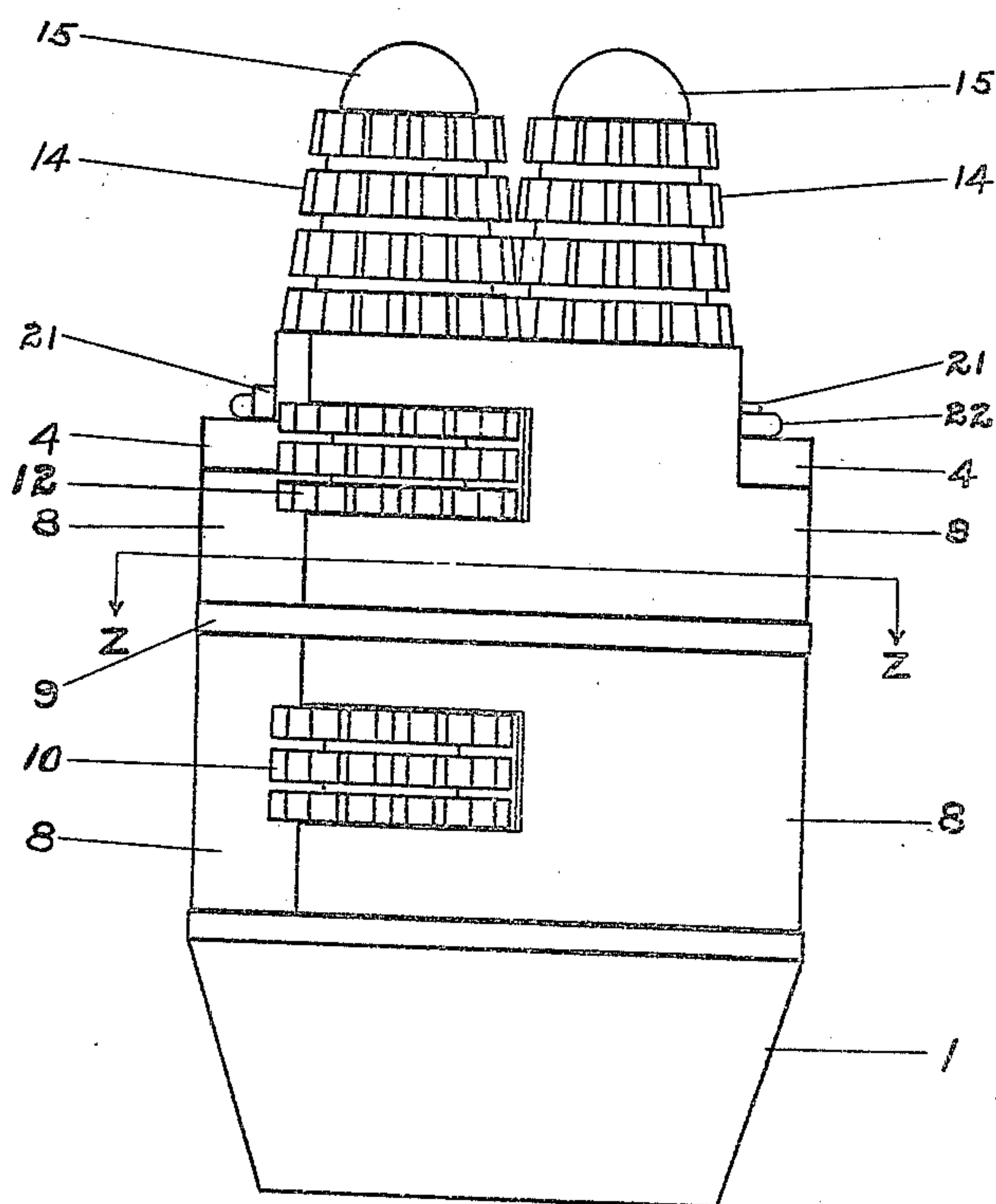


958,118.

E. E. HAUER.
TUBE CLEANER.
APPLICATION FILED AUG. 5, 1909.

Patented May 17, 1910.
3 SHEETS—SHEET 1.

FIG. 1.



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Patented May 17, 1910.

3 SHEETS—SHEET 2.

FIG. 2.

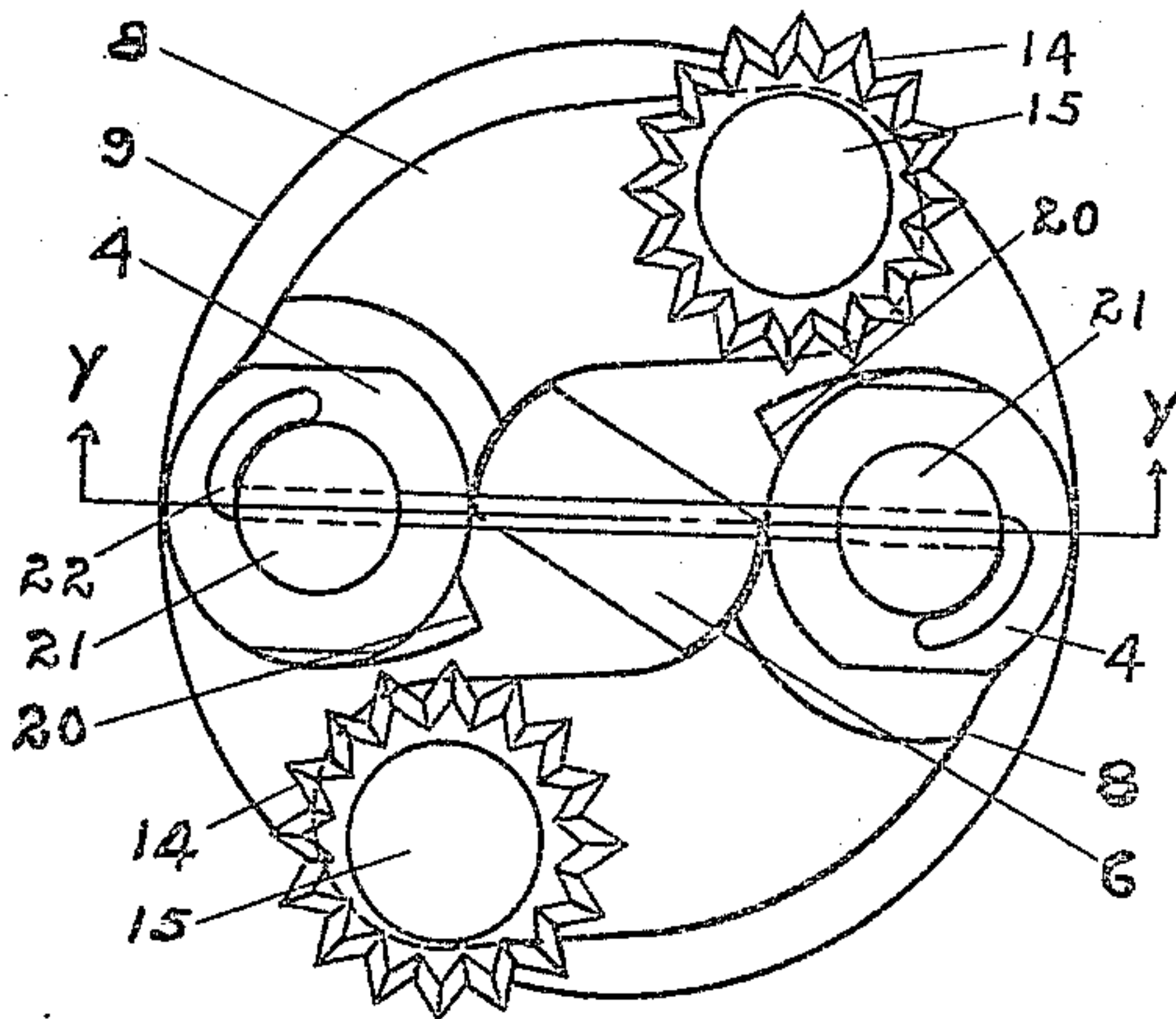


FIG. 3.

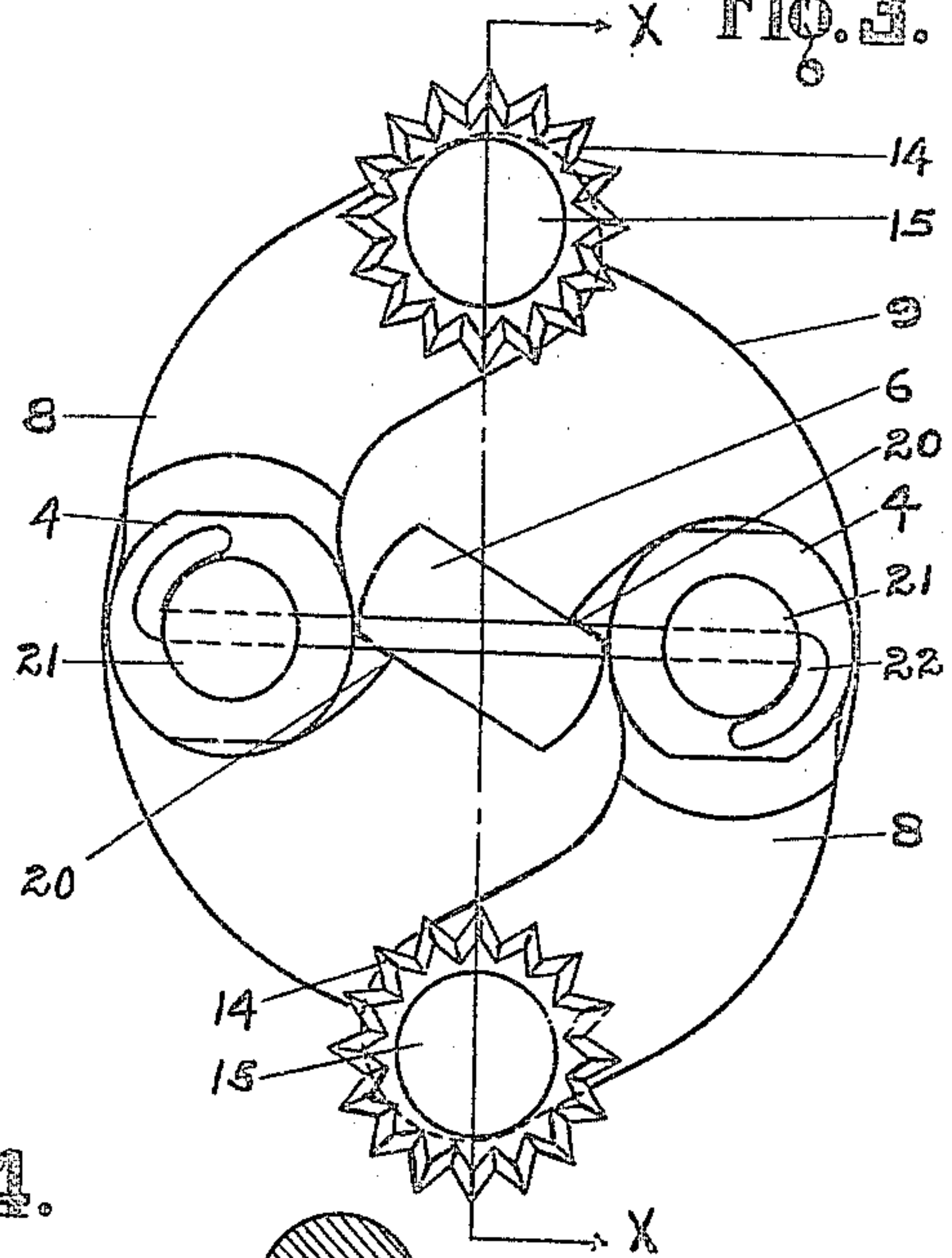
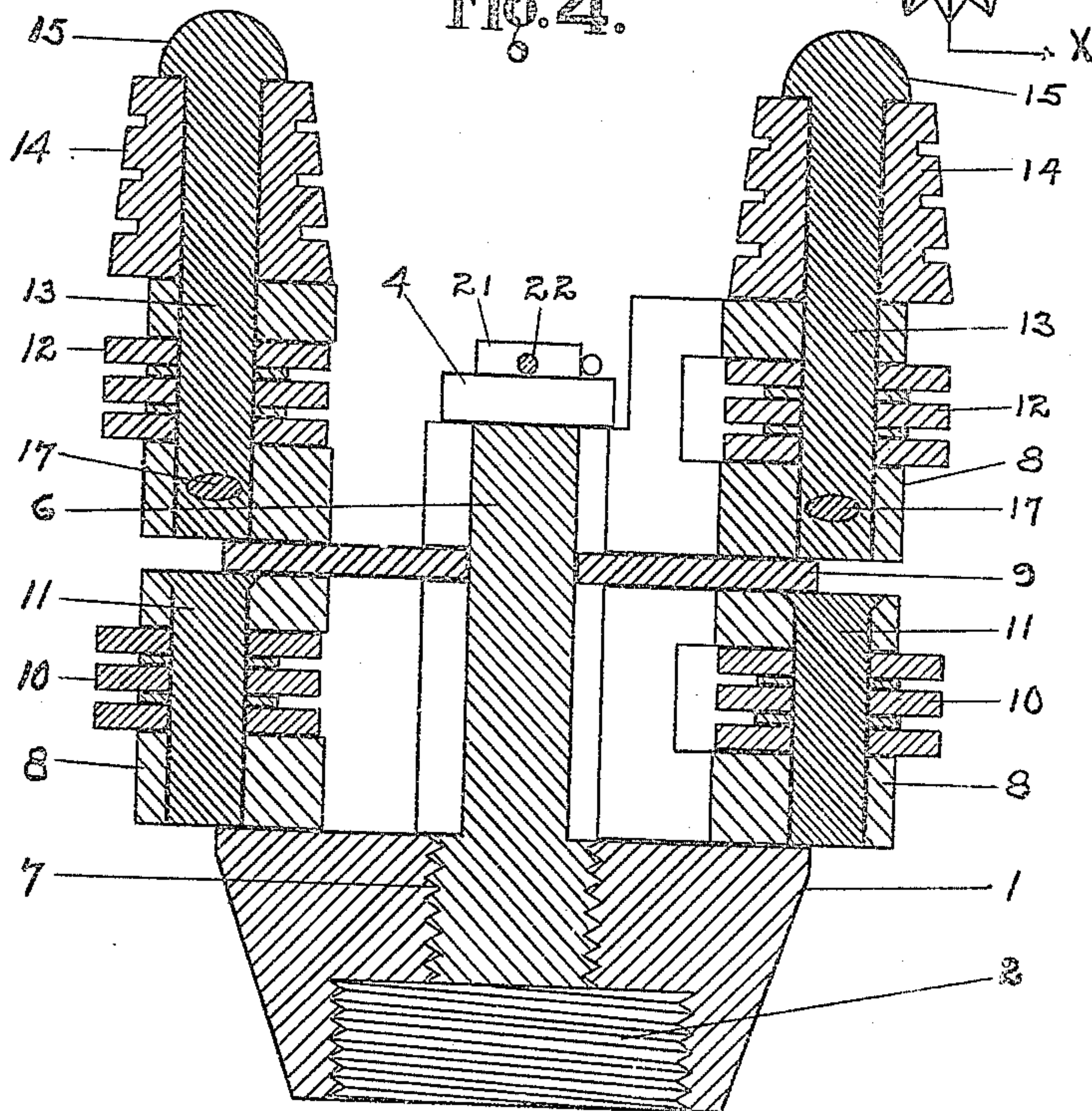


FIG. 4.



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FIG. 5.

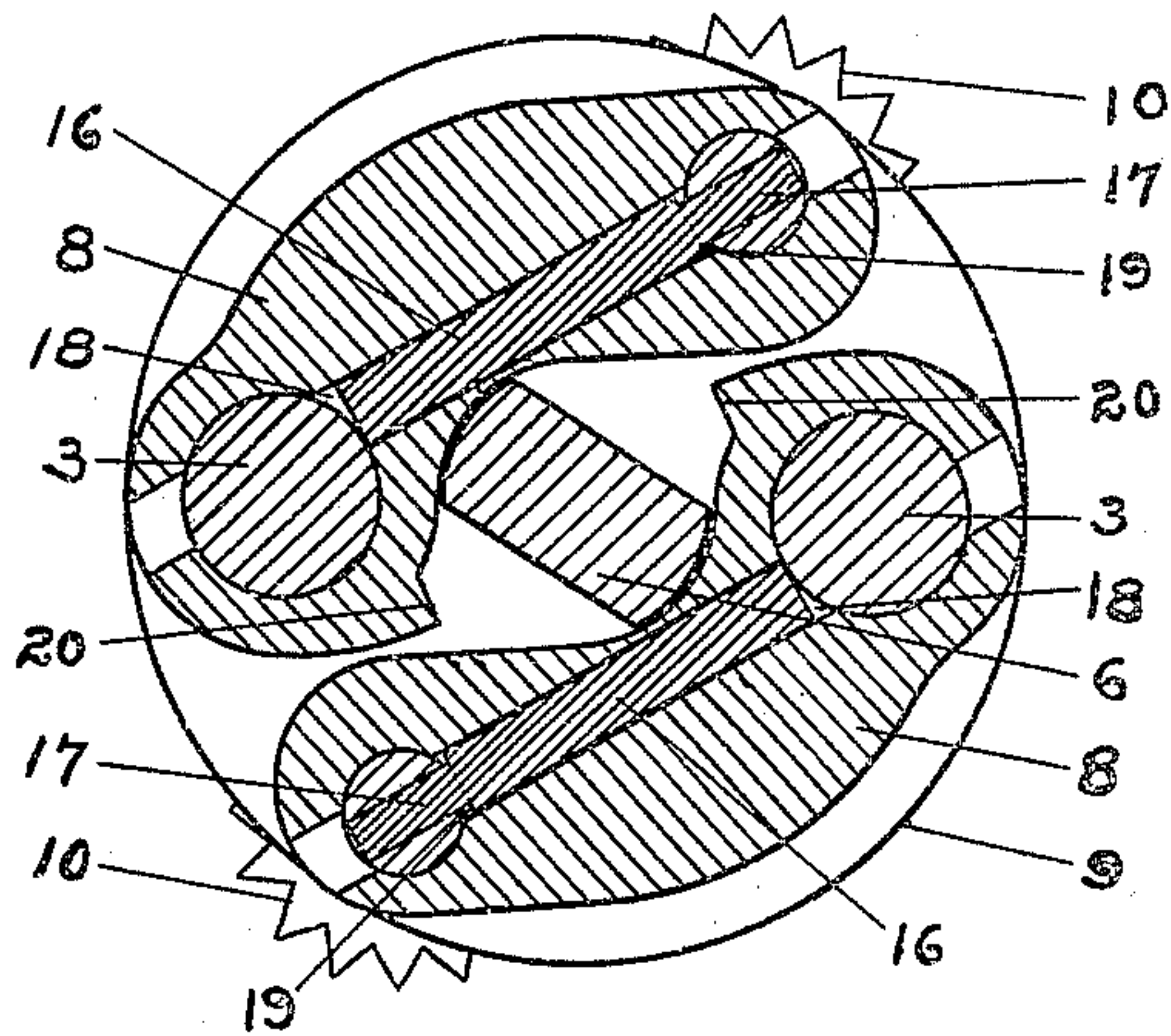
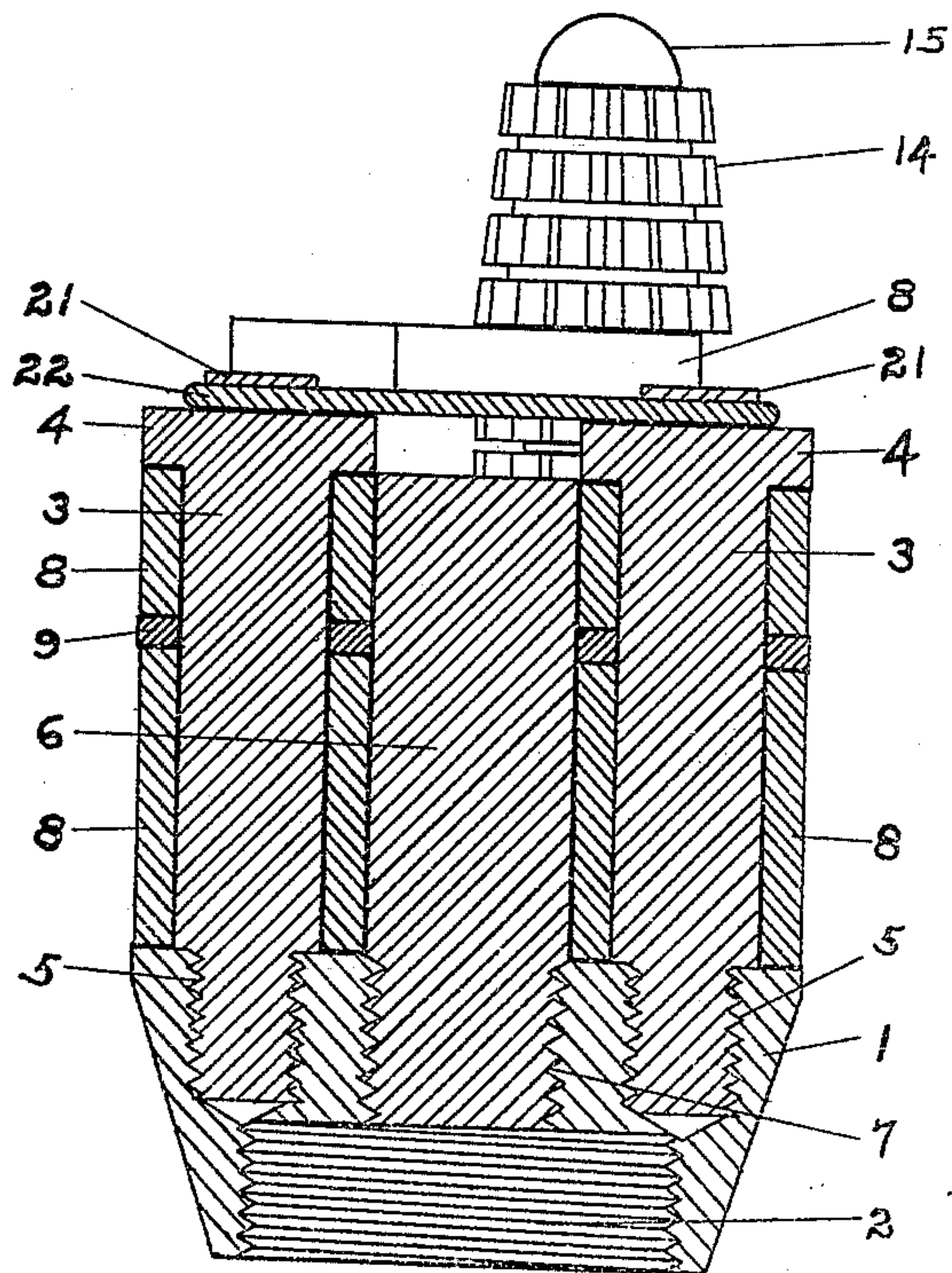


FIG. 5.



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TUBE-CLEANER.

958,118.

Specification of Letters Patent.

Patented May 17, 1910.

Application filed August 5, 1909. Serial No. 511,436.

To all whom it may concern:

Be it known that I, ELMER E. HAUER, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Tube-Cleaners, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to tube cleaners and more particularly to a rotary cleaner operated at a high speed for cleaning tubes in water tube boilers. Cleaners of this class are subject to great stress and wear and the object of my invention is to provide a cleaner of greater efficiency and durability having few parts that can be easily assembled and taken apart for repairs.

With these and other objects in view, my invention consists of the constructions and combinations hereinafter described and set forth in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a cleaner embodying my invention. Fig. 2 is an end view with the cutter carrying arms at the limit of their inner movement, and Fig. 3 is a like view with said arms at the limit of their outer movement. Fig. 4 is a longitudinal section, on the line $x-x$ of Fig. 3; Fig. 5 is a longitudinal section on the line $y-y$ of Fig. 2; and Fig. 6 is a cross-section on the line $z-z$ of Fig. 1.

Like numerals represent the same parts in the several views.

In the drawings, a support 1 has in its rear face a screw-threaded recess 2, to which the motor shaft can be attached. Bolts 3, having heads 4, are screw-threaded into recesses 5 in the front face of said support and project forwardly therefrom. A central forwardly-extending projection 6 may be formed integrally with the support; but it is preferably made separate therefrom and screw-threaded into a recess 7 in the front face of said support.

Arms 8 are pivoted at one end to swing on the bolts 3. Two sets of these arms are shown, one set in front of the other, and a plate 9 interposed between the respective sets of arms, and having perforations through which the bolts 3 and projection 6 extend, forms a stay for the bolts to strengthen the cleaner and to take the wear between the two sets of arms. The arms

8 composing the rear set are shown with recesses at their free ends, in which cutters 10 are mounted on spindles 11 extending through perforations in the arms, said spindles being held in place by abutting at their respective ends on the support 1 and plate 9. The arms composing the forward set are also provided with recesses in their free ends, in which cutters 12 are mounted on spindles 13 extending through transverse perforations in said arms. Said spindles project forwardly from said arms with cutters 14 mounted therein in front of said arms, heads 15 holding the cutters in place; and the spindles 13 are removably secured in the arms by cross-bars 16 having reduced portions 17 extending through perforations in said spindles, said cross-bars being disposed in longitudinal openings 18 through the arms, with shoulders 19 abutting the spindles and their inner ends resting against the bolts 3. The openings 18 extend entirely through the arms so that when the bolts 3 are removed the cross-bars can be driven out to release the spindles.

A projection 20 on the arms 8 engages the central projection 6 of the support to limit the swing of the arms. To prevent the bolts 3 from jarring loose from the support I provide means to lock and keep them from turning in the screw-threaded recesses of the support, and to accomplish this I have shown the bolt heads with extensions 21 having transverse perforations, and a wire 22 extends through said perforations in each of the head extensions and is bent about each of said head extensions, as particularly shown in Figs. 2, 3 and 5.

The cleaner is easily assembled by securing the projection 6 to the support 1, then the cutters are mounted on the spindles in the respective sets of arms with the cross-bars 16 in place; the arms are then mounted on the bolts 3 with the plate 9 interposed between the respective sets of arms, and the bolts are then secured to the support 1 and locked from turning by the wire 22 as described.

It will be seen that by removing the wire 22 and unscrewing and removing the bolts 3 the arms 8 and plate 9 will be released; and the arms, plate and cross-bars 16 being removed, the spindles with the cutters thereon are released and may be removed from the arms.

Having thus described my invention, I claim:

1. The combination of a support having forwardly projecting bolts with heads on their front ends and screw-threaded at their rear ends into perforations in said support, arms adapted to swing on said bolts, cutters on said arms and a locking device separate from said support to rigidly hold said bolts from turning, substantially as described.

2. The combination of a support having bolts removably secured thereto projecting from the front face thereof, arms adapted to swing on said bolts, cutters on said arms, a forwardly extending central projection secured to said support, which said arms are adapted to engage to limit their swinging movement, and a locking device common to said bolts and separate from said support to keep the bolts from turning, substantially as described.

3. The combination of a support having forwardly projecting bolts with heads on their front ends and screw-threaded at their rear ends into perforations in said support, arms arranged in sets, one set in front of the other and adapted to swing on said bolts, cutters on said arms, a removable wearing plate between each set of arms, said plate having perforations through which said bolts extend unattached to stay said bolts and a locking device independent of the threaded attachment to the support to keep said bolts from turning, substantially as described.

4. The combination of a support having forwardly projecting bolts with heads on their front ends and screw-threaded at their rear ends into perforations in said support, arms arranged in sets, one set in front of the other and adapted to swing on said bolts, cutters on said arms, said support having a forwardly extending central projection which said arms are adapted to engage to limit their swinging movement, a removable wearing plate between each set of arms, said plate having perforations through which said central projection and bolts extend unattached to stay said bolts and a locking device separate from said support to keep said bolts from turning, substantially as described.

5. The combination of a support with bolts and arms adapted to swing on said bolts, spindles in said arms with cutters thereon and means removably held in place by said bolts to removably secure said spindles to the arms, substantially as described.

6. The combination of a support having forwardly projecting bolts with heads on their front ends and screw-threaded at their rear ends into perforations in said support, arms arranged in sets, one set in front of the other and adapted to swing on said bolts, cutters on said arms, a forwardly extending central projection screwthreaded into a perforation in said support which said arms are adapted to engage to limit their swinging movement, a removable wearing plate between each set of arms, said plate having perforations through which said central projection and bolts extend to stay said bolts, and a locking device common to said bolts to keep said bolts from turning, substantially as described.

7. The combination of a support having bolts removably secured thereto projecting forwardly from the front face thereof, arms adapted to swing on said bolts, spindles in transverse perforations through said arms, cutters on said spindles, and means removably held in place by said bolts to removably secure said spindles to the arms, substantially as described.

8. The combination of a support having forwardly projecting bolts removably secured thereto, arms adapted to swing on said bolts, spindles in transverse perforations in said arms, cutters on said spindles, said arms having longitudinal openings there-through with cross-bars therein adapted to engage said spindles, said cross-bars being removably held in place by said bolts, substantially as described.

9. The combination of a support having forwardly projecting bolts removably secured thereto, cutter carrying arms arranged in sets, one set in front of the other, and adapted to swing on said bolts, a forwardly extending central projection secured to said support which said arms are adapted to engage to limit their radial movement, a removable plate between each set of arms, said plate having perforations through which said central projection and bolts extend, spindles extending through transverse perforations in the rear set of arms, the respective ends of which abut on said plate and support, and cutters on said spindles, substantially as described.

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

ELMER E. HAUER.

Witnesses:

MAURICE M. SELLERS,
CARL CASKEY.