

No. 741,775.

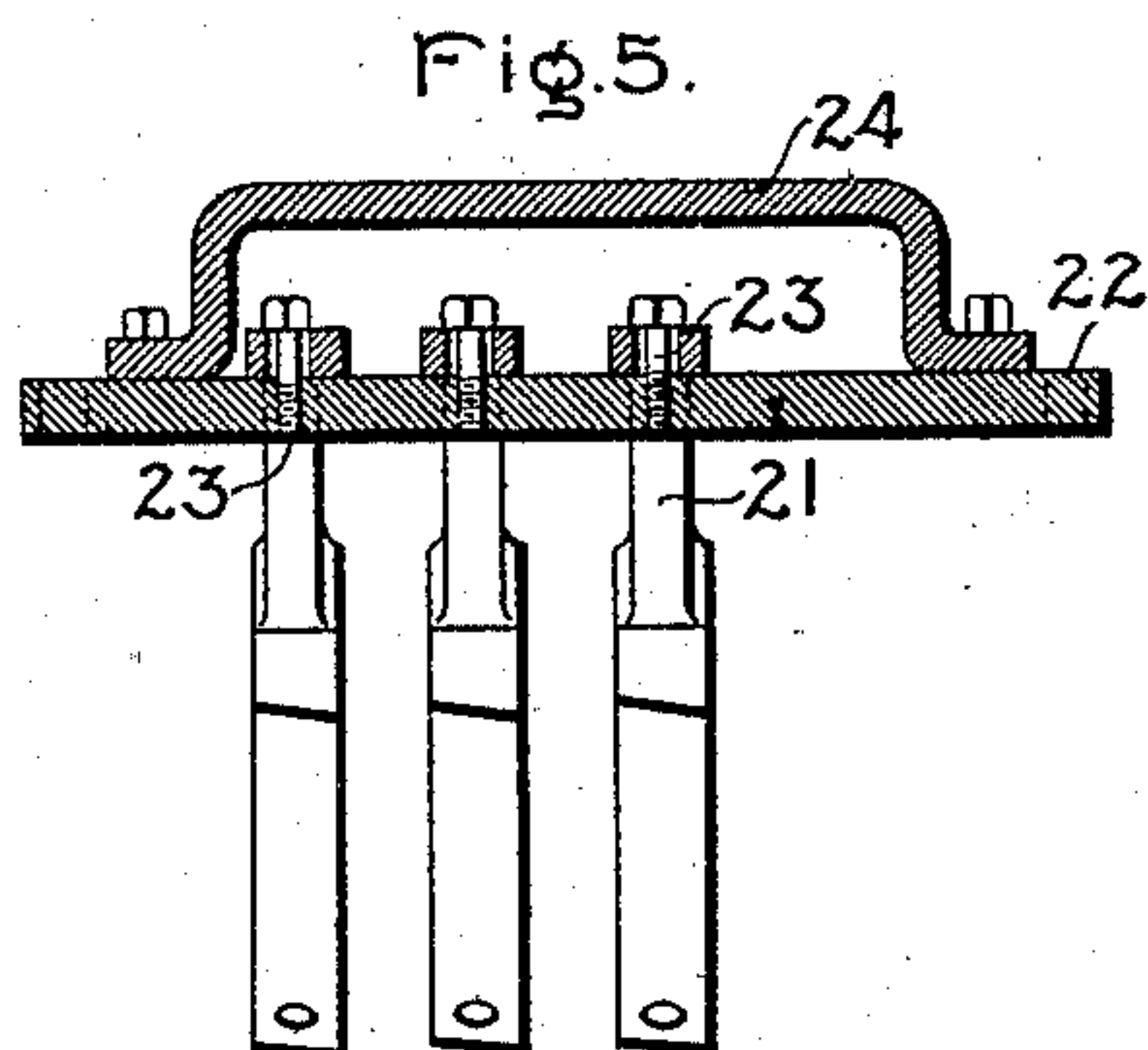
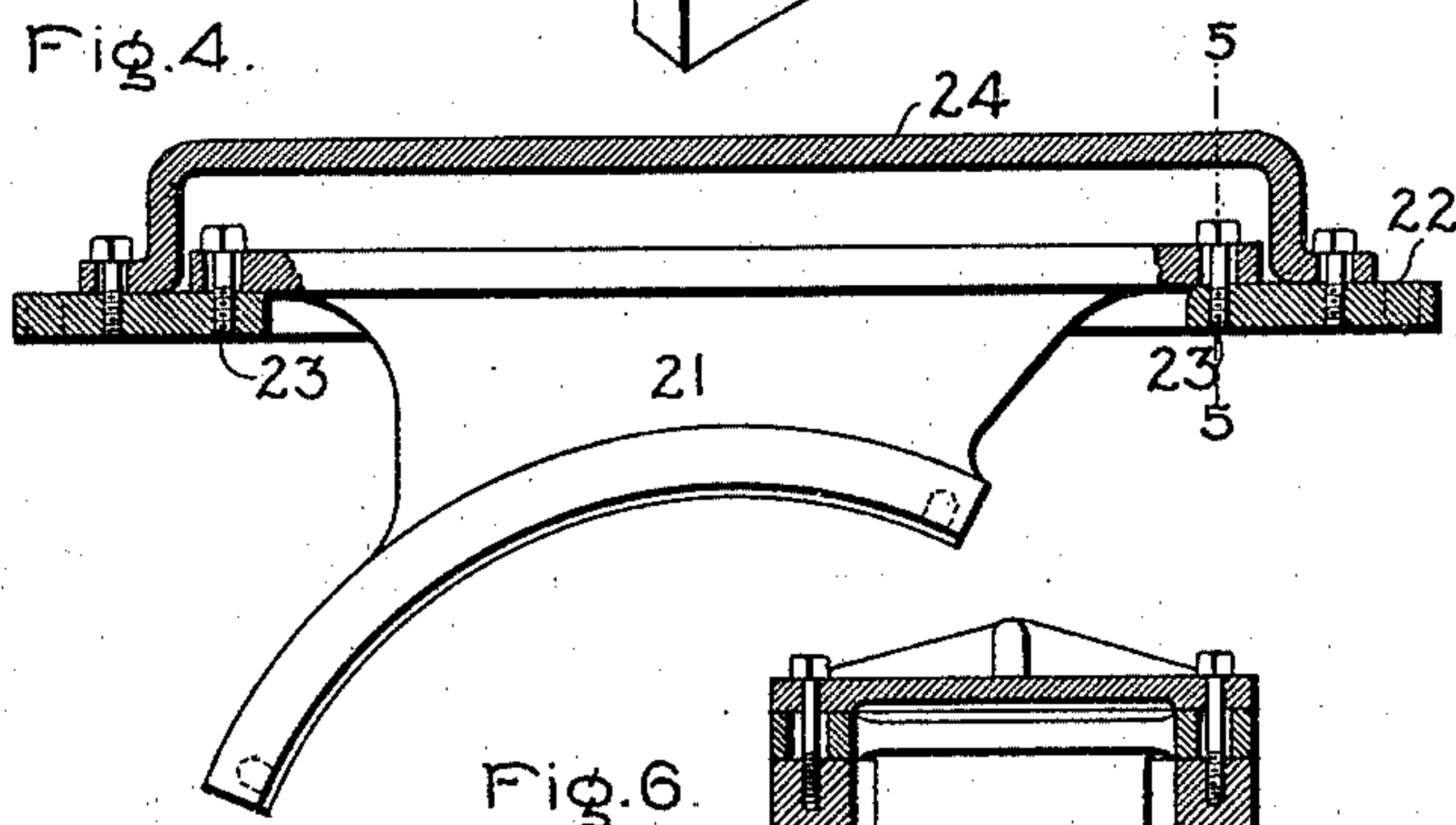
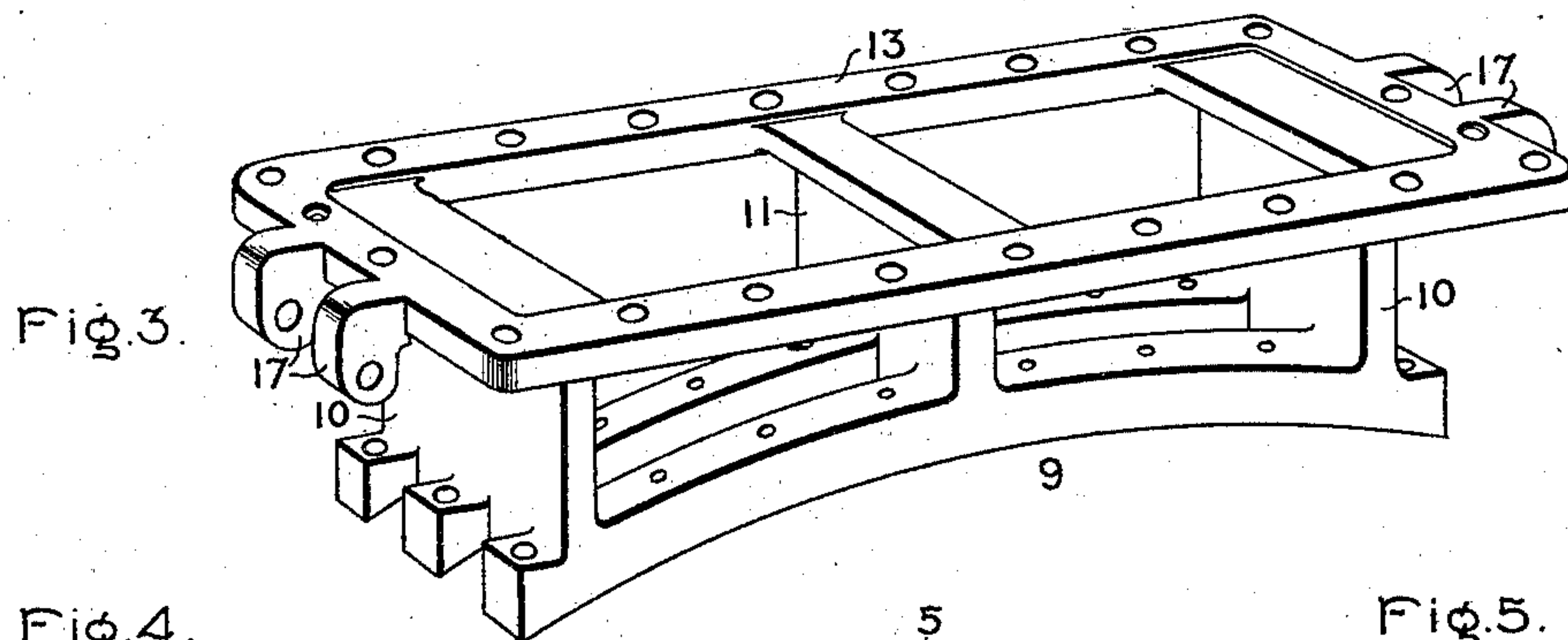
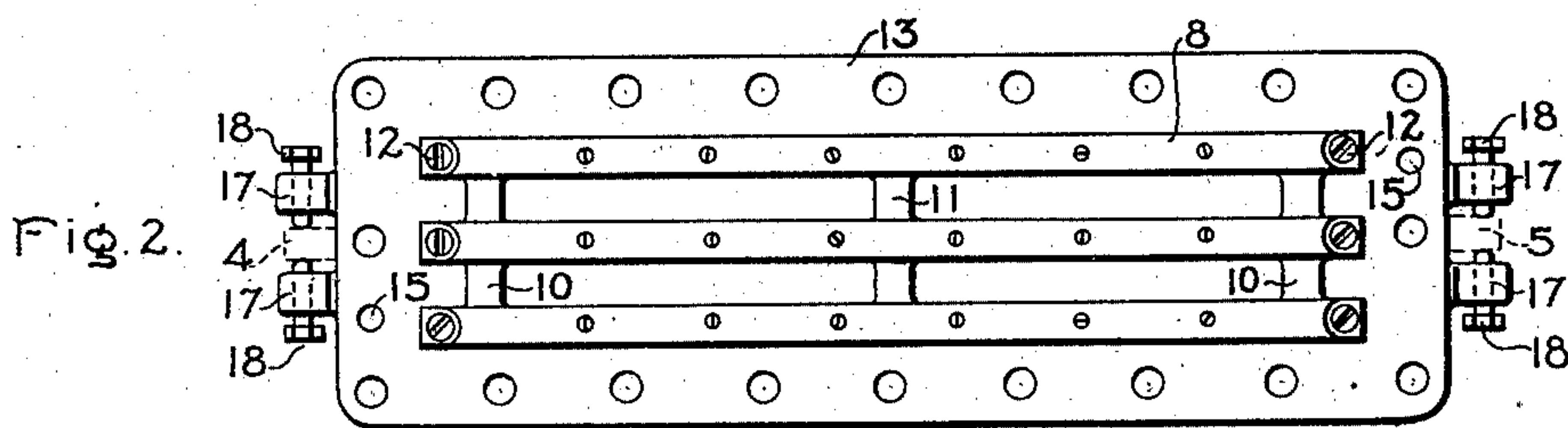
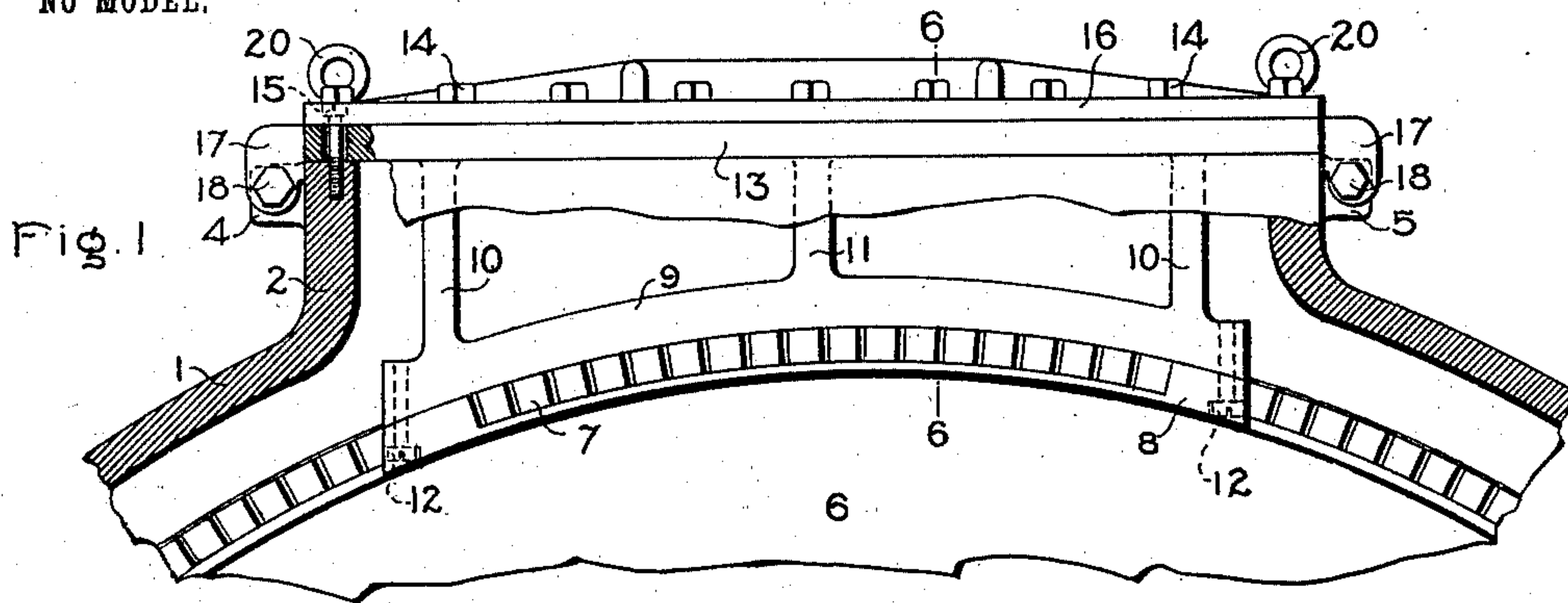
PATENTED OCT. 20, 1903.

A. R. DODGE.

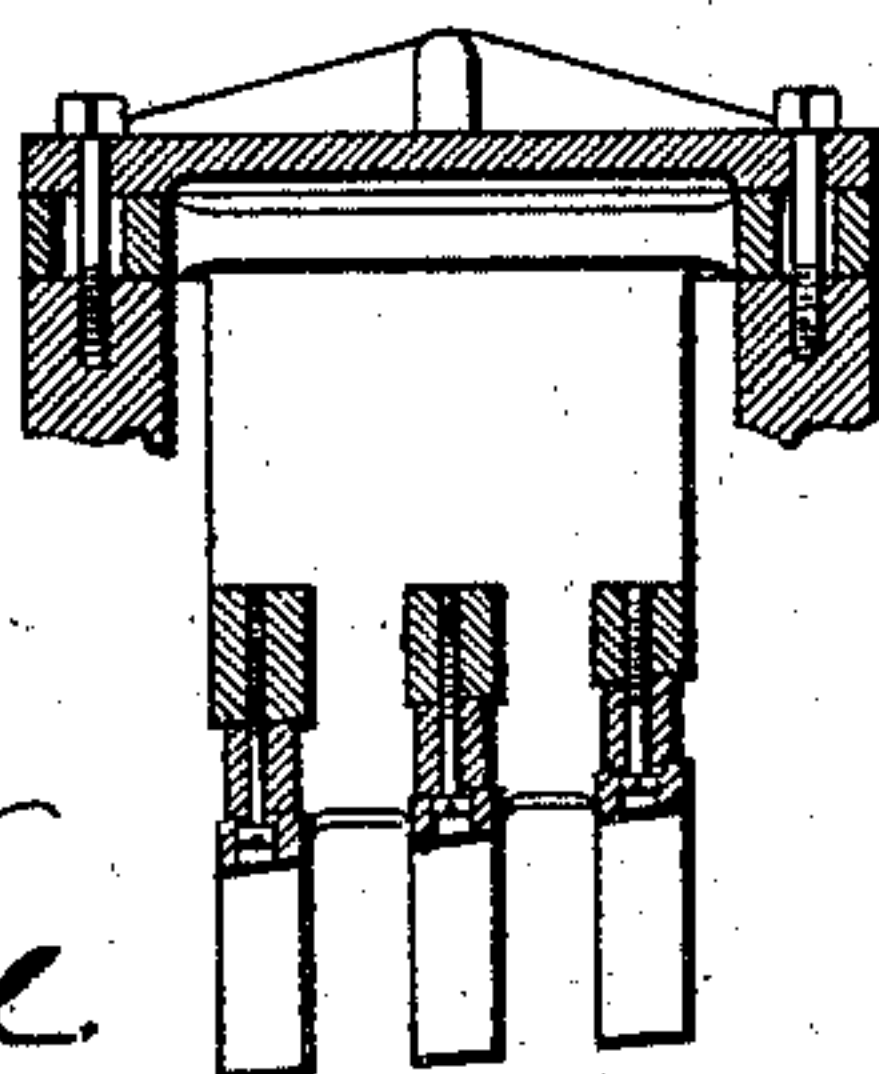
SUPPORT FOR INTERMEDIATE BUCKETS IN TURBINES.

APPLICATION FILED AUG. 23, 1902.

NO MODEL.



WITNESSES:
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UNITED STATES PATENT OFFICE.

AUSTIN R. DODGE, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

SUPPORT FOR INTERMEDIATE BUCKETS IN TURBINES.

SPECIFICATION forming part of Letters Patent No. 741,775, dated October 20, 1903.

Application filed August 23, 1902. Serial No. 120,755. (No model.)

To all whom it may concern:

Be it known that I, AUSTIN R. DODGE, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Supports for Intermediate Buckets in Turbines, of which the following is a specification.

In a certain type of turbine with which I am familiar a plurality of sets of working passages are formed either in projections carried by a single rotating element or in separately-formed wheels. These working passages are connected by intermediate passages which are formed in an element that is secured to the casing. The elements are inclosed by a suitable casing, which also carries the bearings for the shaft of the revolving member and the fluid-admitting nozzles. In order to use the motive fluid economically, the rotating and stationary buckets are closely associated; but at the same time a certain amount of clearance must be provided between them, so that the two elements will not engage. Owing to the close association of the elements, the matter of adjusting them is somewhat difficult, particularly on large machines. This difficulty is greatly enhanced by the fact that with the previous constructions it was impossible to get a full view of the sets of moving and stationary buckets. Obviously this is a most unsatisfactory arrangement, and in certain large constructions the parts are so related and arranged that they could not be adjusted by the former and primitive method of feeling. Furthermore, the parts have assumed such substantial proportions and increased weight in the large machines now being built that they could not be adjusted as heretofore.

My invention has for its object to provide a support for the intermediate vanes of a turbine which will overcome the objections referred to and be simple in construction.

The scope of my invention will be more fully described and claimed hereinafter.

In the accompanying drawings, attached to and made a part of this specification, Figure 1 is a side elevation of a bucket-support, showing one embodiment of my invention, the parts of the turbine being broken away.

Fig. 2 is a plan view of the support. Fig. 3 is a perspective view of the support. Fig. 4 is a side elevation of a modified form of the support. Fig. 5 is a cross-section taken on line 5 5 of Fig. 4, and Fig. 6 is a cross-section taken on line 6 6 of Fig. 1.

1 represents the casing of the machine, which casing is closed at all points except where the steam enters and leaves. At a predetermined point or points in the periphery projections 2 are provided, which have an opening of sufficient size to receive the support for the buckets. The end of the projection may be straight or curved and is provided with holes for receiving the clamping-bolts for the bucket-support. The end of the projection is faced off true to receive the bucket-support and make a tight fit therewith. Ordinarily packing will not be needed at this point; but red lead or a gasket may be used, if desired. On opposite sides of the projection are formed lugs 4 and 5, which are used in adjusting the parts.

Mounted within the casing and on a suitable shaft is a revolving member 6, having one or more sets of buckets on its periphery. When only one set of buckets is provided for each wheel, a number of wheels are used, it being necessary in order to use the motive fluid economically to cause it to act more than once upon suitable devices designed to convert its velocity into rotary mechanical motion. The ends of the buckets are closed in by any suitable tire, band, or cover, and the fluid passes between the buckets in a direction substantially parallel with the shaft. In other words, the fluid passes from one side of the disk or wheel to the other.

Situated between each two rows of moving buckets are stationary or intermediate buckets 7. These buckets are cut or otherwise formed in a segmental piece 8. The segmental pieces are cut on the arc of a circle and are bolted or otherwise secured to the curved segmental frame-piece 9. One of these frame-pieces is provided for each segmental piece. The frame-pieces are united at the ends by walls 10 and are braced in the center by the web 11. Each frame-piece is curved concentric with the center of revolution at the bucket-receiving face and is pro-

vided with screw-threaded holes for receiving the bucket-retaining bolts 12. The end walls 10 and web 11 are united by a rectangular frame 13, and the latter is secured to the projection 2 on the casing by a number of stud-bolts 14. The bolts enter screw-threaded openings in the projection 2, and the holes in the frame are made large enough so that the buckets and their support can be shifted laterally or transversely by an amount sufficient to meet all demands for adjustment. In addition to the bolts 14 above mentioned other bolts or fillister-head screws 15 are provided, which likewise pass freely through the frame 13 and enter the projection 2. These bolts, unlike those previously mentioned, do not pass through the cover, and the heads are countersunk in the frame, so that the cover 16 can be applied to and removed from the machine without interfering therewith. The object of these bolts is to retain the stationary buckets and their supporting-frames in position after the nuts on the stud-bolts 14 have been removed. By reason of this arrangement the cover can be removed without in any way disturbing the position of the buckets. It is obvious that with the construction described an unobstructed view of the buckets can be had when the cover is removed and the relation that they bear to the rotating buckets readily determined and this without difficulty and without disturbing the working members of the machine. The ends of the frame are provided with ears 17, which extend on each side of the fixed lugs 4 and 5. Mounted in the lugs are bolts 18, by means of which the frame can be adjusted as a whole in a manner to move the stationary buckets in a direction parallel with the shaft and toward or away from any given bucket-wheel. In making this adjustment the bolts of the fillister-head screws 15 would be slacked off to permit of the adjustment.

Mounted on the frame and retained in place by the clamping-bolts 14 is a cover 16, and when this is removed, as before stated, an unobstructed view is had of the moving and stationary buckets because of the open-work construction of the support for the stationary buckets. The parts being of considerable size and heavy, eyebolts 20 are provided, by means of which the parts can be removed by a chain hoist or other suitable means. Under the usual conditions of operation no packing is necessary between the cover, support, and projection 2; but it can be used, if desired, without interfering with the apparatus, it being understood, of course, that the said packing will be made so as to permit an unrestricted view of the buckets.

In Fig. 6 is shown a transverse section of the bucket-support wherein the feature of clamping the bucket frame or support and the cover by the bolts 14 is clearly shown. The fact that a certain clearance is provided between the bolts and the support is also clearly shown.

Referring now to Figs. 4 and 5, a slight modification of the invention is shown; but the idea of arranging the bucket-supports so that an opportunity to observe the relation of parts when the cover is removed is still preserved. In this case each bucket-segment is mounted on a curved support 21, as before; but instead of uniting them in one structure they are bolted separately to the casing or to a separate frame or plate 22 by stud-bolts 23. The plate 22 is the equivalent of the rectangular frame 13 and is bolted to the projection 2 of the casing. The bolt-holes in the supports are larger than the bolts to permit of lateral and longitudinal adjustment. The size of these holes with respect to that of the bolts will be governed by the amount of adjustment required. This is true of both cases. The bolt-holes in the plate 22 and also in projection 2 are so related to those in the frame and cover that the frame may be reversed in case it is desired to convert a machine from a right to a left hand machine. In making such a change it is evident that the bucket wheel or wheels would be changed also. This arrangement is also advantageous in that all parts can be made interchangeable. It is to be observed that the nuts on all bolts which are required to be loosened in adjusting the parts are in such a position that they can readily be seen and adjusted by a wrench. Surrounding the ends of the bucket-supports and at the same time forming a cover for the opening in the frame or plate 22 is a dish-shaped cover 24, which is retained in place by bolts. Packing between the cover and the plate 22 may or may not be used, as desired. The frame or plate 22 may be provided with lugs similar to the arrangement shown in the previous figures.

In accordance with the provisions of the patent statutes I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a turbine, the combination of a casing having an opening, a set of stationary buckets mounted in the opening, an open-work support for said buckets, and a cover for closing in the casing.

2. In a turbine, the combination of a casing having an opening, an open-work support for the stationary buckets having a frame by means of which it is attached to the casing, a detachable cover which closes in the opening in the casing, and bolts for clamping the frame in place.

3. In a turbine, the combination of a casing having an opening, a bucket-support which extends through the opening and is provided with bucket-receiving faces and a frame which frame engages with the casing, a cover,

and a single set of bolts for holding the cover and support in place.

4. In a turbine, the combination of a casing having an opening, a bucket-support having
5 separate finished faces for receiving the rows of buckets, bolts for permanently clamping the support in place, and other means for holding the support in place when the clamping-bolts are loosened.

10 5. In a turbine, the combination of a casing having an opening, a bucket-support comprising an open-work structure, a cover for closing in the end of the support, and means for adjusting the position of the support.

15 6. In a turbine, the combination of a plurality of rows of buckets, a supporting-surface for each row, the said surfaces being separated from each other so as to give an unobstructed view of the interior of the turbine, a
20 casing, and a cover arranged to close in the casing and cover the buckets from view.

7. In a turbine, the combination of a casing having a hollow projection, lugs formed

thereon, a bucket-support having a plurality of finished faces arranged to receive the buckets, which faces are separated, lugs and bolts
25 for adjusting the buckets, a cover, and a set of bolts for holding the support and cover.

8. In a turbine, the combination of a plurality of stationary buckets, a number of separate supports for said buckets, walls for
30 uniting the supports, a frame which is secured to the walls, a casing, and a cover which closes in the casing and covers the buckets from view.

9. In a turbine, the combination of a casing, a cover, a bucket-support, means for adjusting the support, and a single set of bolts for clamping the cover and support in place.

In witness whereof I have hereunto set my
40 hand this 20th day of August, 1902.

AUSTIN R. DODGE.

Witnesses:

ALEX. F. MACDONALD,
BENJAMIN B. HULL.