

No. 731,976.

PATENTED JUNE 23, 1903.

F. W. THUNEN & L. L. CHESHIRE.
DREDGER.

APPLICATION FILED DEC. 11, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

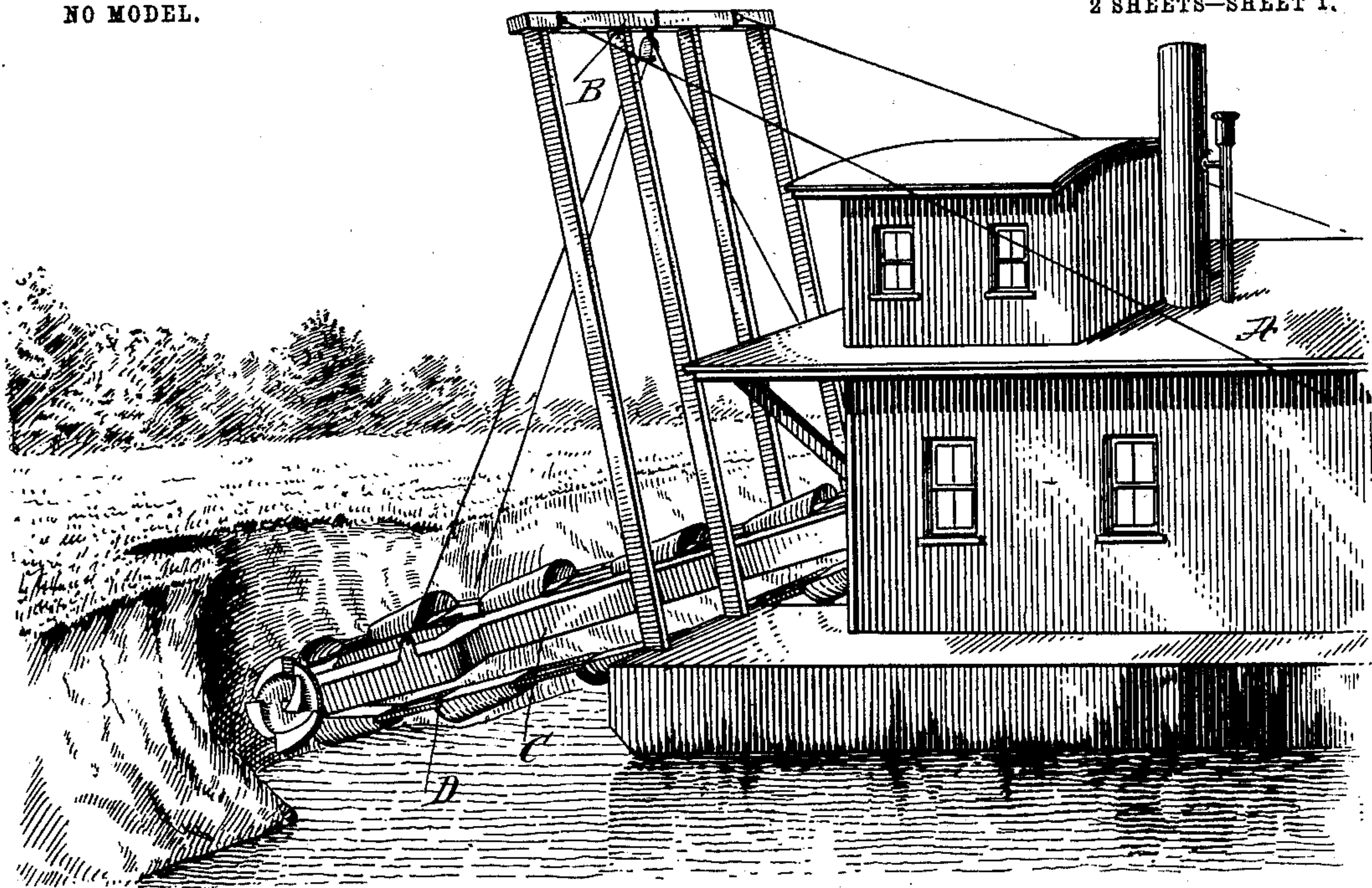
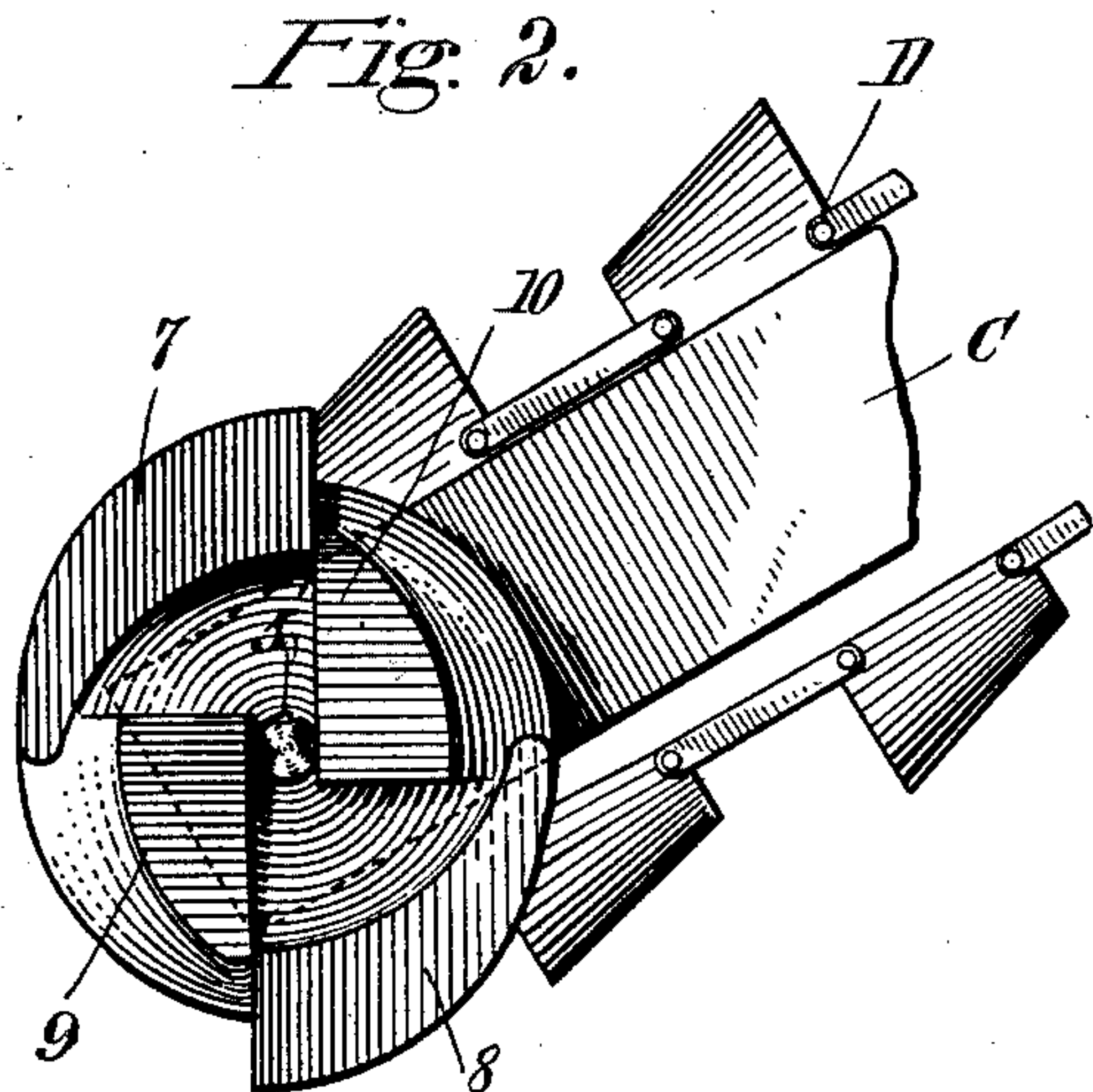


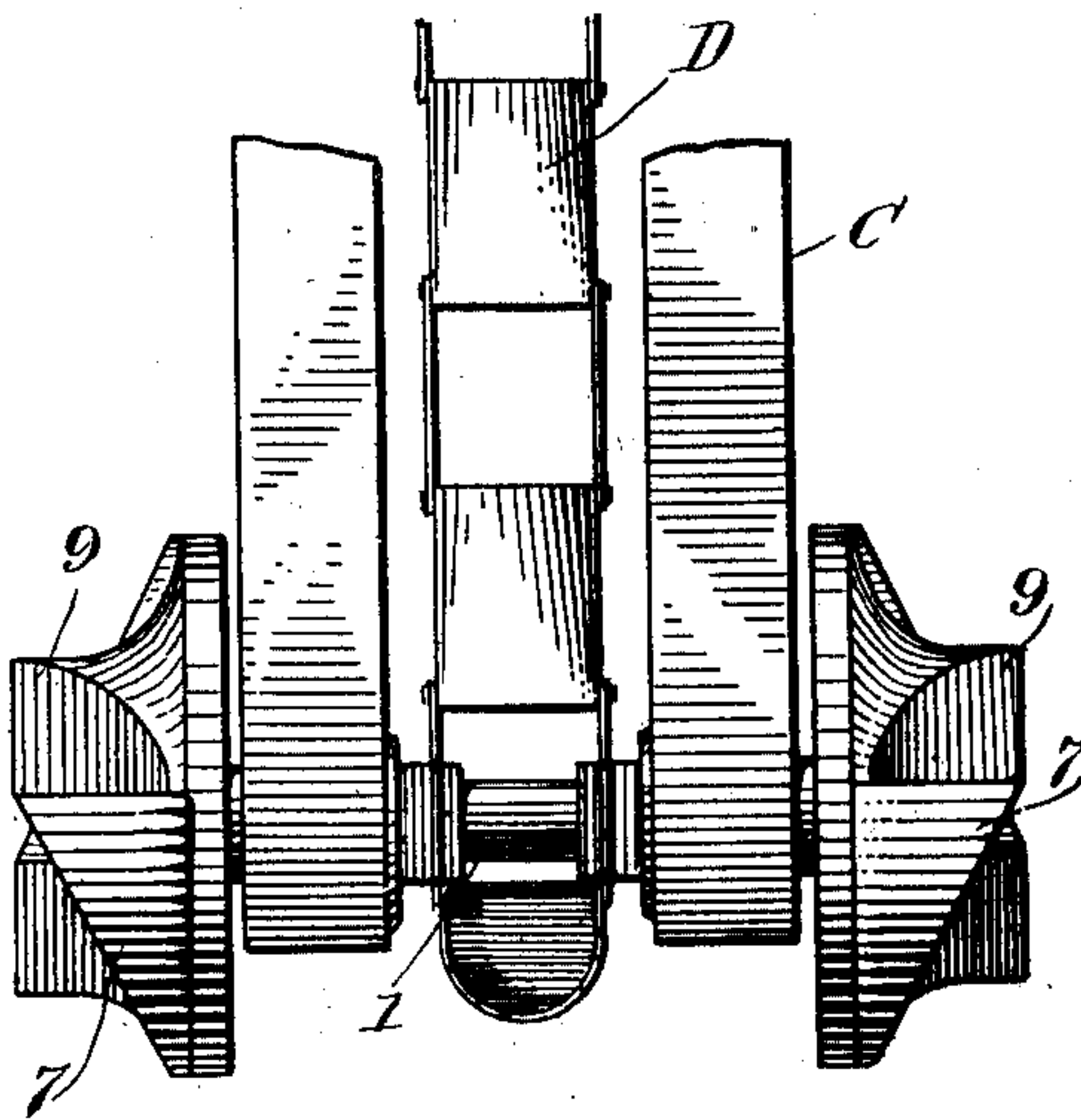
Fig. 1.



WITNESSES:

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Fig. 3.



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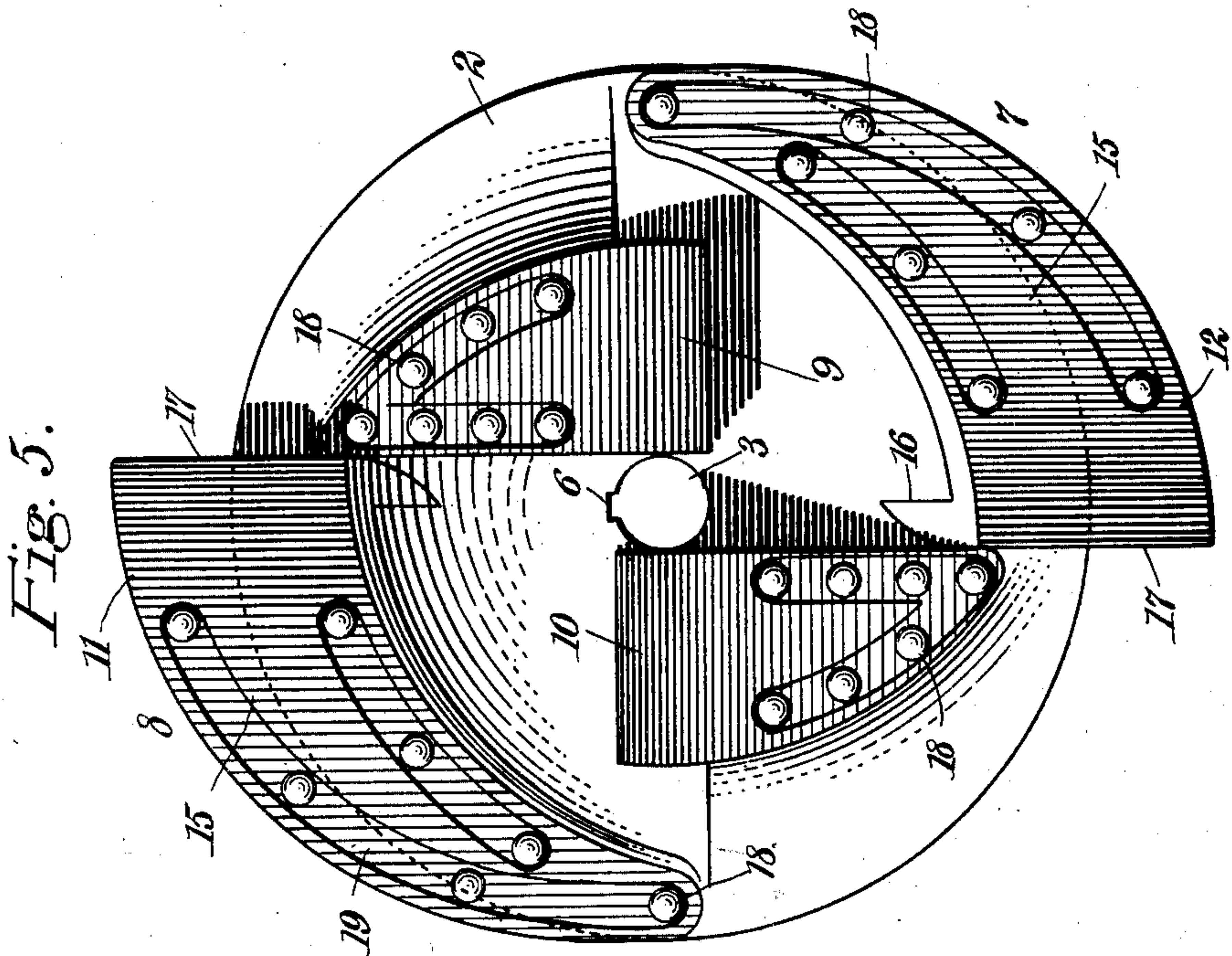
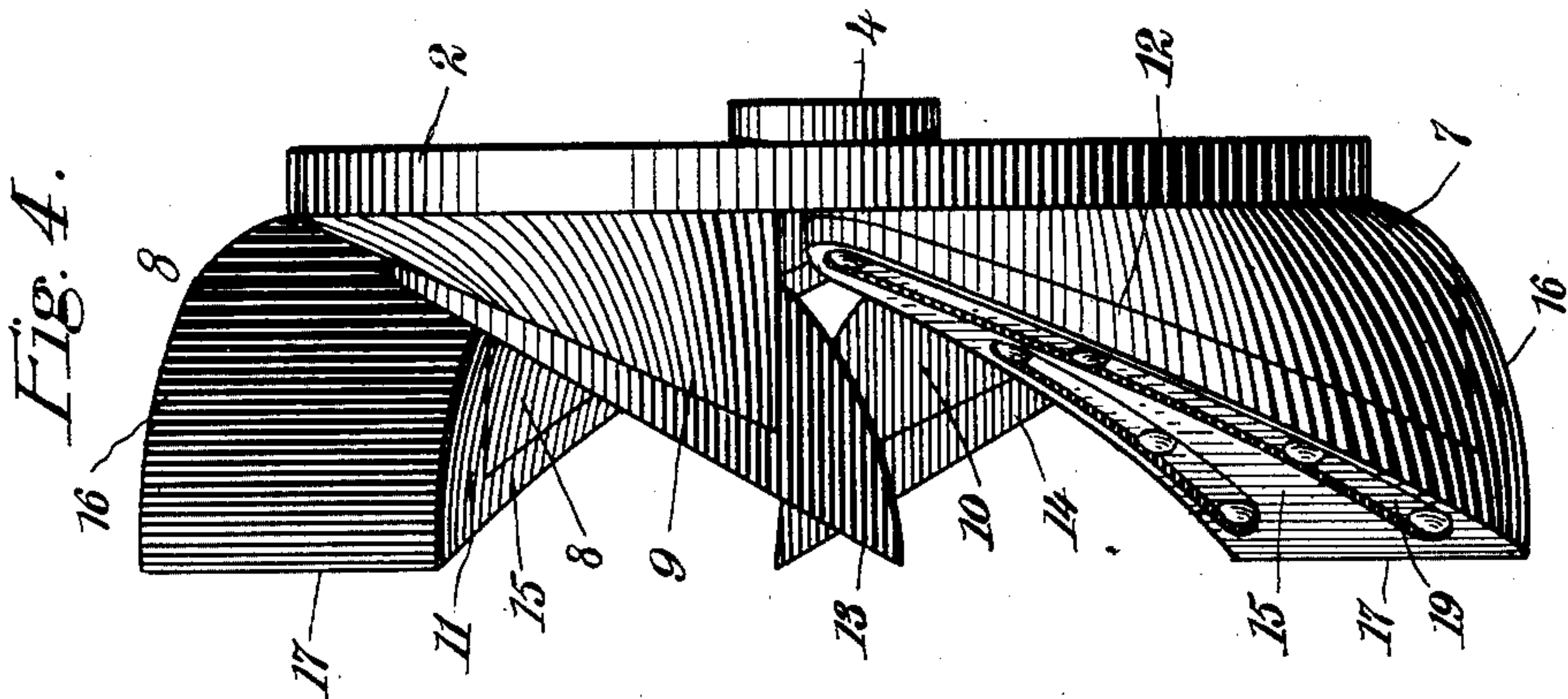
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2 SHEETS—SHEET 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FREDERICK W. THUNEN AND LOUIS L. CHESHIRE, OF OROVILLE,
CALIFORNIA.

DREDGER.

SPECIFICATION forming part of Letters Patent No. 731,976, dated June 23, 1903.

Application filed December 11, 1902. Serial No. 134,777. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK W. THUNEN and LOUIS L. CHESHIRE, both citizens of the United States, and residents of Oroville, in the county of Butte and State of California, have invented new and useful Improvements in Dredgers, of which the following is a full, clear, and exact description.

Our invention relates to certain novel and useful improvements in dredgers, and has particular application to the construction of the cutting-disks or diggers adapted for use on the type of dredgers commonly employed in mining operations.

In carrying out our invention we have particularly in view the provision of cutting or digging mechanism for the dredger which shall be so constructed that stones, rocks, and the like will be prevented from entering the space between the teeth or body of the digger and the side of the support or frame upon which the diggers are mounted, thus obviating the possibility of breaking or damaging the cutting-teeth of said diggers.

A further object of our invention is to so arrange the cutting-teeth upon disks that the largest possible cutting-surfaces shall be available and at the same time the aforesaid peculiarly-arranged teeth will throw or force the gravel or dirt cut from the bank to either side, as well as upward or downward, thereby greatly facilitating the work of loading the conveyer-buckets by forcing said dirt or gravel into the path of said buckets. In the present instance we also contemplate forming projections or extensions integral with the revolving disks, such extensions being adapted to have the cutting shoes or teeth detachably secured thereto, so that when one or more of the teeth are damaged by contact with jagged pieces of rock or similar obstructions or become worn through constant use such damaged cutters may be readily removed and new ones substituted.

A further object of the present invention is to provide a digging or cutting attachment for a dredger of the type described, which attachment shall be simple and durable in construction, positive in operation, presenting but little liability of being broken or deranged by contact with the earth or bank in

which said digger is working, and one which may be easily and readily attached to the said dredger when desired.

With the above-recited ends and others of a like nature in view our invention consists in the construction, combination, and arrangement of parts, as will be hereinafter delineated in the accompanying drawings, described in this specification, and set forth in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a view of a dredging apparatus of a well-known type having our improved cutting mechanism applied thereto. Fig. 2 is a view in side elevation of a portion of the conveyer-supporting frame or ladder, showing the manner of mounting the cutters thereon. Fig. 3 is a top plan view of a portion of the aforesaid conveyer and conveyer-frame, showing the arrangement of the turning-shaft and the mounting of the cutters on said shaft. Fig. 4 is an enlarged side elevation of one of the diggers or cutting-disks, and Fig. 5 is a face view of the same.

Referring now to the accompanying drawings, A designates a dredging boat or vessel of any well-known form or type provided with the usual derrick-frame B and its accompanying rigging, but as these parts do not affect the present invention but are merely conventional illustrations it is unnecessary to describe the same in detail. At one end of the aforesaid dredger is arranged the inclined supporting frame or ladder C, having journaled at its lower end a tumble or turning shaft 1, said shaft projecting slightly beyond the ends of said aforesaid frame or ladder and adapted to be encircled by and support a portion of the endless bucket conveyer D. At each extremity of the shaft 1 at a point adjacent to the outer wall of the parallel struts or standards forming the conveyer frame or ladder is adapted to be mounted one of our improved cutting-disks or diggers, the construction of which is more clearly shown in Figs. 4 and 5. On such digger comprises a disk or wheel 2, cen-

trally apertured or orificed, as at 3, to receive the sleeve or hub 4, through the medium of which hub or sleeve the disk is adapted to be keyed or splined on the shaft, a pin or key 5 entering a groove 6, formed in said orifice or aperture. The disk or wheel 2 is of peculiar construction—that is to say, it has cast integral therewith at points near its periphery the two inclined segmental projections or wings 7 and 8, the arc or curvature of said segmental projections extending slightly beyond the periphery of the disk or wheel. Two similar segmental projections 9 and 10 are arranged opposite to each other at points beyond the aforesaid peripheral segments 7 and 8, the latter projections 9 and 10 extending inwardly toward the center of said disks, the construction being such that all of the aforesaid projections extend at varying or different angles relatively to each other and to the axis of the disk or wheel. By this arrangement the two outer projections when provided with their cutting-teeth are adapted to describe in the course of their rotation a circle substantially equal to the circle described by the buckets of the endless conveyer revolving on the shaft, and the inwardly-extending projections will describe a circle of less diameter than the circle described by the peripheral projections. To each of the inclined segmental projections is adapted to be attached a cutting tooth or shoe, the teeth 11 and 12 of the peripheral projections being, of course, of relatively greater size than the teeth 13 and 14 of the inwardly-extending projections. The construction or formation of these teeth will be clearly seen by reference to Figs. 4 and 5. It will be seen by referring to said figures that these teeth are substantially of hook-shaped form—that is, are provided with a relatively long inclined face portion 15 and a short extension 16, arranged approximately at right angles to the aforesaid base portion 15, the edge at the outer angle of said faces, as at 17, being sharpened to form the cutting edge of the teeth or shoes. It will also be evident that the hook portion of the aforesaid teeth engages with the apex of the angular segmental projections, and the teeth are removably held in place by means of suitable studs or screws 18, which are seated in grooves 19, formed in the longitudinal faces 15 of the teeth.

With a digger or cutter constructed in accordance with the above description very satisfactory results can be attained, as the cutters may be quickly and easily mounted in position and the teeth attached or detached when desired. The feature of side feed possessed by our improved cutter is also very important, as the rapidity with which the dirt or gravel may be fed to the conveyers is greatly increased. When the cutters are mounted on the tumble or turning shaft of the conveyer, as they are in pairs—that is, one right-hand cutter and one left-hand cut-

ter—the teeth of said disks will be at varying angles relatively to each other.

While we have shown and herein described one particular embodiment of our invention, it is of course to be understood that we do not wish to consider ourselves as limited to the precise details of construction shown herein, as there can be modifications and variations in these respects without departing from the spirit of the invention or sacrificing any of the advantages thereof.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. A cutting attachment of the class described, comprising a disk having two inclined segmental projections formed thereon, the curved faces of said projections extending slightly beyond the periphery of the disk, and two additional projections extending inwardly from the periphery of the disk toward the center of the same, and cutting-teeth for said projections, substantially as set forth.

2. In combination with a dredging apparatus and the conveyer thereof, of disks mounted on the conveyer-shaft, a series of inclined oppositely-arranged projections formed on the outer face of each of said disks, and detachable cutting-teeth for said projections, substantially as set forth.

3. The combination with a dredging apparatus, and the conveying devices therefor, of disks mounted on the conveyer-shaft, a series of peripherally-arranged cutting-teeth on said disks, and a second series of cutting-teeth having the cutting edges thereof arranged at right angles to the cutting edges of the peripheral teeth, substantially as set forth.

4. In combination with a dredging apparatus and conveying devices therefor, of disks mounted on said conveyer-shaft, a series of inclined cutters mounted to have their cutting edges extend slightly beyond the periphery of the disks, and a second series of inclined cutters arranged to have their cutting edges extend inward toward the center of the disks, substantially as set forth.

5. In combination with a dredging apparatus and conveying devices therefor, of disks mounted to revolve with the shaft of the conveying devices, a series of projections formed integral with said disks and having one edge extending slightly beyond the periphery thereof, a second series of projections formed integral with said disks but extending toward the center thereof, cutting teeth or shoes for said projections, and means for detachably securing said teeth to said projections, substantially as set forth.

6. A cutting attachment comprising a disk, a series of inclined segmental projections formed at the periphery of said disk, said members of the series being inclined in different directions relatively to each other, a second series of inclined segmental projections formed integral with said disk, the said

projections of the second series being also inclined in different directions relatively to each other, and cutting-teeth for all the disks of the series adapted to be detachably secured
5 to said disks, the construction being such that the cutting edges of the teeth of the disk will lie in substantially the same vertical plane, substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

FREDERICK W. THUNEN.

LOUIS L. CHESHIRE.

Witnesses:

G. L. THUNEN,

M. E. DUNCAN, Jr.