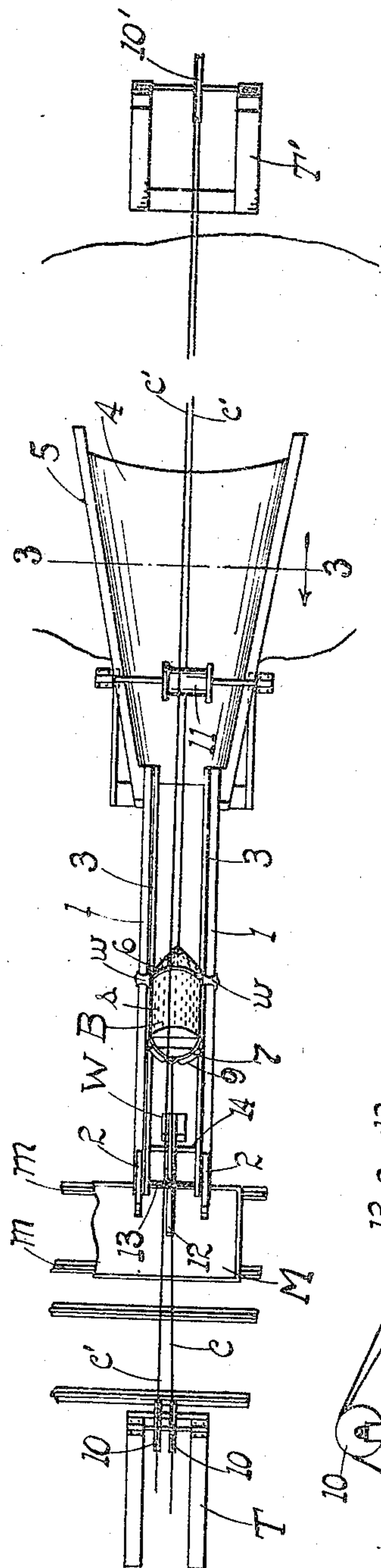


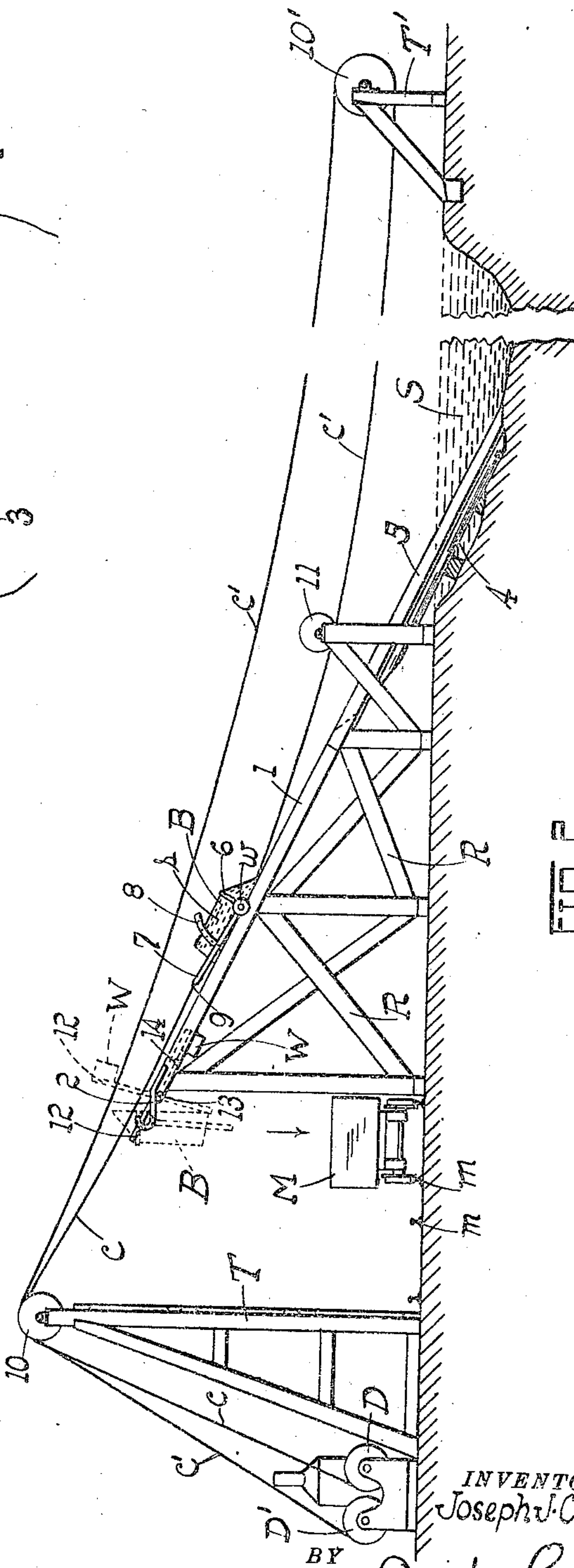
963,034.

3 SHEETS--SHEET 1.

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DREDGING APPARATUS.
APPLICATION FILED APR. 7, 1910.

963,034.

Patented July 5, 1910.

3 SHEETS—SHEET 2.

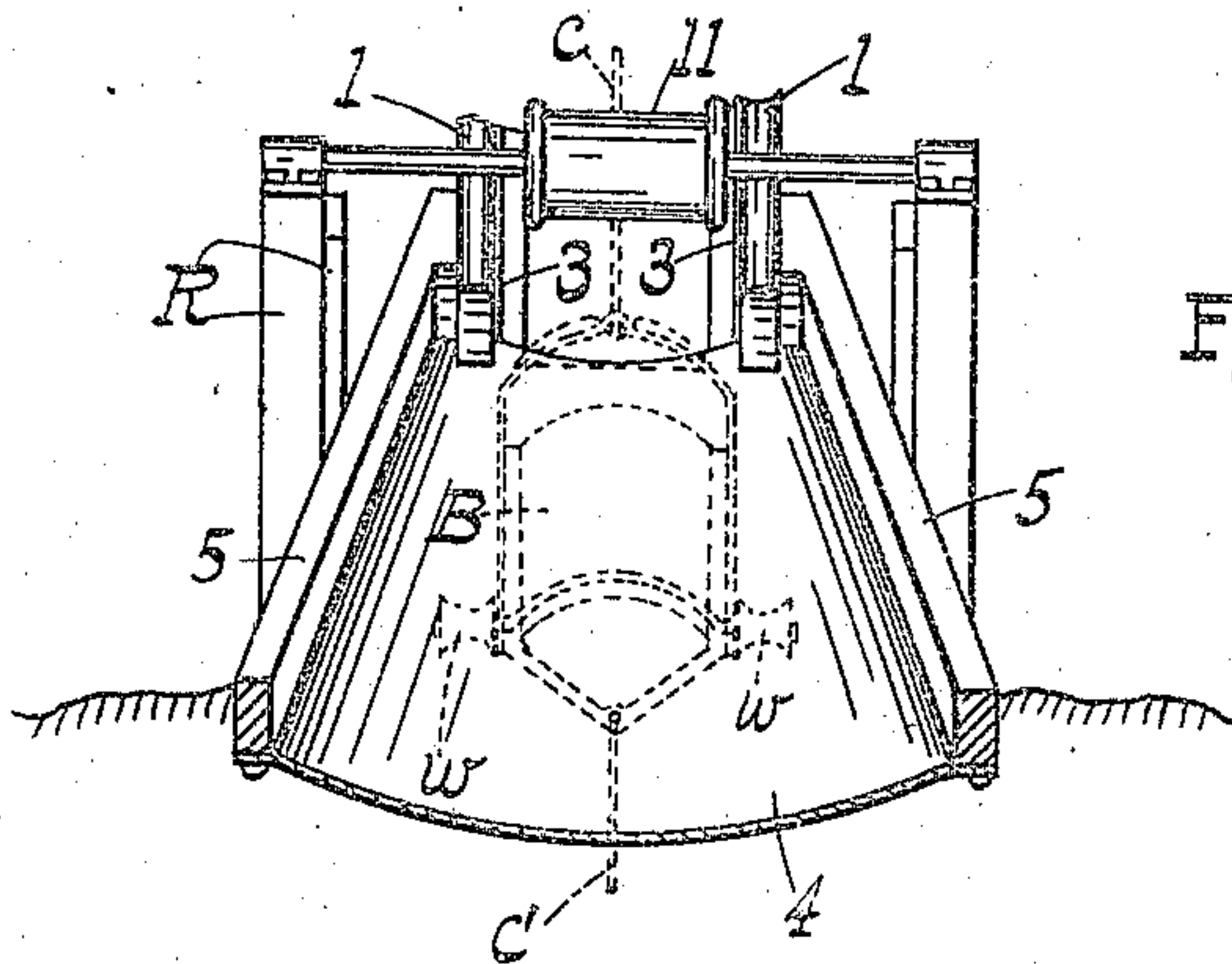


FIG. 3.

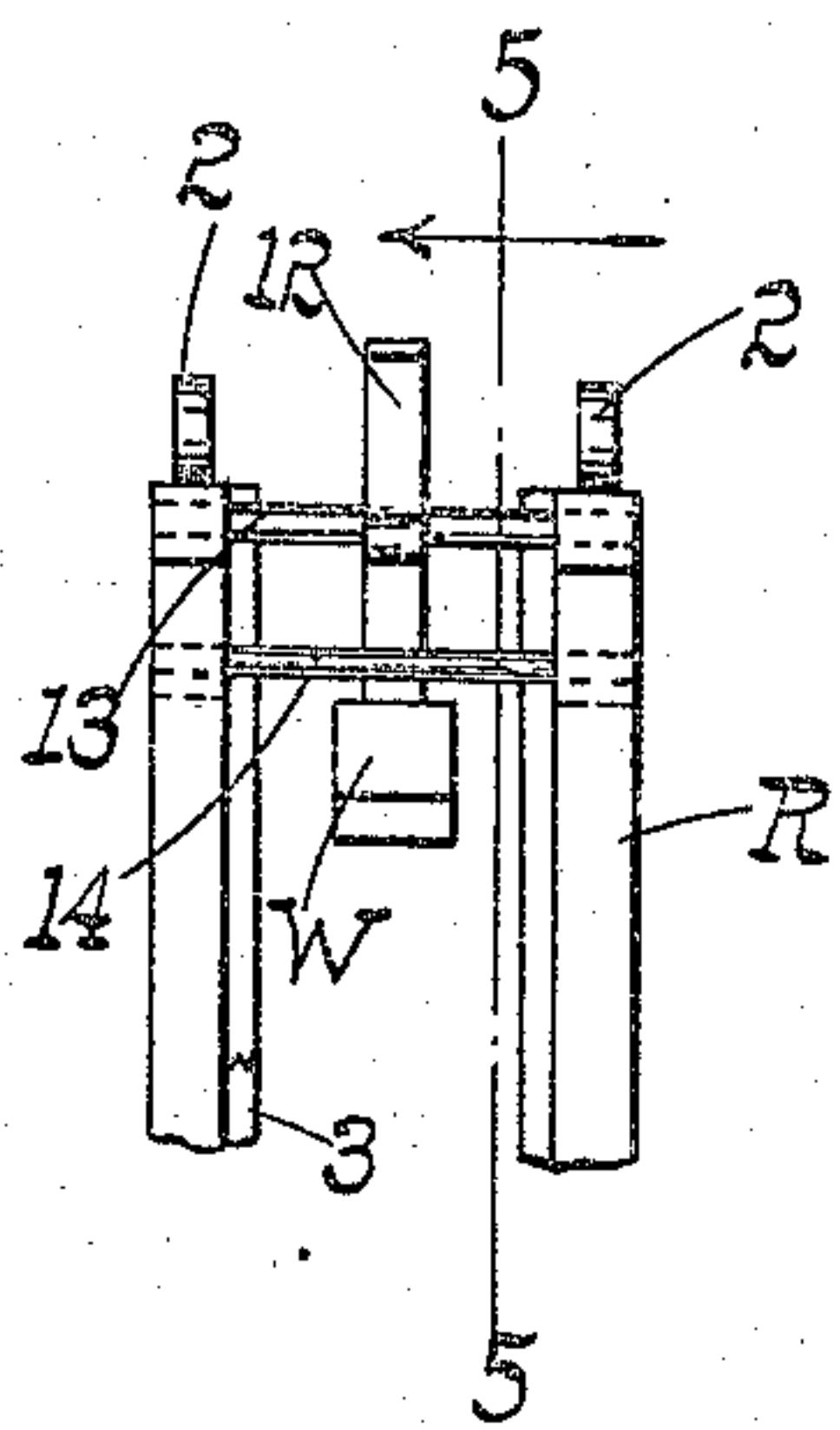


FIG. 4.

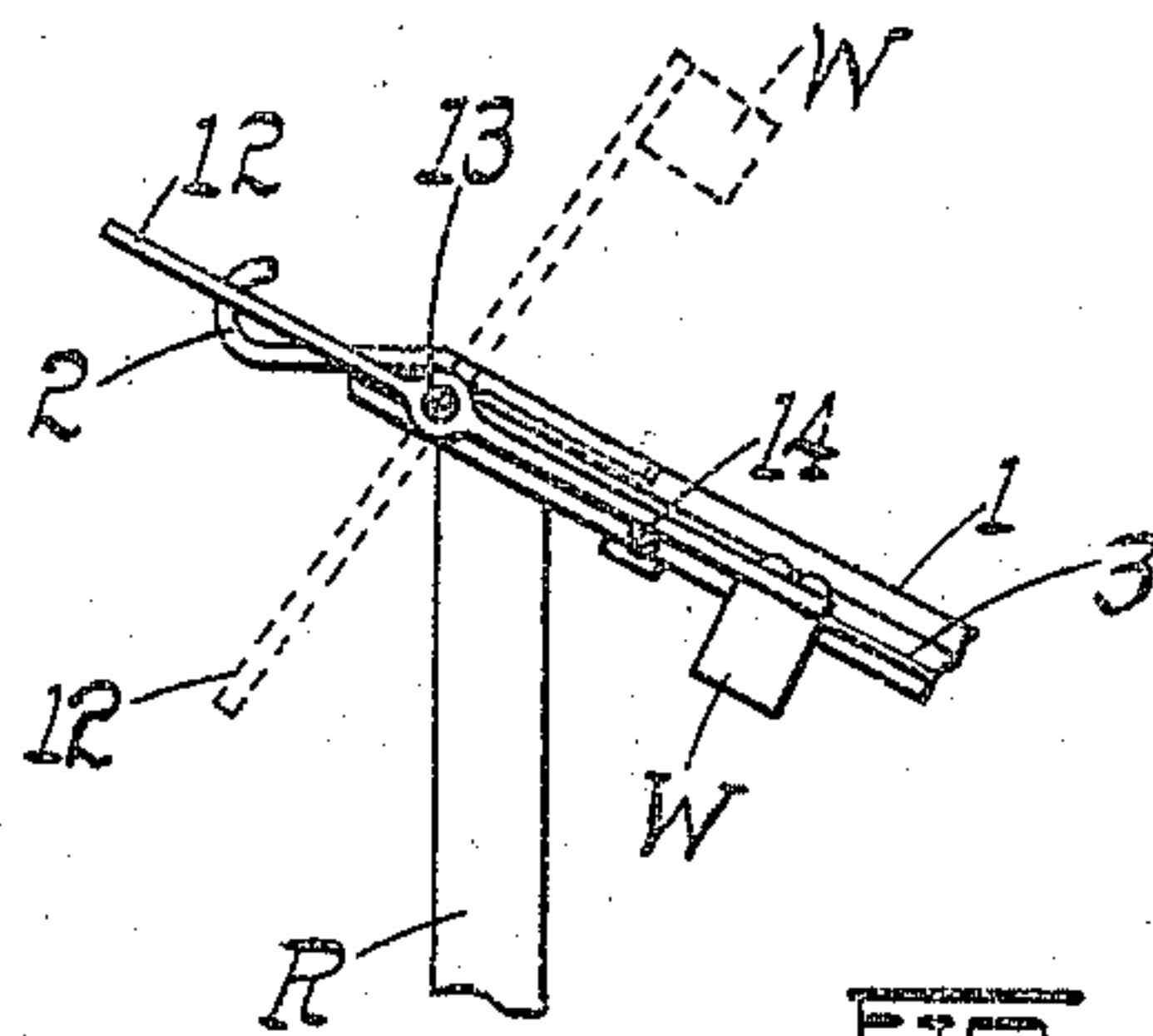


FIG. 5.

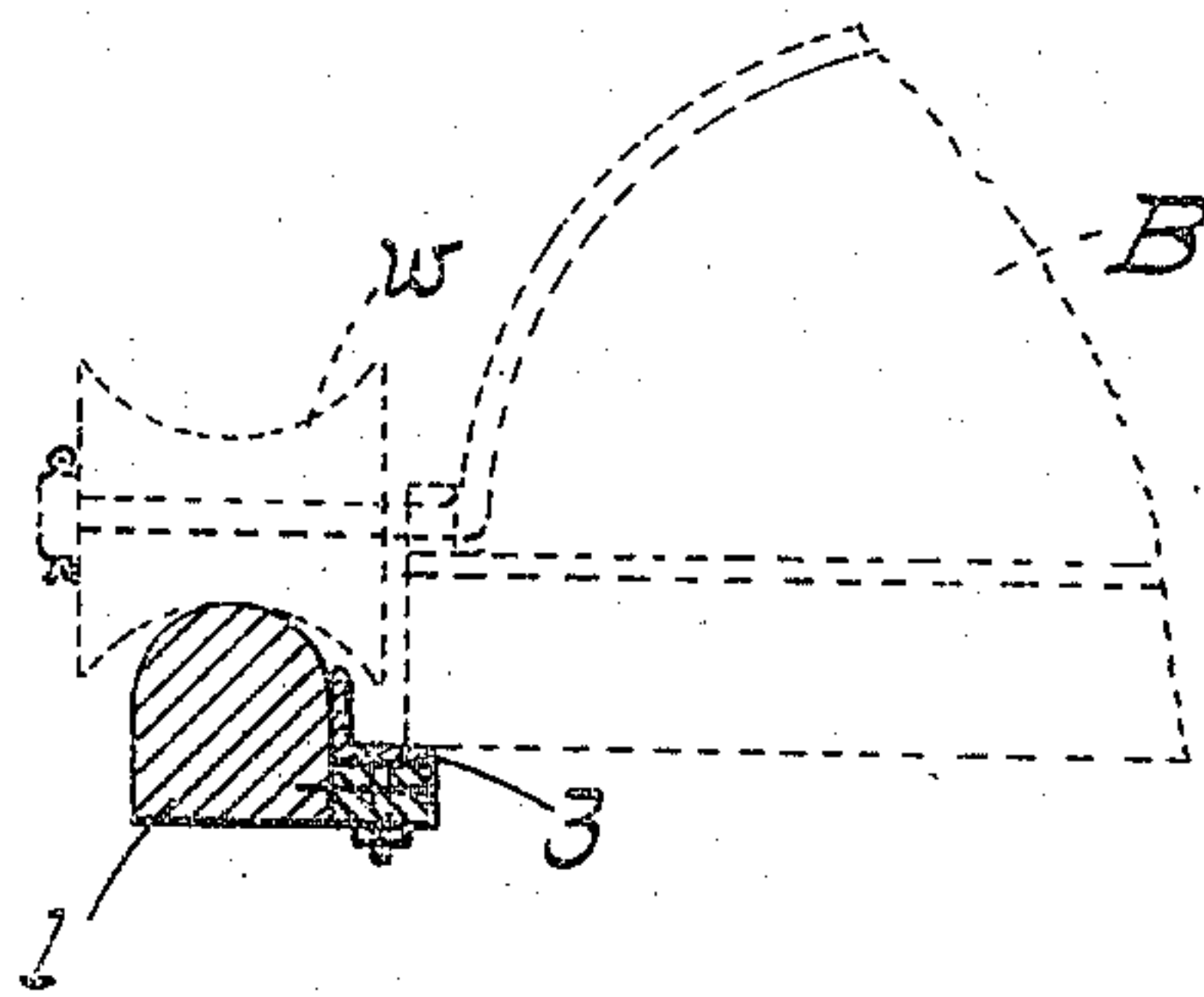


FIG. 6.

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Patented July 5, 1910.

3 SHEETS—SHEET 3.

FIG. 7.

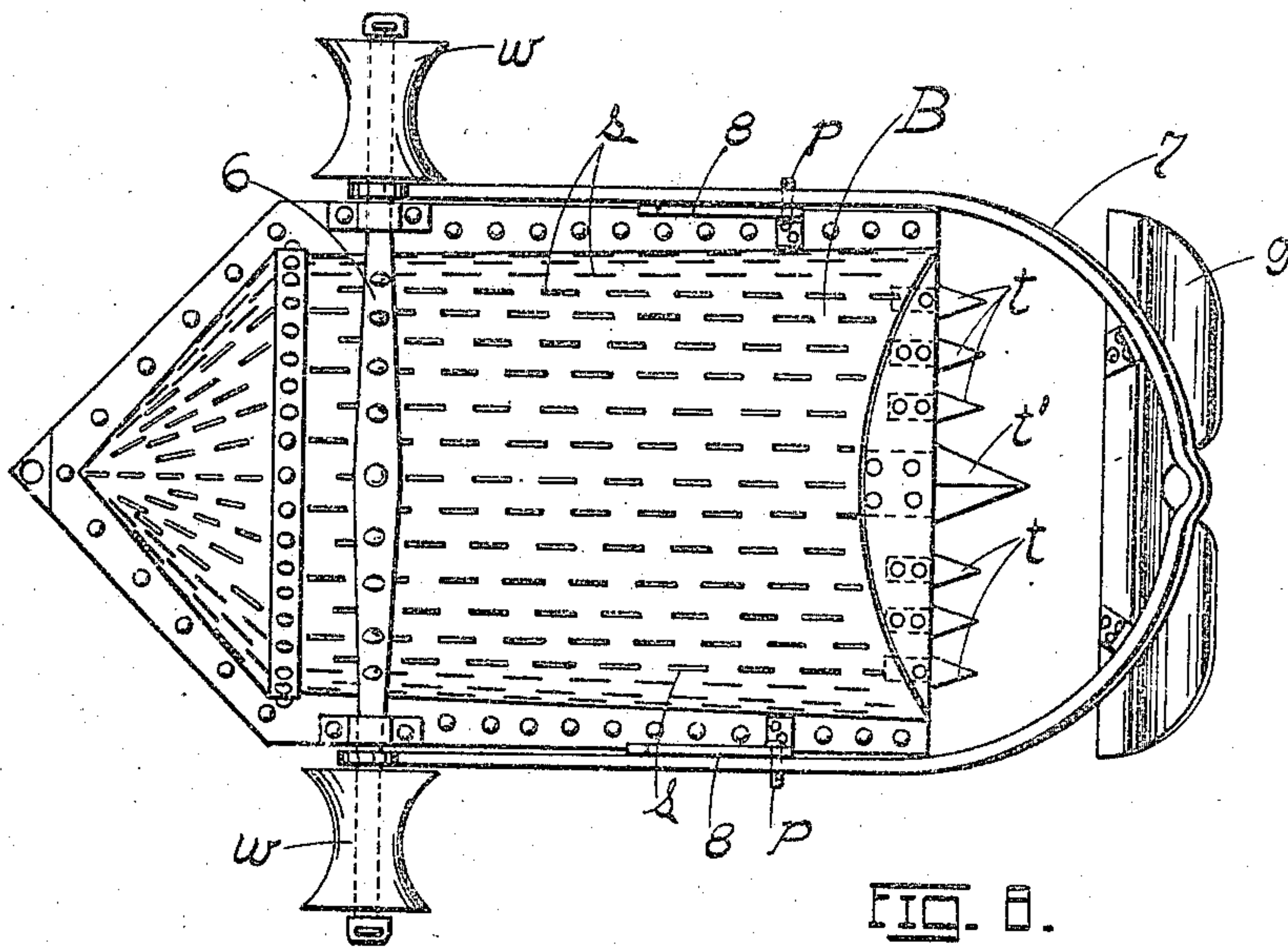
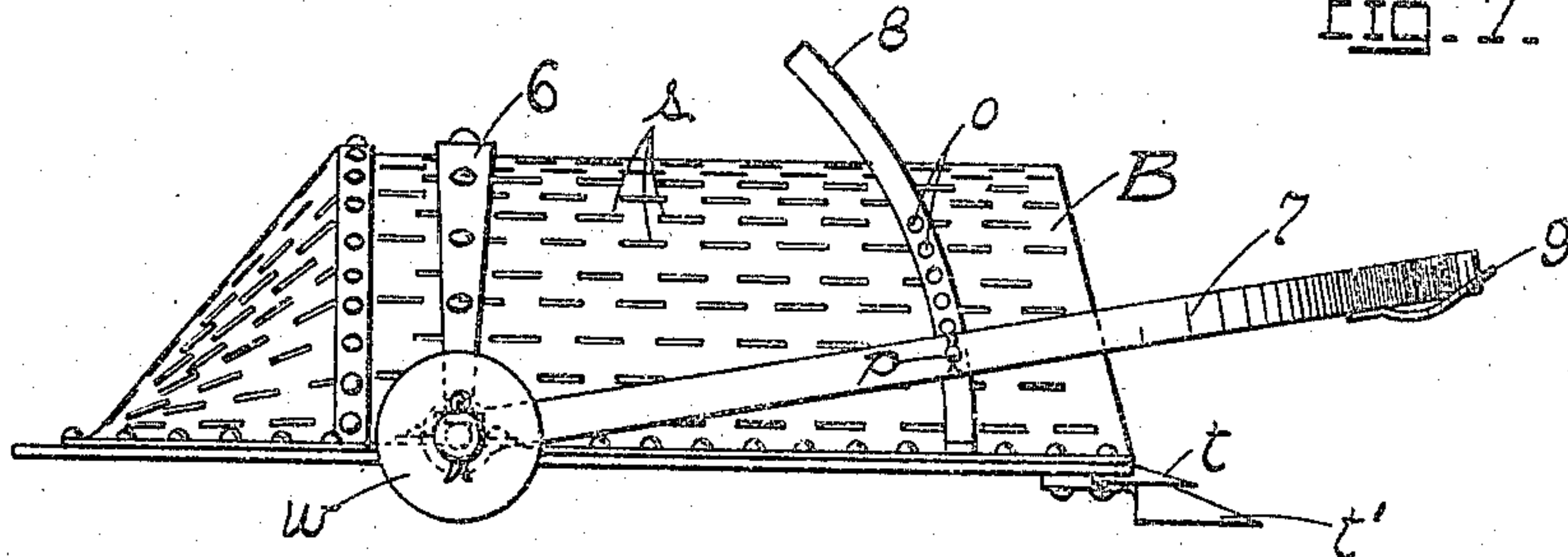


FIG. 8.

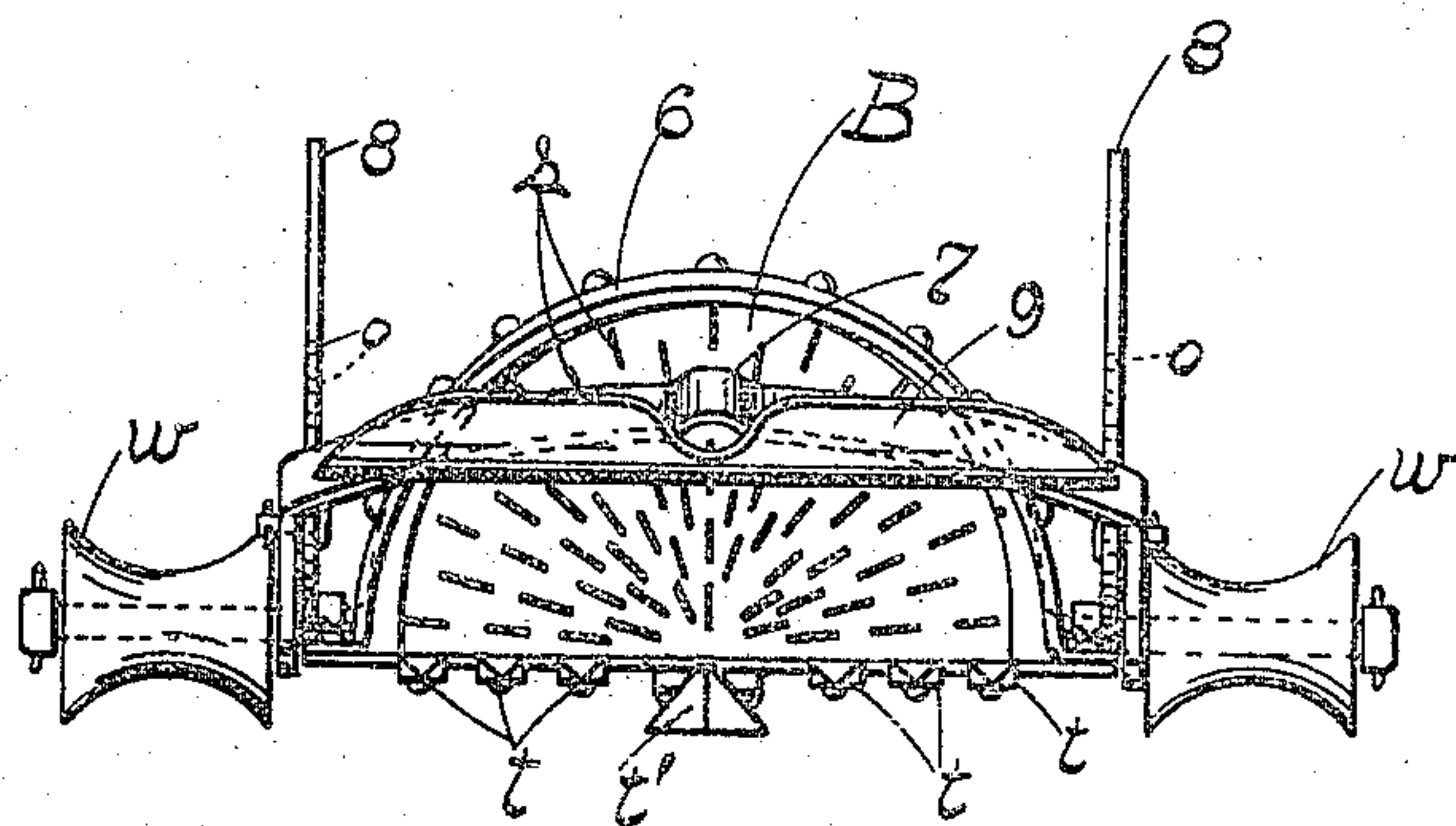


FIG. 9.

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UNITED STATES PATENT OFFICE.

JOSEPH J. CONNELL, OF OTTUMWA, IOWA.

DREDGING APPARATUS.

963,034.

Specification of Letters Patent.

Patented July 5, 1910.

Application filed April 7, 1910. Serial No. 554,019.

To all whom it may concern:

Be it known that I, JOSEPH J. CONNELL, citizen of the United States, residing at Ottumwa, in the county of Wapello and State of Iowa, have invented certain new and useful Improvements in Dredging Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in dredging apparatus; and it consists in the novel details of construction more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a top plan of the apparatus; Fig. 2 is a side elevation thereof; Fig. 3 is a vertical cross section on the line 3—3 of Fig. 1; Fig. 4 is an end view of the upper terminal of the tram-way or track showing the righting lever for the scoop-bucket; Fig. 5 is a vertical section on the line 5—5 of Fig. 4; Fig. 6 is a cross-section of the rail on which the bucket travels; Fig. 7 is a side elevation of the bucket; Fig. 8 is a top plan thereof; and Fig. 9 is a front end view.

The present apparatus is particularly adapted for use in the removal of sand and gravel from under water and loading the same into cars or barges, and the primary object sought is to remove such sand or gravel without necessitating the handling of any water, the scraping or loading scoop being so constructed as to permit of the expulsion of the water during the dredging operation, the scoop filling entirely with the solid materials, thus materially reducing the cost of handling.

A further object is to provide means for readily dumping the scoop or bucket at the proper moment; for guiding the bucket in its travel to and from the bed of the stream or other body of water in which it may be operating; and to provide further and other details the advantages of which will be apparent from a detailed description of the invention, which is as follows:

Referring to the drawings, T, T', represent suitable towers on opposite sides of the stream or other body of water S to be dredged. Between the water-body S and the tower T is an inclined trestle R supporting the track or rails 1, 1, the upper ends of the rails terminating in flanged outwardly projecting brackets or irons 2 for arresting

the bucket B when the latter reaches its dumping position. The upper faces of the rails are outwardly convexed to conform in a measure to the elongated concaved rollers 60 or wheels *w* of the bucket, the latter being held against dumping or turning during its passage over the track by the guide or guard-rails 3, preferably in the form of angle-bars bolted to the bottom lateral extensions of the rails 1. The track 1, 1, terminates at the bottom in a downwardly flaring inclined concaved chute 4 provided with side projecting timbers 5, said chute leading down to the water, and tapering toward the rails 1, 1, whereby as the bucket is drawn out of the water onto the chute, the latter will not only serve to center the bucket or bring the same in line of the center of the track formed by the rails 1, 1, but will guide the bucket-rollers *w* onto the rails.

The rollers *w* are mounted on the terminal journals of the strap 6 disposed rearward of the center of gravity of the bucket, a suitable bail 7 loosely embracing the journals on the sides of the bucket as well understood in the art. To the sides of the bucket are secured the curved segments or plates 8 provided with a series of openings *o* with any one of which an opening in the arm of the bail may be brought into register and a pin *p* inserted through the openings, whereby the bail may be held at any inclination to the flat bottom of the bucket. This inclination of course, depends on the depth of cut or penetration which the bucket shall make to scoop out a predetermined quantity of sand, gravel, clay or the like. While the depth of penetration of the cutting edge of the bucket is varied by the inclination of the bail 7, said depth is limited by a terminal concaved shoe 9 at the free end of the bail, which shoe (together with the support accorded the bucket by the surfaces of the elongated rollers *w*) prevents any material sinking of the bucket into the bed to be dredged, once said shoe bears against the surface of said bed.

As mentioned above, the bottom of the bucket is flat, the bucket being open in front, the plane of the front edge of such open front being inclined to the plane of the bottom (Fig. 7). The front edge of the bottom serves as a cutting edge for loose sand, but in operating on gravel it is preferable to equip the bucket with teeth or tangs *t*, and when operating on very compact or

solid clay or earth, a center plow t' may be provided in addition to the teeth t . The main or body portion of the bucket is substantially a half-cylinder slightly tapering rearward (Fig. 8) to allow for ready dumping, the cylinder terminating in a rear substantially half conical formation, as shown in the drawings, the flat bottom being beveled to conform thereto, thus giving the bucket or scoop a pointed rear end which readily penetrates the bed into which it is lowered.

The free end of the bail and the rear end of the bucket are connected to the adjacent ends of cables c, c' , the former passing over a sheave 10 on top of the tower T , and leading to a winding drum D in front of the tower T , and the latter (c') passing over a sheave 10' on top of the tower T' , thence passing forward over a sheave 10 on top of the tower T to a winding drum D' . As one drum winds its rope or cable the other unwinds, and vice versa, so that the scoop-bucket may be pulled down into the bed, and then by reversing the drums (the engine therefor not being here shown, as it is well understood in the art) the scoop is made to dredge the bed, after which the bucket continues up the track-rails 1, 1, and when it reaches the brackets 2, (when it is no longer held against rotation by the guard-rails or stringers 3) it automatically rotates about the axis of the wheels w and dumps the contents to any convenient point where wanted, as for example onto a sand car M traveling on a suitable track m for the purpose (Fig. 2).

In order to maintain the pulling sections of the cables or ropes c, c' , as near as possible in the line of draft, that is to say as nearly as possible to the inclined track-rails 1, 1, I provide a suitable guide-roller 11 above the track where necessary, for the cable c' , the passage of the cable thereover keeping the cable depressed and hence avoiding any tendency on the part of the cable to lift the bucket off the rails. Of course, as the bucket approaches the roller 11, the cable will necessarily be drawn away from the same; but it soon becomes restored thereto when the bucket is removed from the roller the required distance to leave a sufficient length of cable between it and said roller. As the bucket reaches its dumping position on the brackets 2, 2, the bottom thereof (while the bucket is dumping or rotating) engages the outer arm of a lever 12 rotating about a transverse rod 13, the inner lever-arm carrying a weight W which is more than balanced by the weight of the contents of the bucket. When the latter therefore turns on its axis (axis of the rollers w) in the dumping operation, it depresses the outer arm of the lever 12 (Fig. 2) and raises the weighted arm of the lever; the

latter being compelled to turn or swing about the rod 13 on account of the excess of the weight of a loaded bucket over that of the weight W . But as soon as the bucket is empty, then the weight W more than balances the weight of the bucket, the weighted lever thus released dropping back to its normal position in which operation it picks up the tipped bucket, righting it and restoring it to its position to be again lowered by reversing the rotation of the drums D, D' .

The operation will now readily be understood, and briefly stated is as follows:—Rotation being imparted to the drums D, D' , in proper direction to lower the bucket or scoop B , the rear conical heel of the latter readily enters the bed to be dredged. The drums being now reversed and with the bail set at any predetermined angle to the plane of the bottom of the bucket, the bucket is pulled or dragged out and up. The cutting edge scoops in the sand, gravel or clay as the case may be, filling the bucket (provided the bail has been set right), the depth of penetration of the edge into the sand being limited by the shoe 9 striking and riding on, the surface of the bed, the extended supporting surfaces of the rollers w likewise preventing the bucket sinking into the bed. As the bucket is being pulled out and up it rides over the guide-chute 4, the concavity and tapering formation of which guides the bucket onto the rails 1, 1. In its travel along the rails 1, 1, the bucket can not tip, being prevented by the guard-rails 3. When the bucket reaches the brackets 2 it automatically tilts and dumps as already described (the drums D, D' , being stopped and cable slackened), after which it is righted by the weighted lever 12. The righting lever 12 when at rest is maintained substantially in the plane of the tram-way 1, 1, by the cross-bar 14, which arrests the weighted arm of the lever after the latter has righted the empty bucket.

In order to insure the bucket filling with solid material only, provision is made to expel the water through openings, perforations, or slits s formed in the walls of the bucket, the openings being sufficient to allow the water to pass out, but not the sand. At any rate the quantity of sand that may be expelled would be a negligible quantity. By the construction herein, the water is so effectively expelled, that the bucket is practically full of sand (gravel or clay as the case may be) only, and no water need practically be got rid of in the handling of the material. It follows therefore that the efficiency of a dredging apparatus of the kind here described is of the highest.

Having described my invention, what I claim is:—

1. In a dredging apparatus, a scoop-bucket having a flat bottom extending the

full length of the bucket and a substantially semi-cylindrical body portion open at the front and having its edge inclined rearwardly from the front cutting edge of the bottom, the rear end of the bucket being substantially a half-cone connecting the body portion with the flat bottom.

2. In a dredging apparatus, a scoop-bucket having a flat bottom extending the full length of the bucket and a substantially semi-cylindrical body portion open at the front and having its edge inclined rearwardly from the front cutting edge of the bottom, the rear end of the bucket being substantially a half-cone connecting the body portion with the bottom and having a taper in excess of the inclination of the front edge of the body portion with the bottom.

3. In a dredging apparatus, a traveling scoop-bucket provided with elongated peripherally concaved rollers having a sufficient cross-section to present an extended supporting surface and thereby prevent embedding of the bucket in the soil over which the bucket is dragged.

4. In a dredging apparatus, a traveling scoop-bucket provided with peripherally concaved rollers, a track for the support of the rollers directing the bucket to the bed of the material to be dredged, a bail pivotally coupled to the sides of the bucket for drawing the bucket, means in connection with the track for maintaining the loaded bucket in substantial parallelism to the line of draft, and means at the outer end of the track for allowing the bucket to rotate about the axis of the rollers and dump the material scooped thereby.

5. In a dredging apparatus, a traveling scoop-bucket provided with peripherally concaved rollers rearward of the center of gravity of the bucket, an inclined track therefor leading to the bed to be dredged, a bail pivotally coupled to the sides of the bucket about the common axis of the rollers, a shoe on the free end of the bail for riding over the surface of the bed during the scooping operation, the bucket having an open front end provided with a bottom cutting

edge and a closed rear end, an inclined track for the support of the rollers, structural members connected to the track and forming guide-rails to maintain the bucket in the general line of draft, pull cables coupled to the bucket at opposite ends, means for maintaining the cables in the general line of draft, and means for actuating the cables in proper direction for lowering or raising the bucket.

6. In combination with a track, a scoop-bucket provided with rollers running on said track and disposed with their common axis to one side of the center of gravity of the bucket, whereby the latter is free to tilt about said axis for purposes of dumping when released from support at the free end of the track, a lever at said free end having a weighted arm adapted to be overbalanced by the weight of the loaded bucket engaging the opposite arm of said lever in the dumping operation, the weighted arm in turn righting the bucket when lightened after the discharge of the contents thereof.

7. In a dredging apparatus, a scoop-bucket having a flat bottom provided with a cutting edge at the open end of the bucket, a central substantially semi-cylindrical body portion and a rear substantially half-conical portion surmounting said flat bottom, a pair of peripherally concaved elongated rollers mounted rearward of the center of gravity of the bucket, journals for said rollers, a bail hinged to said journals on each side of the bucket, and provided with a transversely disposed concaved shoe at its free end to limit the depth of penetration of the cutting edge into the earth or sand operated on, and means for securing the bail to the walls of the bucket at any predetermined inclination to the plane of the bottom of the bucket for varying the depth of said penetration at the will of the operator.

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

JOSEPH J. CONNELL.

Witnesses:

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Jos. A. MICHEL.