

No. 745,448.

PATENTED DEC. 1, 1903.

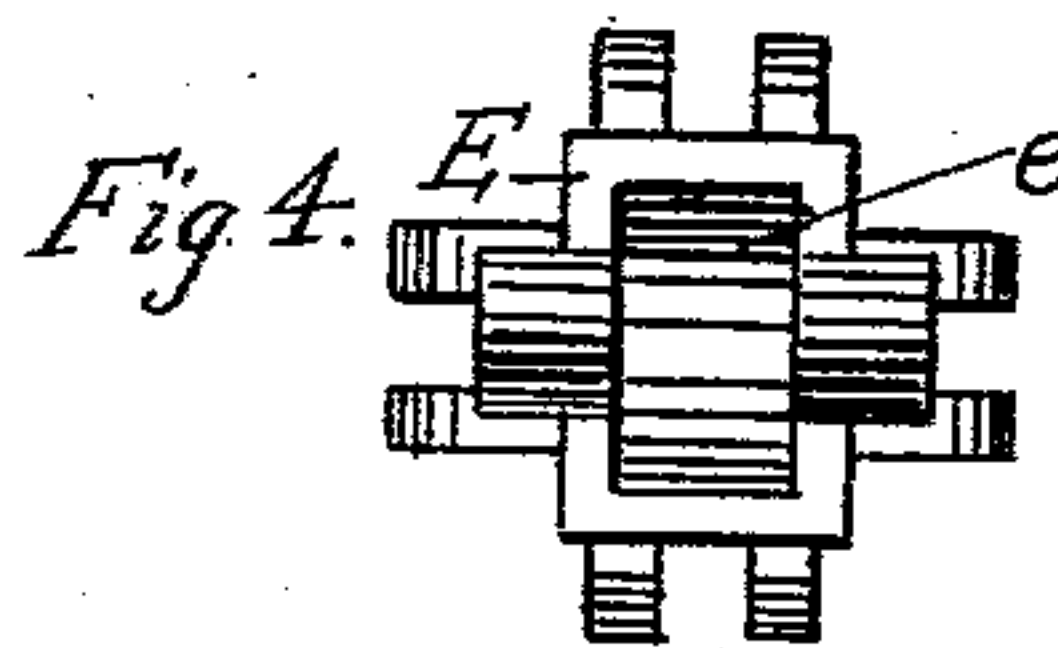
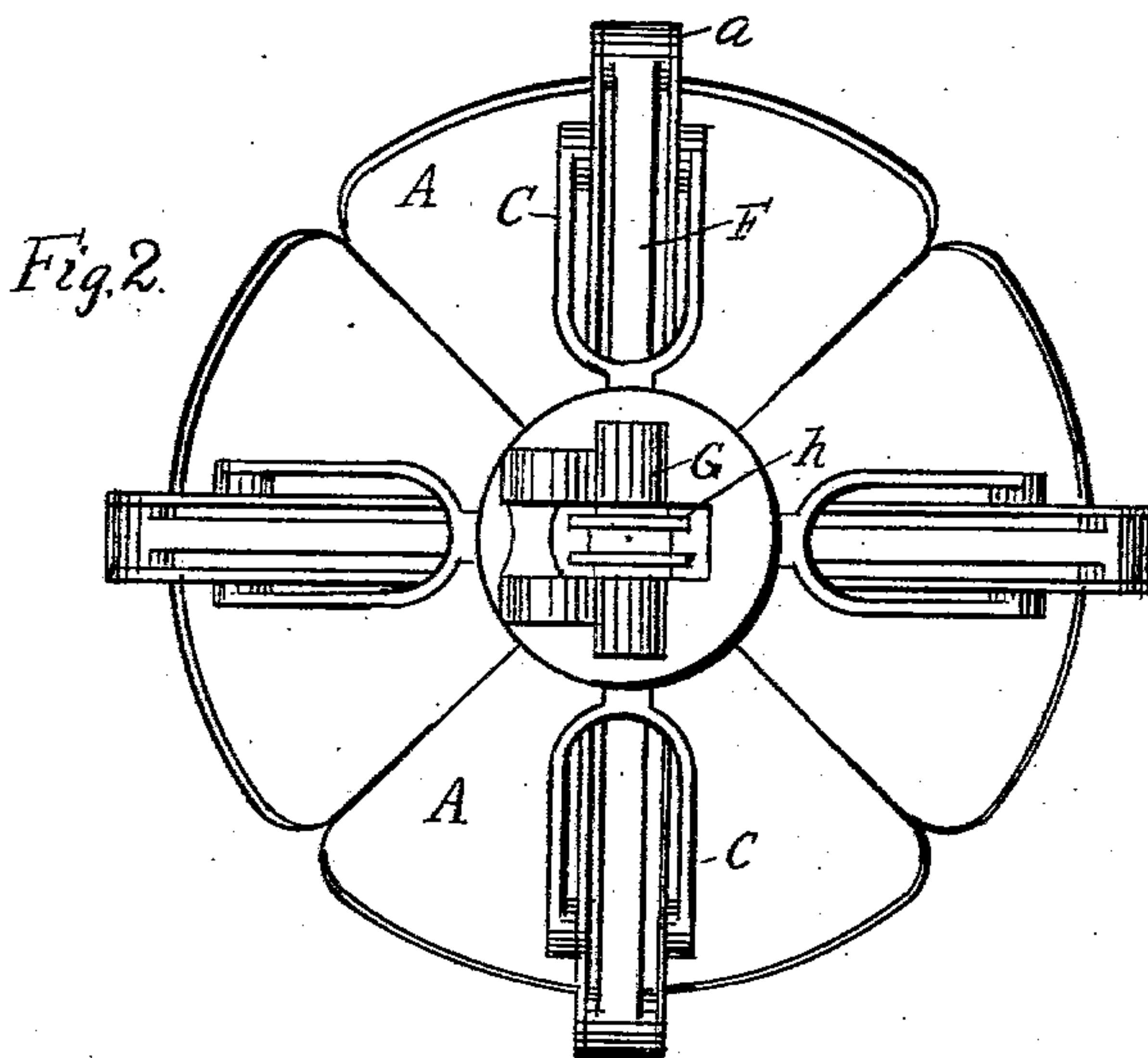
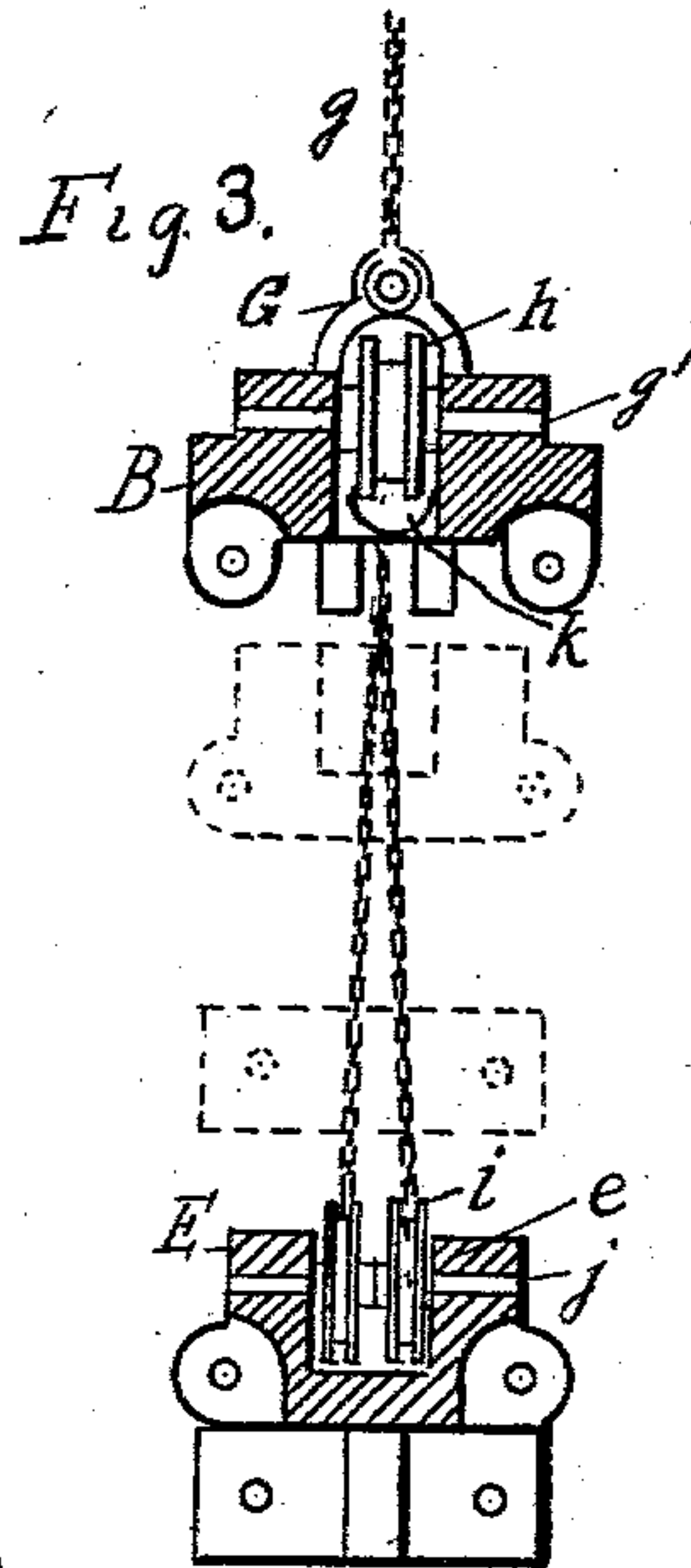
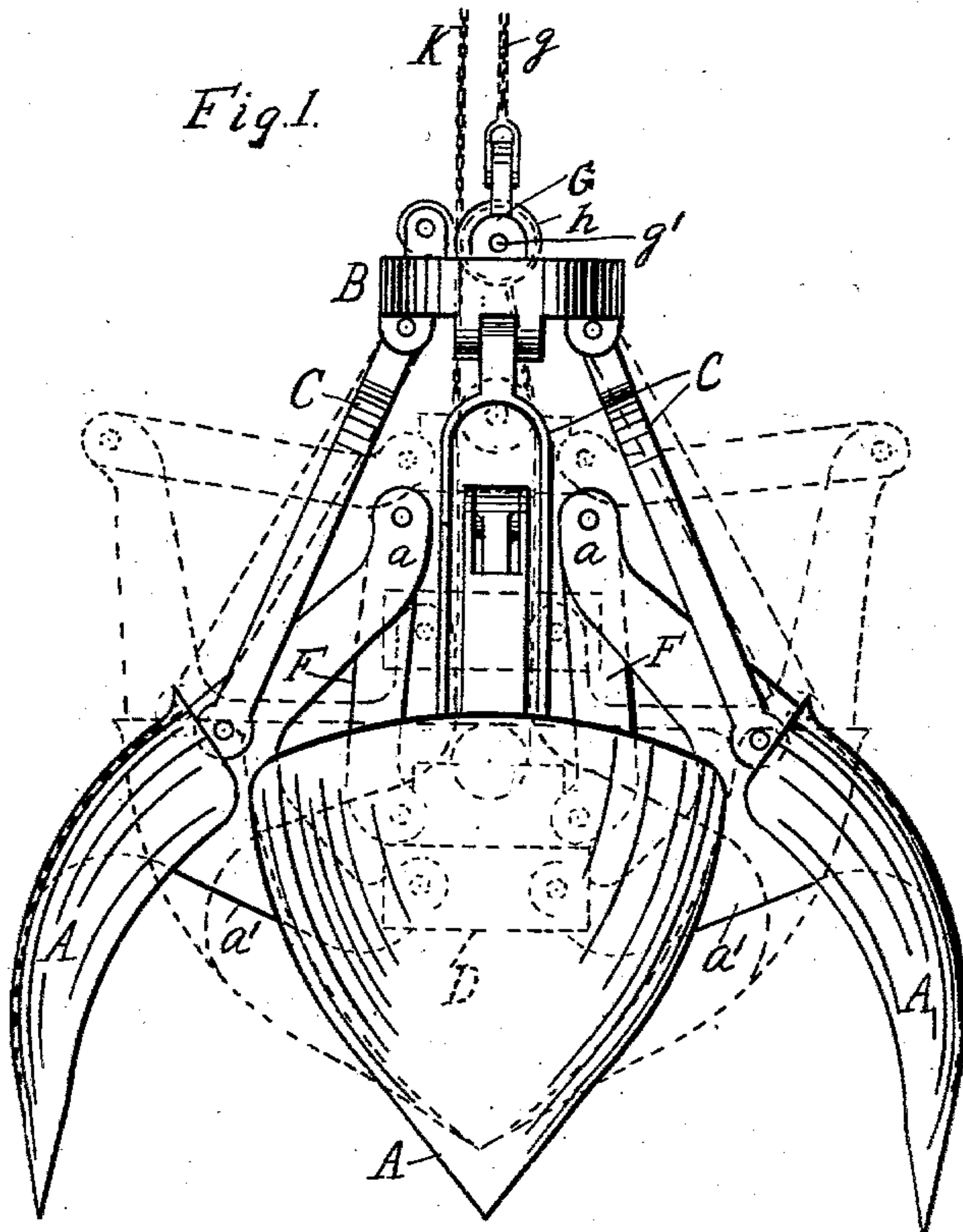
C. A. MARRDER.

EXCAVATING AND DREDGING BUCKET OR GRAPPLE.

NO MODEL.

APPLICATION FILED AUG. 30, 1902.

4 SHEETS—SHEET 1.



Witnesses  
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By his Attorney  
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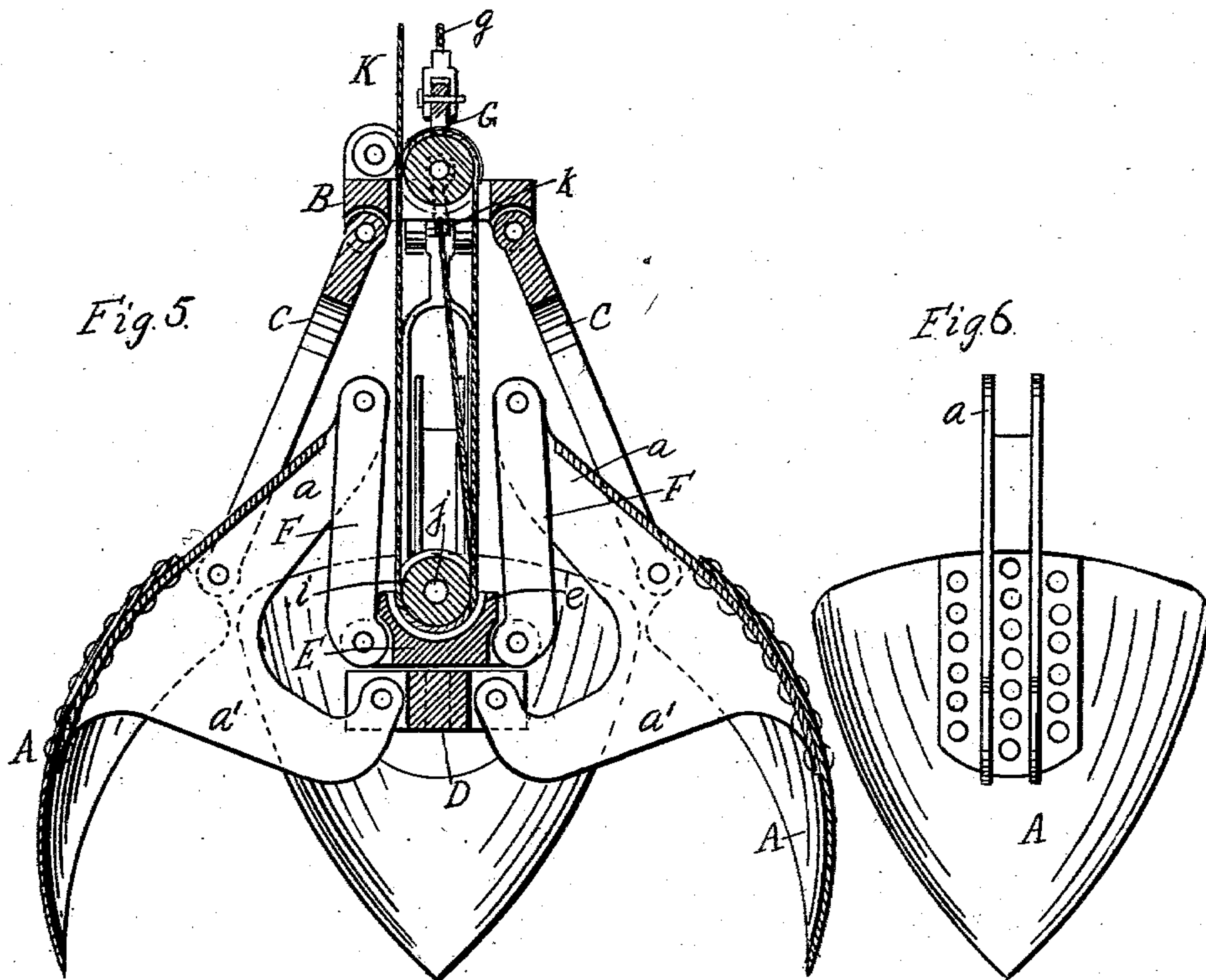
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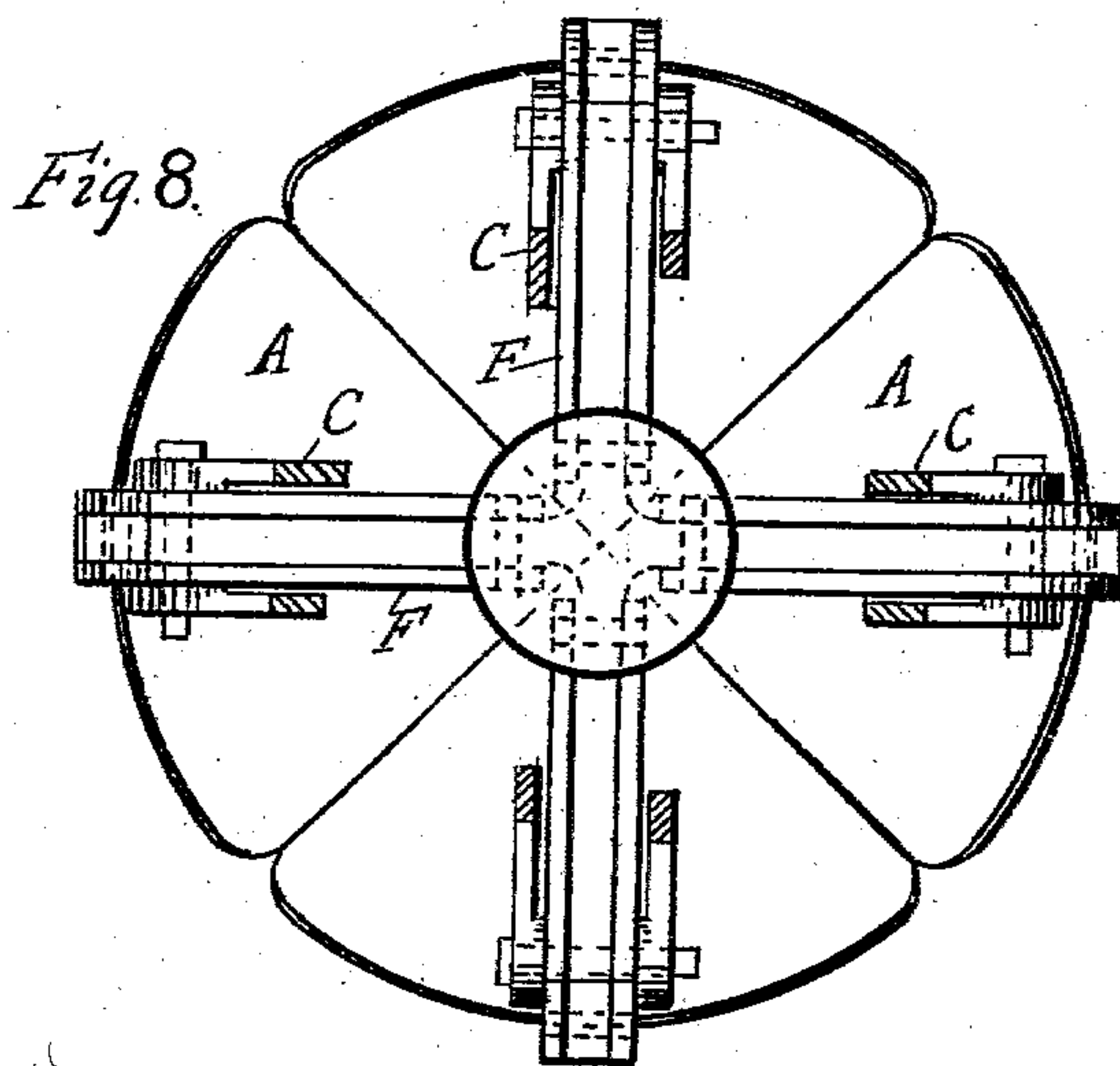
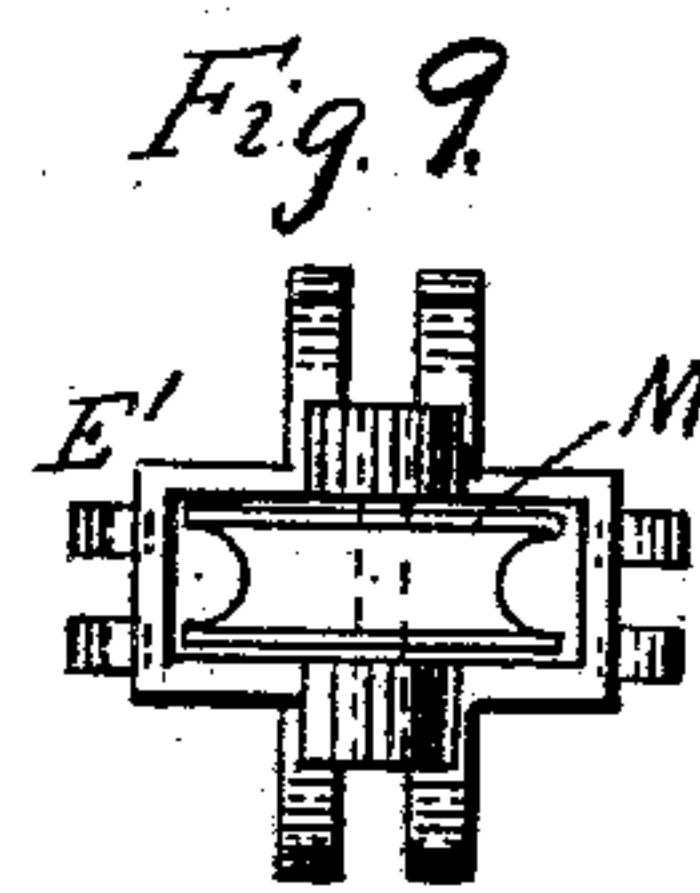
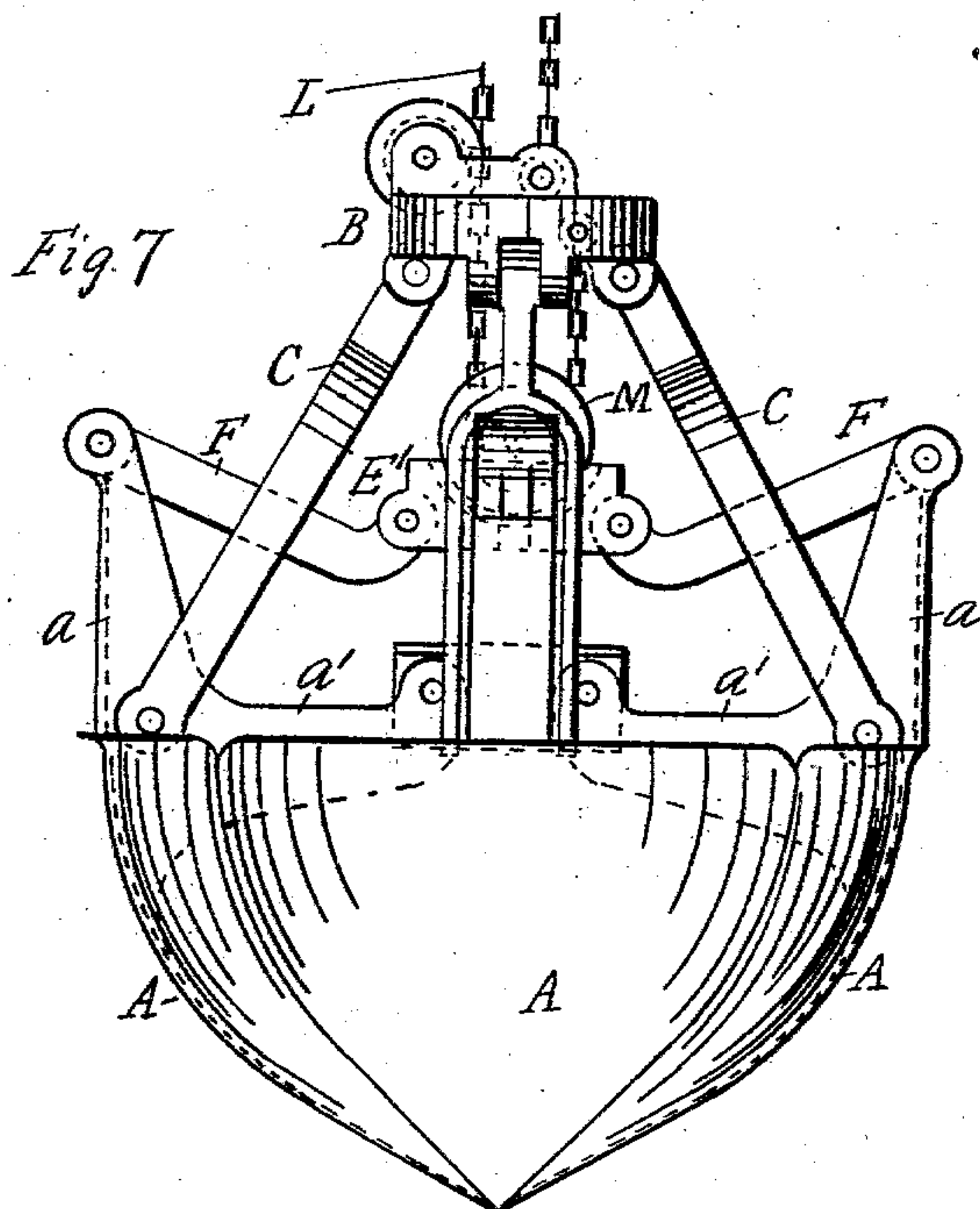
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4 SHEETS—SHEET 3.



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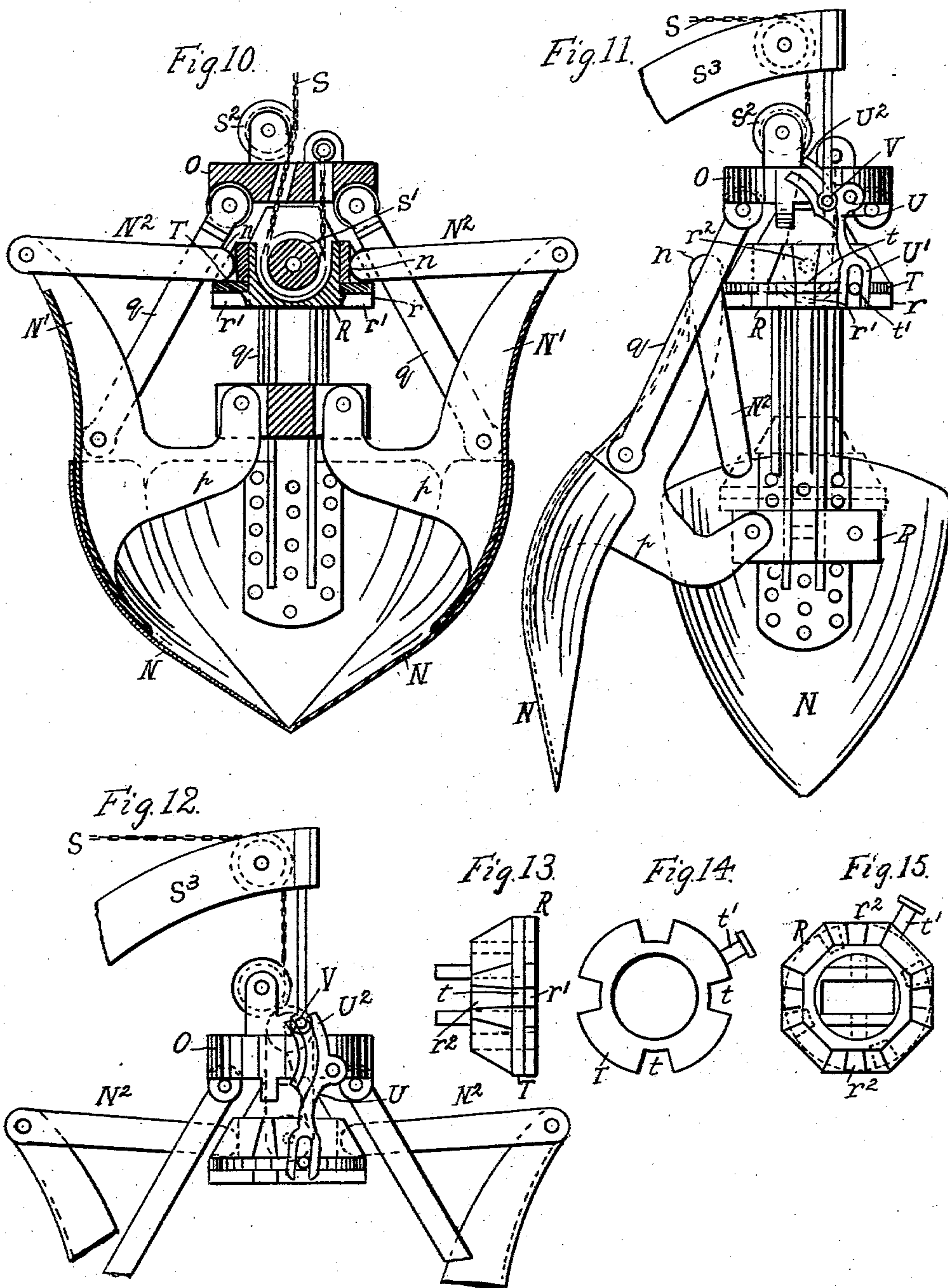
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## EXCAVATING AND DREDGING BUCKET OR GRAPPLE.

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NO MODEL.

4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

CHARLES A. MARRDER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO THE HAYWARD COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## EXCAVATING AND DREDGING BUCKET OR GRAPPLE.

SPECIFICATION forming part of Letters Patent No. 745,448, dated December 1, 1903.

Application filed August 30, 1902. Serial No. 121,565. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. MARRDER, a citizen of the United States of America, and a resident of New York, borough of Manhattan, State of New York, have invented certain new and useful Improvements in Excavating and Dredging Buckets or Grapples, of which the following is a specification.

This invention relates to an excavating and dredging bucket or grapple of the class in which grappling scoop sections or jaws are pivoted to links carried by a head-block, the scoop-sections being provided with lever-arms and with opening-arms which are respectively pivoted to an intermediate block and to a foot-block, the intermediate block being raised or lowered for the purpose of closing or opening the scoop-sections.

The object of the invention is to improve on this class of excavating-buckets by considerably increasing the power thereof to enter and remove a quantity of earth or other material, and especially in case of clay or hard earth to enable the same to efficiently penetrate the same, this being accomplished by less height and width in the buckets than heretofore.

My invention consists of certain features of construction and combinations of parts, to be hereinafter described and then particularly claimed.

In the accompanying drawings, Figure 1 is a side elevation of one form of my improved excavating and dredging bucket shown in open position, dotted lines indicating its closed position. This form of bucket is desirable where great power of penetration and quickness of motion of the scoop-sections are required. Fig. 2 is a plan view of the same. Fig. 3 is a detail view of the head, foot, and intermediate blocks—two of them in section—the full lines indicating the position when the scoop-sections are open and the dotted lines indicating closed position of the scoop-sections. Fig. 4 is a detail plan view of the intermediate or strike block. Fig. 5 is a longitudinal central section of this form of the invention at right angles to Fig. 3, the scoop-sections being shown open. Fig. 6 is a detail elevation of one of the scoop-sections. Fig. 7 is a side elevation of a modified form of the

invention in which the bucket is designed especially for lifting and lowering only. Fig. 8 is a plan view of same, partly in section. Fig. 9 is a detail plan view of the intermediate or strike block. Fig. 10 is a longitudinal central section of a form of the invention in which the excavating-bucket is raised and lowered and the scoop-sections operated by a single suspension-chain and the bucket is sustained from a traveling carrier, the closing and opening of the scoop sections or jaws taking place automatically. Fig. 11 is a side elevation of this form of the invention in open position, two of the scoop-sections, however, being omitted for the sake of clearness. Fig. 12 is a side elevation in closed position, the lower part of the bucket being broken away. Figs. 13, 14, and 15 are detail views of the intermediate block.

Referring to Figs. 1 to 6, inclusive, A indicates the grappling scoop-sections; B, the head-block; C, links pivotally connecting the head-block and scoop-sections;  $\alpha$ , the lever-arms of the scoop-sections;  $\alpha'$ , the opening-arms thereof; D, the foot-block to which the opening-arms are pivoted, and E the strike-block, which is pivotally connected with the lever-arms  $\alpha$  by links F. These parts, with the exception that the intermediate block is not a "strike-block," are old in the art and need not be described in detail to indicate the present improvements. It is evident that the grappling scoop sections or jaws may be two, three, or more to operate as a grapple, bucket-scoop, or clam-shell bucket.

A characterizing feature of this invention is that the parts are so proportioned and arranged as by turning upwardly and inwardly the ends of the opening-arms  $\alpha'$  and by so distancing the blocks D and E from each other that when the scoop-sections are fully opened by the resistance during penetration of the scoop-sections the block E strikes upon the foot-block, and thereby stiffens and strengthens the parts to relieve the same against the shock due to the said resistance.

In Figs. 1 to 6 a block-and-tackle arrangement is provided for the purpose of accelerating the motion of the scoop sections or jaws and to render them more powerful. To this



end the lifting-rope  $g$  is pivoted on an arch or support  $G$  on the head-block  $B$ , and in the part  $G$  is mounted the shaft or pivot  $g'$  for the sheave or pulley  $h$ , while in a cup-shaped portion  $e$  of the intermediate or strike block  $E$  turns a sheave or pulley  $i$  on a pivot or shaft  $j$ . Over the pulleys or sheaves  $h$  and  $i$  is trained once or twice or the desired number of times an operating cable or rope  $K$ , which is fixed to the head-block  $B$  at  $k$ . It will be seen that when an excavating or dredging bucket such as described is lowered by the rope or cable  $g$  and when the rope or cable  $K$  is let out or slackened the scoop-sections  $A$  will automatically open, due to the weight of the intermediate block  $E$ ; but this is also due in part to any contents in the bucket. As the lowering is performed quickly and suddenly, the points or lower ends of the scoop-sections  $A$  will forcibly strike or penetrate the earth or other material to be grappled, thus striking the block  $E$  upon the block  $D$  and affording that strength and resistance which are desirable to distribute the shock properly.

Referring to Figs. 7, 8, and 9, corresponding parts are indicated by the same reference letters, and the only difference over the described form of the invention other than a possible difference in the shape is that in place of the operating-rope  $K$  an operating-rope  $L$  is substituted and the power sheave or pulley is dispensed with, so that the operating cable or rope simply passes or is trained around one pulley  $M$ , which is mounted to turn on the intermediate or strike block  $E'$ . This form of the invention is not so powerful as the main form, but is desirable in certain cases.

In Figs. 10 to 15, inclusive, which exhibit a third form of the invention,  $N$  indicates the scoop sections or jaws;  $O$ , the head-block;  $P$ , foot-block;  $p$ , the opening-arms pivoted to the foot-block;  $q$ , links supporting the sections from the head-block, and  $R$  the intermediate or strike block, which is shown in detail in Figs. 13, 14, and 15. In this form of the invention a single rope or cable  $S$  is preferably used to both lift and lower the bucket and operate the scoop-sections, the same passing over the pulley  $S'$ , mounted in the intermediate block  $R$ , a guide-pulley  $S^2$ , mounted on the head-block, and a pulley on the boom  $S^3$ . The intermediate or strike block is not in this form of the invention pivotally connected with the operating-levers  $N'$  of the scoop-sections. The operating-levers  $N'$  carry floating links  $N^2$ , the ends  $n$  of which are rounded or convexed. The ends  $n$  of the floating links  $N^2$  are adapted to be automatically engaged by the intermediate block, as in Fig. 10. This position takes place when the scoop-sections are closed; but when the scoop-sections are opened for discharging material the floating links are free from the intermediate block.

A flange  $r$  is formed on the intermediate block  $R$  and is provided with edge recesses

$r'$ , arranged opposite the floating links  $N^2$ , so that the ends thereof may pass through the recesses. A turning ring  $T$  is located on the upper side of flange  $r$  and has recesses  $t$ , adapted to register with the recesses  $r'$ . After the bucket has been opened by the release of the floating links from the block  $R$  and the bucket has struck the material to be raised the intermediate block lowers relatively to the adjacent parts. Upon penetration of the material to be raised the bucket is raised, thus bringing the intermediate block through ring  $T$  in engagement with the ends of the floating links that enter recesses  $r^2$  in the block above the ring. The intermediate block and links  $N^2$  now act like a toggle to close the scoop sections or jaws. Just before the bucket reaches the limit of upward motion a shifting-lever  $U$ , pivoted to head-block  $O$ , is rocked automatically to turn the turning ring by the engagement of its forked or slotted end  $U'$  with a pin  $t'$  on the turning ring  $T$  and register its recesses with the recesses in the block, so that the ends of the floating links may drop through the ring-recesses and the lower recesses in the block, thereby permitting the automatic opening of the scoop sections or jaws and the dropping of the links into the position shown in Fig. 11. The automatic action of the lever  $U$  may be effected in the case of a boom-suspended bucket or grapple by a trip-pin  $V$ , supported from the boom, which is engaged by a recessed or slotted cam portion  $U^2$  of the lever. At the commencement of the lowering movement of the bucket the lever  $U$  is rocked back and the turning ring  $T$  turned, so as to close the lower recesses  $r'$  of the block  $R$ . In lowering the block the same snaps past the lower ends of the floating links, as indicated by dotted lines in Fig. 11, so that on raising the block the same will engage the said links, as shown in Figs. 10 and 12. It is evident that the automatic action may be performed in various ways, according to the manner of supporting the bucket and the nature of the traveling support.

What I claim as new is—

1. In an excavating or hoisting bucket, the combination of scoop sections or jaws, a head-block, links connecting the head-block to the scoop sections or jaws, a foot-block, operating-arms pivoted to the foot-block, a strike-block, lever-arms, means for spreading the lever-arms from the strike-block, and an operating cable or chain, the foot-block receiving the impact of the strike-block, substantially as described.

2. In an excavating or hoisting bucket, the combination of scoop sections or jaws provided with lever-arms and with operating-arms, a head-block, links connecting the head-block to the scoop sections or jaws, a foot-block to which the operating-arms are pivoted, a strike-block for abutting upon the foot-block, links pivoted to the lever-arms and operated from the strike-block, pulleys



supported by the head-block and strike-block, and an operating cable or chain, trained a number of times over the pulleys to form a block and tackle, substantially as described.

5 3. In an excavating or hoisting bucket, the combination of the head-block, foot-block, scoop sections or jaws pivoted to both blocks, an intermediate block, an operating cable or chain for raising and lowering the intermediate block and the bucket, floating links pivoted to the scoop sections or jaws, and suitable means for engaging the free ends of the floating links with the intermediate block, substantially as described.

15 4. In an excavating or hoisting bucket, the combination of the head-block, foot-block, scoop sections or jaws pivoted to both blocks, an intermediate block, an operating cable or chain for raising and lowering the intermediate block and the bucket, floating links pivoted to the scoop sections or jaws, and a locking device for confining the free ends of the floating links in engagement with the intermediate block, substantially as described.

25 5. In an excavating and hoisting bucket, the combination of scoop sections or jaws, the head-block supporting them, a foot-block with which the scoop-sections are connected, floating links pivoted to the scoop-sections, an intermediate block, means for raising and lowering the latter relatively to the other blocks, and means for automatically engag-

ing the intermediate block with the floating links, substantially as described.

6. In an excavating and hoisting bucket, 35 the combination of scoop sections or jaws, the head-block supporting them, a foot-block with which the scoop-sections are connected, floating links pivoted to the scoop-sections, an intermediate block, means for raising and 40 lowering the latter relatively to the other blocks, a turning ring mounted on the intermediate block, both the latter and the ring having registerable recesses, and means for automatically turning said ring, substantially 45 as described.

7. In an excavating and hoisting bucket, the combination of scoop sections or jaws, the head-block and foot-block with which they are connected, an intermediate recessed block, a 50 turning ring thereon having recesses to register with the recesses of the intermediate block, floating links on the latter, the ends of which are engaged by said ring, a pivoted lever on the head-block for actuating the turn- 55 ing ring, and means for automatically acting on the pivoted lever when the device is fully raised, substantially as described.

Signed at New York, N. Y., this 26th day of August, 1902.

CHARLES A. MARRDER.

Witnesses:

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MARIE A. CORGE.