of the King of Great Britain, residing at Clarence House, Renfrew, Scotland, engineer and shipbuilder, have invented certain new and useful Improvements in Discharge-Doors of Hopper Dredgers and Barges, of which the following is a specification.

This invention relates to hopper dredgers and barges being a division of my application filed June 29, 1906, Serial No. 324,049 and has for its object to provide improved fluid means for manipulating the discharge doors thereof.

It is very important to be able to raise and lower the discharge doors simultaneously or individually, as desired, with the minimum expenditure of time and trouble and it is equally desirable that, when the doors are closed they should be held fast without continuous strain being put on the manipulating mechanism. My invention is designed to effect this object by mechanism, actuated by means of fluid pressure, and arranged so that all the doors can be raised and lowered simultaneously, and when raised, can be held fast by simply driving a single wedge into position. Mechanism is also provided whereby a single door can be manipulated, and also held in position, by driving in wedges. The wedges take the strain off the manipulating mechanism.

On the drawings annexed:—Figure 1 represents a longitudinal section of a portion of an apparatus embodying my invention. Fig. 2 represents a plan view of the same. Figs. 3 and 4 are detail views of parts of this arrangement. Fig. 5 is a sectional elevation through a hopper, showing another method of carrying out the invention. Fig. 6 is an enlarged side view. Figs. 7, 8 and 9 are enlarged detail views. Fig. 10 shows a single fluid pressure cylinder, for operating two doors simultaneously.

On the drawings the same reference letters wherever repeated indicate the same or similar parts.

When carrying out my invention in accordance with the arrangement shown at Figs. 1 to 4, I connect the hopper doors by means of chains e passing over pulleys f . Each chain e is connected to a cross piece g , and these pieces are fitted rigidly to, and between, horizontal bars h, h^1 adapted to slide in guides, on the upper surface i of the hop-

per girder j . The bars h, h^1 are, at their front ends, connected together and to the block k , these parts being clearly indicated at Figs. 1 and 2. The block k has attached to it the piston rod x^1 , which is operated by the hydraulic cylinder x , for raising and lowering the doors simultaneously. When the doors are closed the block k , and consequently the bars h, h^1 , is held in position by a single wedge q which is driven through the holes q^1 in the housing r^1 , and through a hole in the block. With this arrangement the advantage is, that there is but a single wedge for holding all the doors, and that the hydraulic mechanism and this wedge can be attended to by one man on the spot.

The usual lifting chains b are carried up through hollow or tubular trunks, such trunks are shown at b^1 (Fig. 5) suitably secured in the hopper. In this figure the chains are marked s^2 .

Sometimes, besides having the chains at the end of each door, it is often necessary that the doors should be operated separately. This entails the delicate operation of lowering two chains simultaneously, and at the same speed. To enable this to be done, I provide an arrangement such as shown at Figs. 5, 6, 7, 8, 9 and 10. Hydraulic cylinders r are mounted on the hopper girder j and vertically over the doors, each with its own wedge q . Each door is separate from its neighbor, but if one of its chains s^2 were let go, without the other, while the door was carrying its load, the door would likely be twisted and injured. To prevent such an occurrence, I provide the head or link s of each rod s^1 (attached to its door chain s^2) with a hole for the reception of a wedge q which passes through openings in the hollow base piece t of the hydraulic cylinder and rests on a washer t^1 , inserted in a recess in the base piece, as clearly shown in vertical section at Fig. 7 and in plan at Figs. 8 and 9. The head s , is connected to the piston rod u , of the hydraulic cylinder. Extending from one cylinder to the other of the pair, for each door, is a bar v which is notched at each end at v^1 , Fig. 9, and this bar, which is slidably arranged, is adapted to be moved by means of the lever w , for operating the valve w^1 for supplying and exhausting fluid from the pair of cylinders, which latter are arranged to act simultaneously. The lever of the valve is connected by a link w^2 to the

bar. Now, when the wedges q , q , of each pair of cylinders are inserted in place so as to hold the doors closed, then they engage with the notches v^1 , in the bar, with the result that the latter cannot be moved without first knocking out both wedges. This prevents the possibility of a careless person first knocking out one wedge, and then lowering the door at one side only. Both wedges must be knocked out before the controlling lever w can be operated, and when it is operated, both chains are lowered simultaneously. Likewise, when raising or closing the door, both chains are operated simultaneously, through the manipulation of the lever w and, when the valve is shut by this lever, the bar v is in such a position, that the wedges can be inserted in place.

If preferred I may arrange, as shown at Figs. 6 and 10 a single vertical hydraulic cylinder above each pair of doors, so as to operate the same. In this case, the cylinder would have the wedge adjustment as shown at q , the wedge bearing on a washer t^1 fitted in the base piece t . When the wedge is removed, the hydraulic piston can be operated so as to manipulate its doors.

The hard metal washer t^1 against which the wedge q bears, is, as shown at Fig. 8 made in two parts t^5 , t^6 , which are connected together by studs or pins t^4 . The washer can be readily taken apart and removed, so as to pack it up underneath, in order to provide adjustment for the wear of the chains.

Of course, instead of using hydraulic cylinders for operating the doors, I can use cylinders in which the pistons, or rams, are operated by other suitable non-elastic fluids. Thus, in cold climates, I might use oil instead of water for this purpose.

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

1. In hopper dredgers and barges, the combination of a plurality of doors with fluid means for raising and lowering each door, and a wedge for locking all the doors in closed position.

2. In hopper dredgers and barges the combination with the doors thereof, of slide bars, means connecting the doors to the slide bars, guides for the bars, a block connected to said bars, a guide for the block, fluid means for operating the block and a wedge for holding the block fast.

3. In hopper dredgers and barges the combination with the doors thereof, of slide bars, means connecting the doors to the slide bars, guides for the bars, a block connected to said

bars, a guide for the block, a hydraulic cylinder for operating the block, and a wedge for holding the block fast.

4. In hopper dredgers and barges the combination with each door thereof, of chains arranged one at each side of the door, blocks connected to the chains, fluid pressure cylinders for actuating the blocks, wedges for holding the blocks in position, means adapted to be locked by said wedges, said means being operated simultaneously with the manipulation of the fluid supply valve for the cylinders.

5. In hopper dredgers and barges the combination with each door thereof, of chains arranged one at each side of the door, blocks connected to the chains, fluid pressure cylinders for actuating the blocks, wedges for holding the blocks in position, a bar adapted to be locked by said wedges and means for operating the bar.

6. In hopper dredgers and barges the combination with each door thereof, of chains arranged one at each side of the door, blocks connected to the chains, fluid pressure cylinders for actuating the blocks, wedges for holding the blocks in position, a sliding bar adapted to be locked by said wedges, means connecting the bar with the fluid supply valve of the cylinder, and means for operating both the bar and valve simultaneously.

7. In hopper dredgers and barges the combination with each door thereof, of chains arranged one at each side of the door, blocks connected to the chains, fluid pressure cylinders for actuating the blocks, wedges for holding the blocks in position, a slide bar, a link connected to said bar, a fluid supply valve for the cylinders, and a lever for operating both the valve and the link.

8. In a device of the character described, a dredge, a plurality of doors hinged to the bottom thereof, a chain secured to each door, a block common to each of said chains, a hydraulic operated piston connected to said block, and means to lock said block to hold all of the doors in closed position.

9. In hopper dredgers and barges, the combination of a plurality of doors with fluid means for raising and lowering each door, and means for simultaneously locking all the doors in position.

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

FRED LOBNITZ.

Witnesses:

JAMES R. WOOD,
JAMES TYRE.