

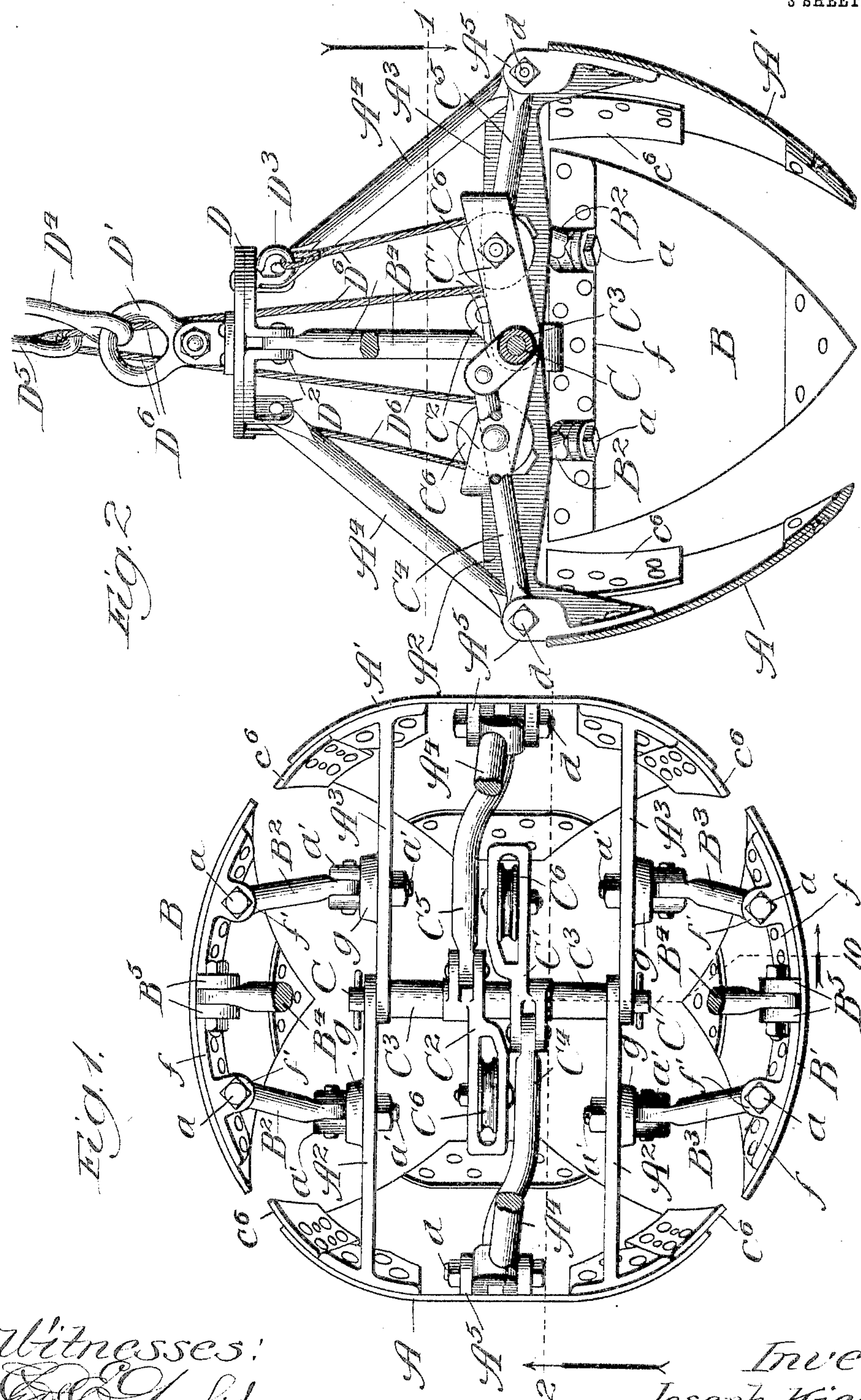
No. 793,880.

PATENTED JULY 4, 1905.

J. KIESLER.  
POWER SHOVEL.

APPLICATION FILED MAR. 23, 1903. RENEWED NOV. 28, 1904.

3 SHEETS—SHEET 1



Witnesses:  
Ed. C. Taylor,  
Geo. C. Harrison.

Inventor:  
Joseph Kiesler,  
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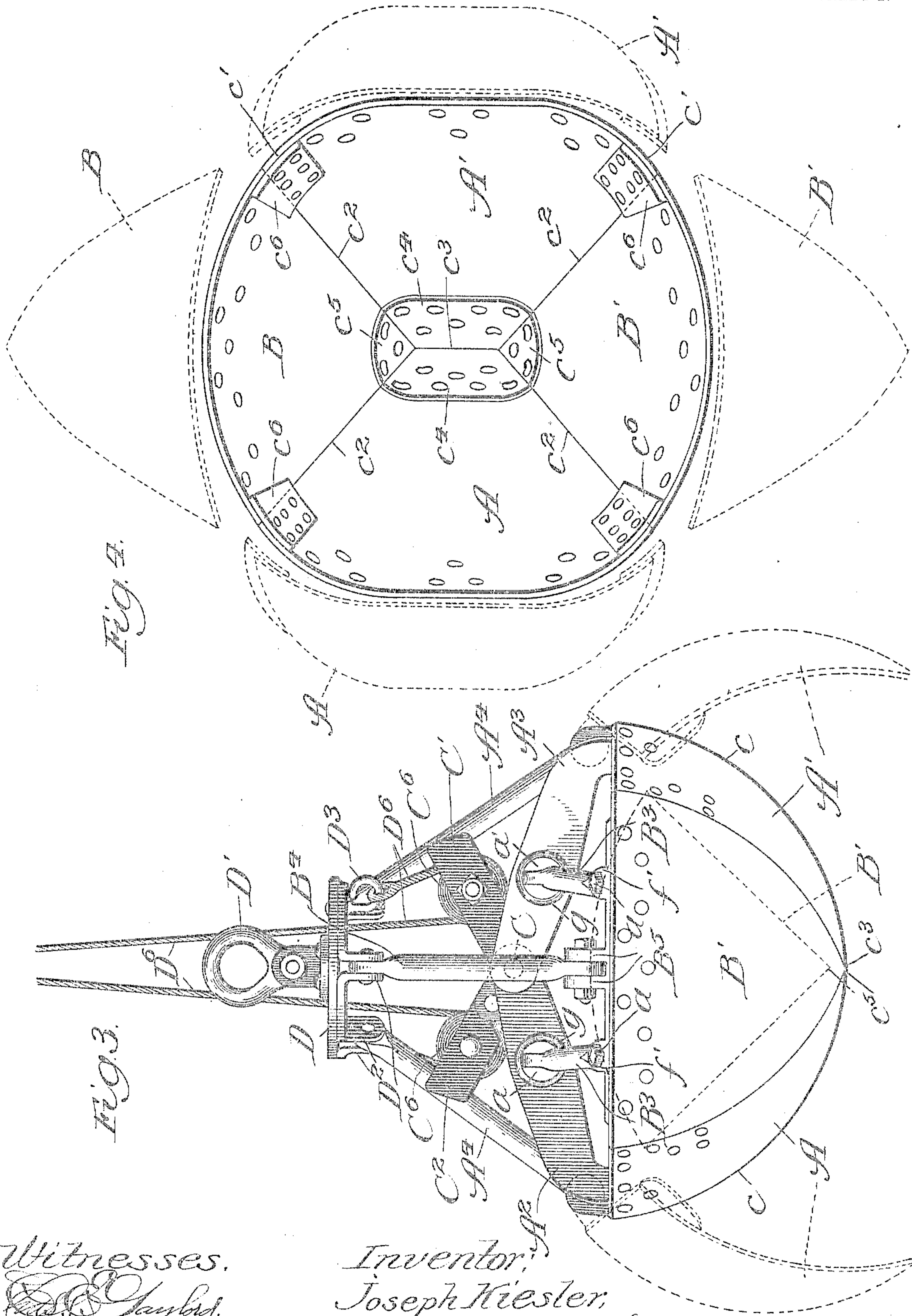
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3 SHEETS—SHEET 2.



Witnesses.  
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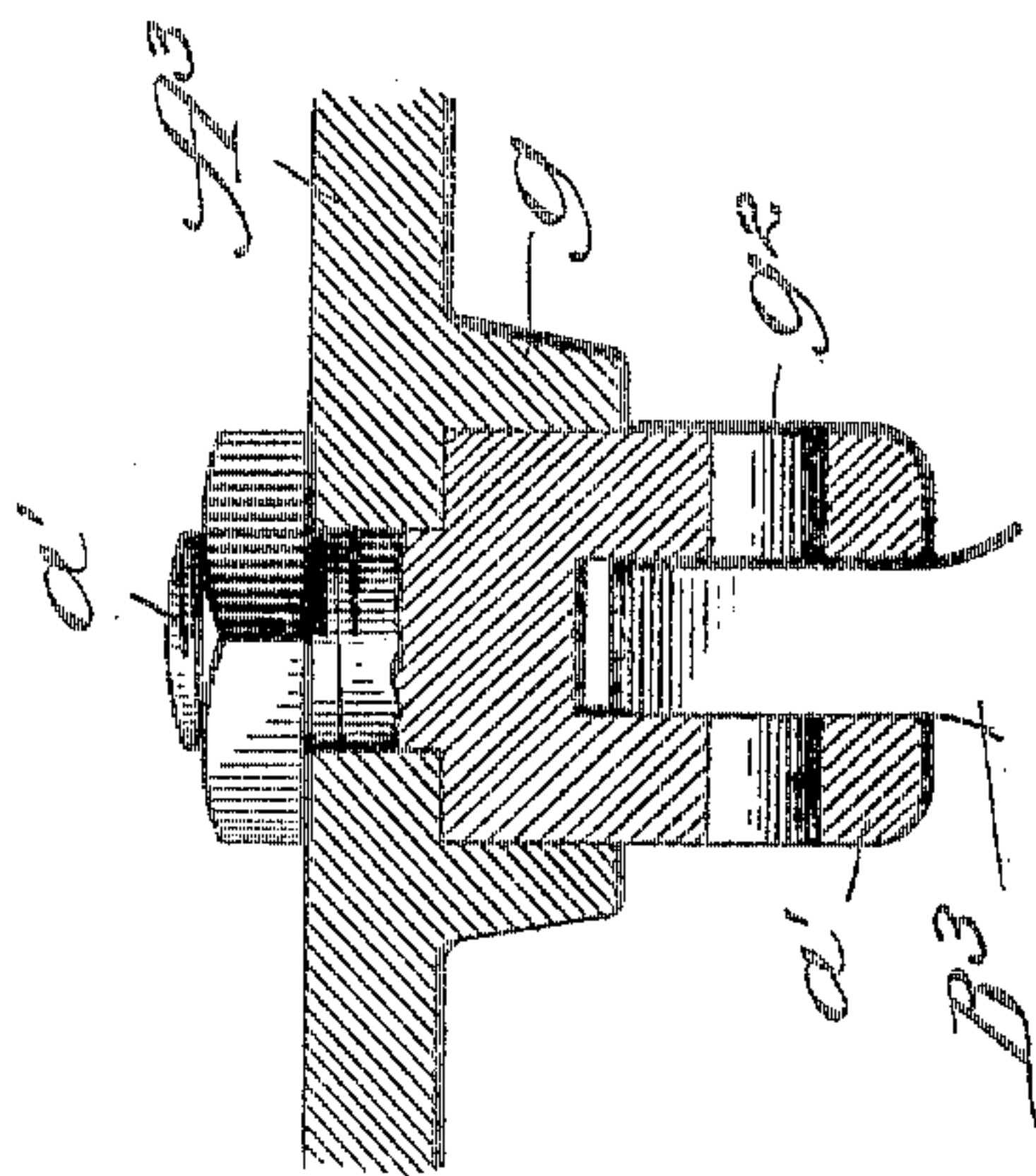
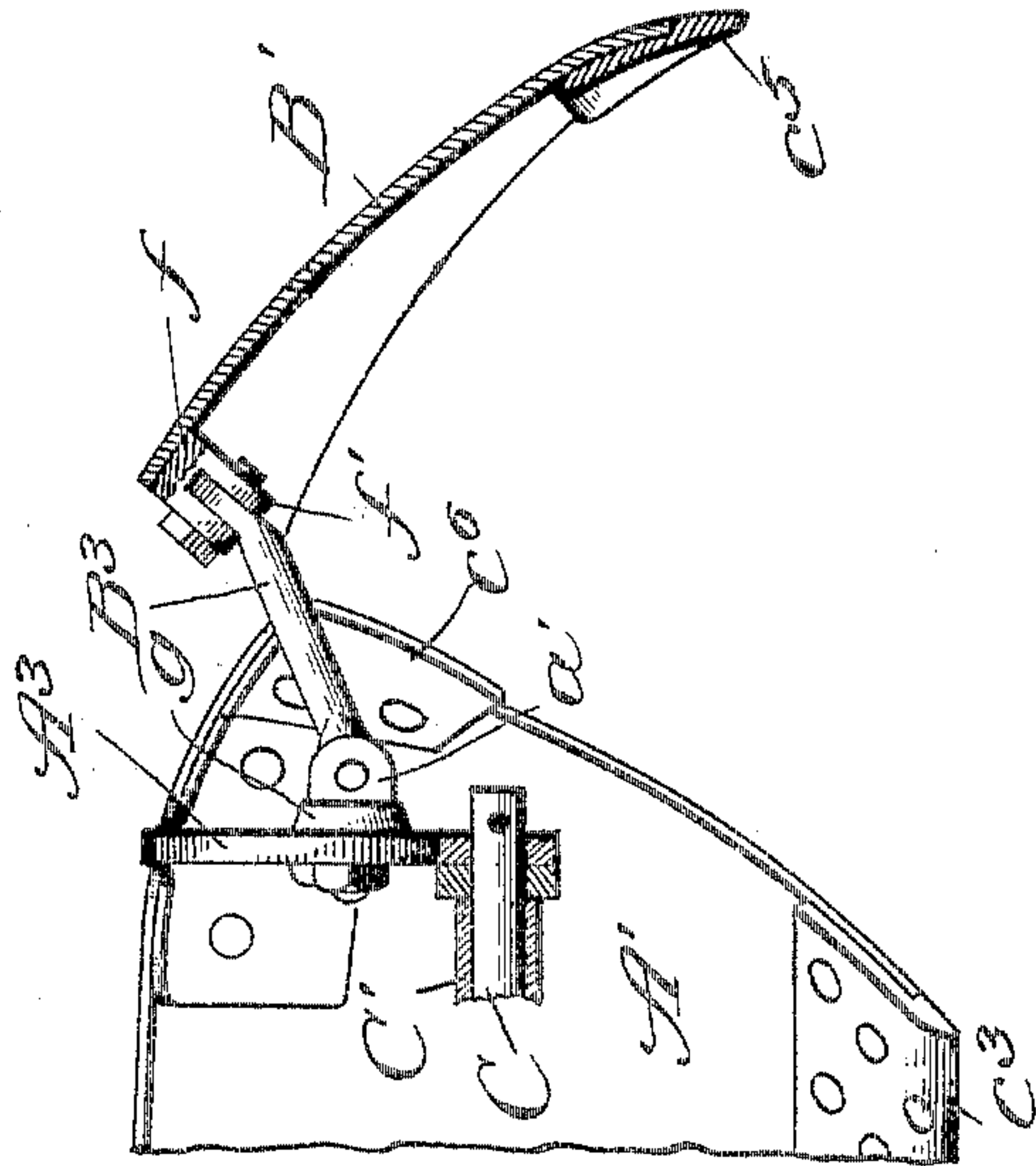
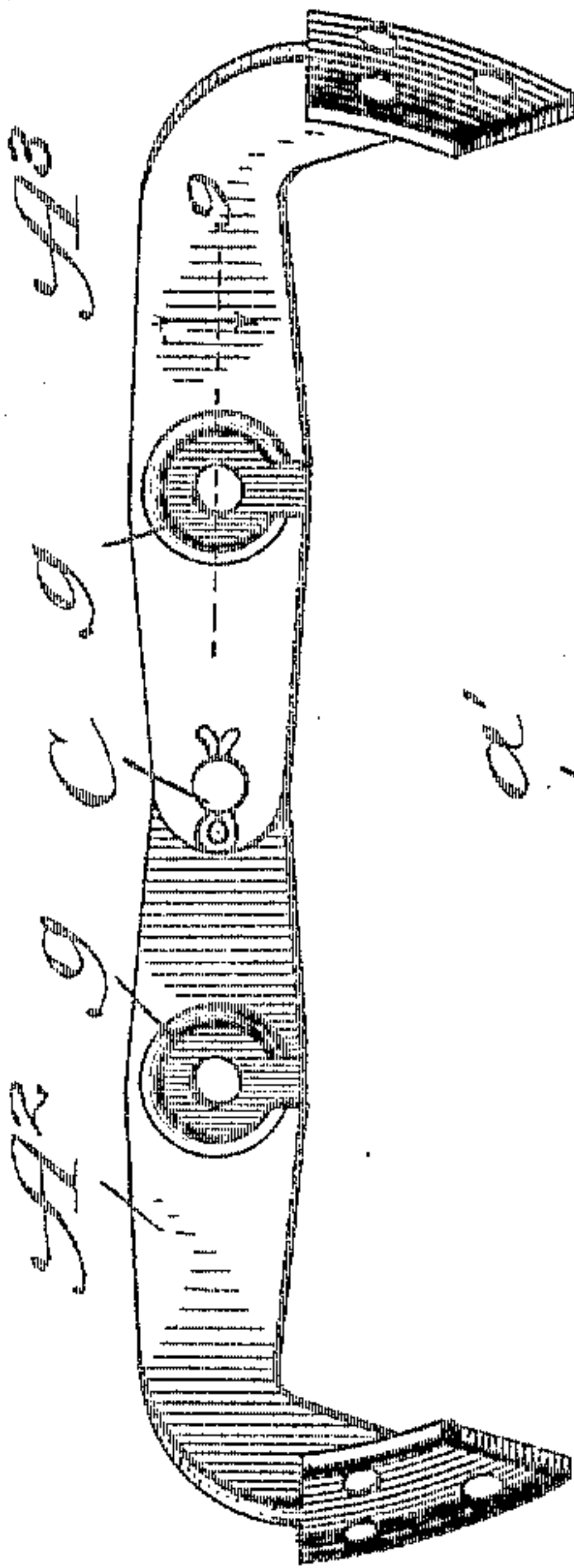
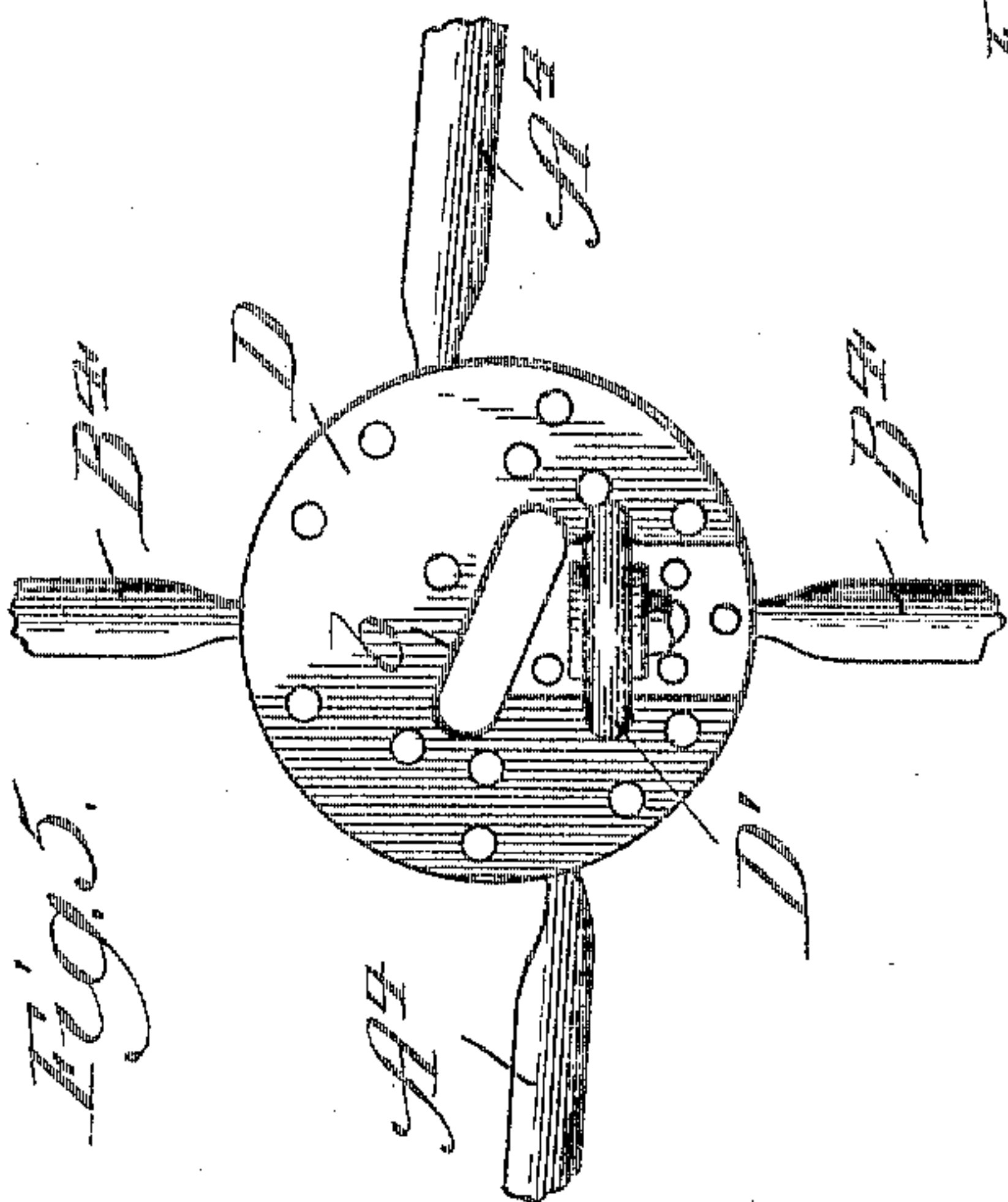
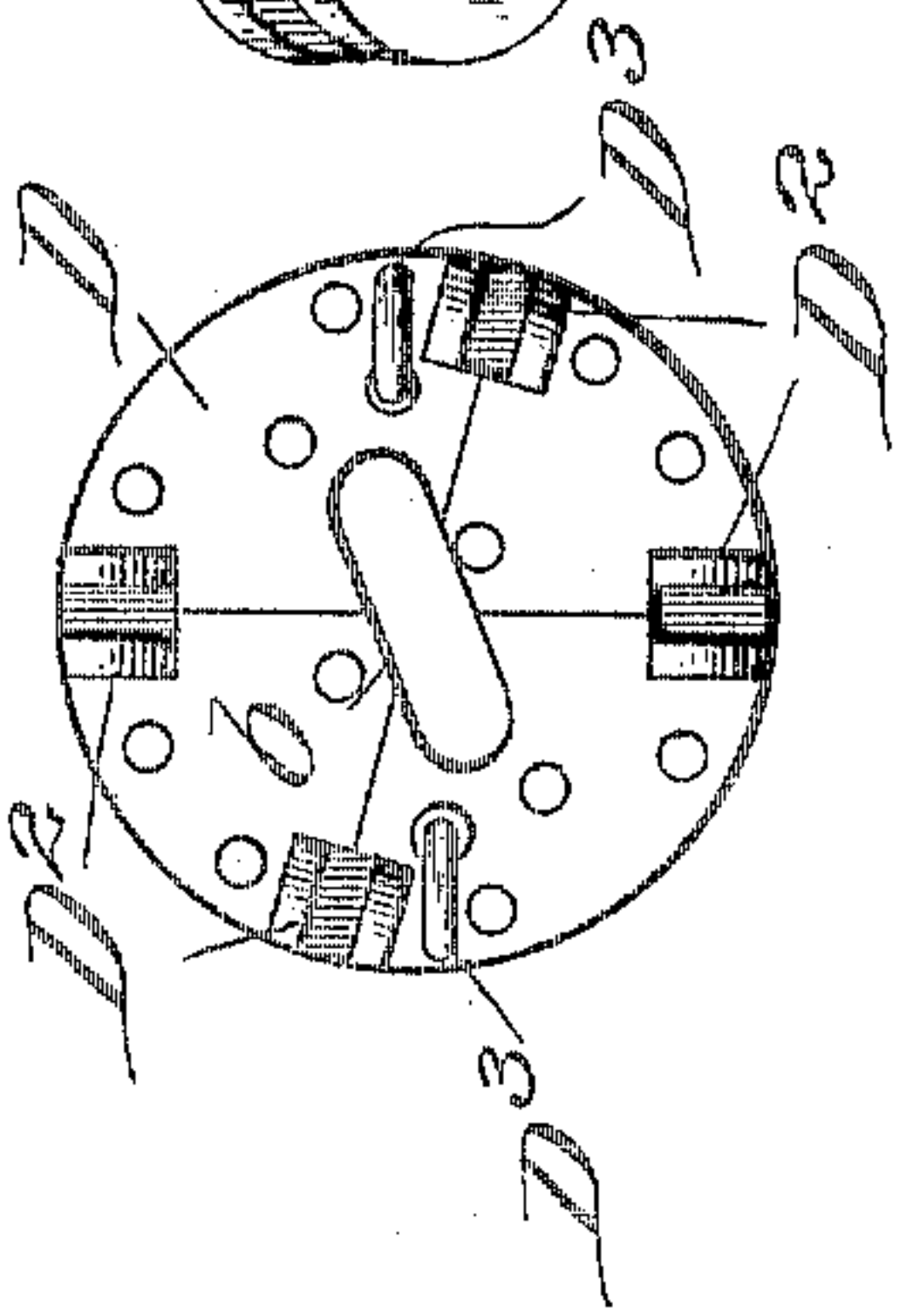
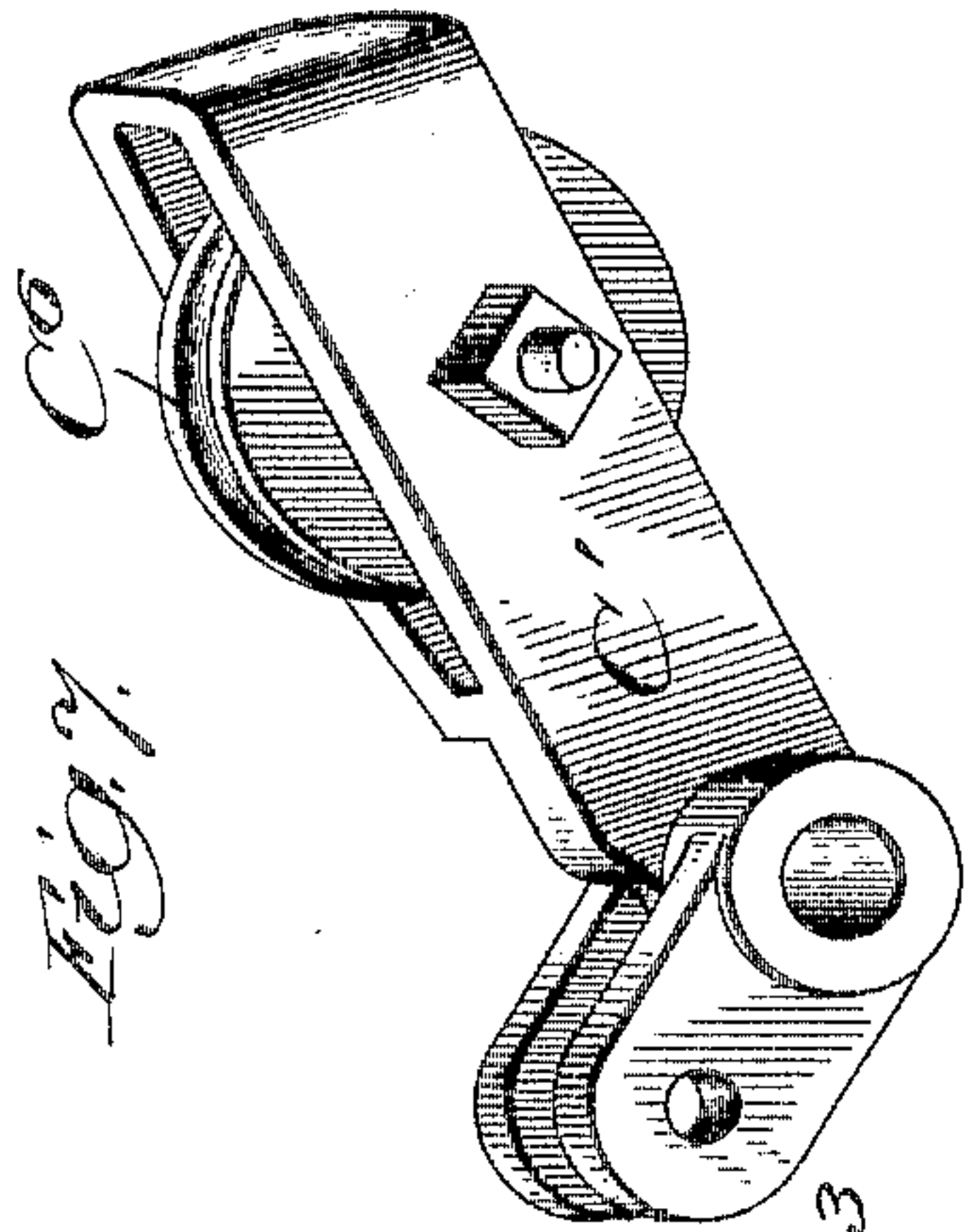
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J. KIESLER.  
POWER SHOVEL.

APPLICATION FILED MAR. 23, 1903. RENEWED NOV. 28, 1904.

3 SHEETS--SHEET 3.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

JOSEPH KIESLER, OF CHICAGO, ILLINOIS.

## POWER-SHOVEL.

SPECIFICATION forming part of Letters Patent No. 793,880, dated July 4, 1905.

Application filed March 23, 1903. Renewed November 28, 1904. Serial No. 234,543.

*To all whom it may concern:*

Be it known that I, JOSEPH KIESLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Power-Shovels, of which the following is a specification.

My invention relates particularly to power-shovels for use in unloading coal, grain, and the like material, as from the hold of a boat, and for analogous uses.

My primary object is to provide a shovel of this character of durable construction, of minimum weight for the load which it is capable of lifting, and well adapted for handling heavy material in lump, such as soft coal, large lump coal, and iron ore. Incidentally the improved shovel may be used for dredging purposes also.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 represents a plan sectional view of the improved shovel, taken as indicated at line 1 of Fig. 2, the shovel being shown in partially-open condition; Fig. 2, a vertical section taken as indicated at line 2 of Fig. 1; Fig. 3, a view in end elevation showing the shovel in the closed condition in full lines and in the open condition in dotted lines; Fig. 4, a plan view of the shovel-sections, the full lines indicating the closed position and the dotted lines the open position; Fig. 5, a broken plan view of the upper portion of the shovel; Fig. 6, a bottom plan view of the same; Fig. 7, a perspective view of the bell-crank lever employed; Fig. 8, a view of the arms which are rigidly joined to the upper portions of one set of shovel-sections; Fig. 9, a broken sectional view illustrating the connections between said arms and the actuating-arms of the other set of shovel-sections, and Fig. 10 a broken vertical section taken as indicated at line 10 of Fig. 1 and showing the position of the shovel-sections of one set with relation to the shovel-sections of the other set in the extreme open position of the shovel.

A description of the preferred construction is as follows:

A A' represent what may be termed the "side sections" of the shovel, constituting

one set of sections; A<sup>2</sup> A<sup>3</sup>, sets of arms rigidly connected, respectively, with the sections A A'; A<sup>4</sup>, links pivotally connected at their lower ends with lugs A<sup>5</sup> at the central upper portions of the sections A A'; B B', a set of end shovel-sections; B<sup>2</sup>, a set of arms connected at their outer ends by substantially vertical pivots *a* with the upper portion of the section B and at their inner ends by substantially horizontal pivots *a'* with the adjacent members of the sets of arms A<sup>2</sup> A<sup>3</sup>; B<sup>3</sup>, arms similarly connected with the section B' and the remaining members of the sets of arms A<sup>2</sup> A<sup>3</sup>; B<sup>4</sup>, links pivotally connected at their lower ends with lugs B<sup>5</sup> at the central upper portions of the sections B B'; C, a shaft passing through pivotal perforations at the inner ends of the arms A<sup>2</sup> A<sup>3</sup>; C' C<sup>2</sup>, a pair of oppositely-turned bell-crank levers pivoted on the shaft C; C<sup>3</sup>, spacing-sleeves on the shaft C, separating the bell-crank levers from the arms A<sup>2</sup> A<sup>3</sup>; C<sup>4</sup> C<sup>5</sup>, links connecting the short ends of the bell-crank levers with the lugs A<sup>5</sup>; C<sup>6</sup>, pulleys journaled in loops with which the long ends of the bell-crank levers are provided; D, a top plate having a central slot *b* and equipped on its upper surface with a dump-cable attaching-eye D' and on its lower surface with lugs D<sup>2</sup>, with which the upper ends of the links A<sup>4</sup> B<sup>4</sup> are pivotally connected and further equipped on its lower surface with eyes D<sup>3</sup>; D<sup>4</sup>, a dump-cable connected with the eye D', and D<sup>5</sup> a closing or lifting cable provided at its lower end with branch members D<sup>6</sup>, passing through the opening *b* about the pulleys C<sup>6</sup> and secured to the eyes D<sup>3</sup>.

The side shovel-sections are suitably dished or curved to present a half-cylindrical contour in the closed position, as indicated at *c* in Fig. 3, have inwardly-curved portions or flanges *c'*, as indicated in Fig. 4, and have oblique edges *c''*, joining the top edges of said shovel-sections and the bottom edges thereof. The bottom edges or points are elongated, as indicated at *c'''*, and equipped with suitable tips *c<sup>4</sup>*. The end sections constitute triangular sections of a spherical shell having oblique edges abutting in the closed position against the edges *c''* and terminating at their lower portions in suitably-tipped points *c<sup>5</sup>*. The



side sections are equipped on their inner surfaces at their upper corners with plates  $c^6$ , which overlap the inner surfaces of the upper corners of the end sections when the shovel is closed. In the closed position of the shovel both arms of each bell-crank lever are inclined upwardly, as will be understood from Fig. 3. The lower ends of the links  $A^4$  are forked, and the outer ends of the links  $C^4$   $C^5$  are received between the bifurcations, the ends being connected with the lugs  $A^5$ , between which they fit, by pivotal bolts  $d$ . The lugs  $B^5$ , with which the lower ends of the arms  $B^4$  are connected, are preferably formed integrally with members  $f$ , riveted to the upper portions of the inner surfaces of the end sections and equipped with lugs  $f'$ , to which the outer ends of the members  $B^3$  are connected by the pivots  $a$ . The pivots  $a'$  are preferably of the construction shown in Fig. 9. Each member of each of the sets of arms  $A^2$   $A^3$  is provided on its outer lateral surface with a bearing  $g$ , which receives the enlarged outer portion of the pivot and is cut away at its lower portion to permit freedom of movement to the link. Each pivot  $a'$  is shouldered, as indicated, and has its outer end slotted to receive the adjacent end of the corresponding link, the link being in turn pivotally connected with the outer end of the pivot  $a'$  by a transverse pivot  $g^2$ . The lugs  $f'$  are provided with horizontal slots which receive the outer ends of the links  $B^2$   $B^3$ .

The operation will be readily understood from the foregoing detailed description. The cables  $D^4$   $D^5$  are connected with suitably-actuated drums. When it is desired to fill the shovel, the shovel is supported by the cable  $D^4$  and permitted to fall with the jaws wide open upon the material to be lifted, the cable  $D^5$  being left slack. Thereupon the cable  $D^5$  is drawn in and the cable  $D^4$  left slack. This causes the pulleys  $C^6$  to be drawn toward the plate  $D$ , thereby closing the shovel-sections and causing them to dig into the material. The downward pressure upon the plate  $D$  is transmitted to the upper corners of the shovel-sections through the links  $A^4$   $B^4$ , thereby increasing the digging power of a shovel of a given weight. As the lifting force upon the cable  $D^5$  increases the downward force through the links  $A^4$   $B^4$  increases. In the wide-open position of the shovel the points of the end shovel-sections are raised a considerable distance above the points of the side shovel-sections, thereby permitting a considerable amount of material to be gathered by the side sections before the end sections are brought into working engagement with the material. This increases the ease with which the shovel-sections are closed, and the elongated points of the side sections permit the shovel to be operated upon a dock or upon the floor of a hold without injury to the floor. The end shovel-sections are actuated

from the arms  $A^2$   $A^3$  through the medium of the links  $B^2$   $B^3$ , which, it will be observed, cannot swing in a vertical plane with relation to the end shovel-sections, owing to the manner of their connection with the lugs  $f'$ . Owing to the nature of the movement of the end shovel-sections with relation to the side sections, it is necessary for the links  $B^2$   $B^3$  to swing somewhat about the pivots  $a$ , which is permitted by the universal connections between the inner ends of said links and the arms  $A^2$   $A^3$ .

It will be understood that changes in details of construction within the spirit of my invention may be made. Hence no undue limitation should be understood from the foregoing detailed description. Changes, for instance, may be made in the pivotal connections and in the contour of the shovel-sections, as desired.

When the shovel is to be used in the hold of a vessel, it will be longer in proportion than shown, which form is convenient to permit the shovel to pass through the hold and to be swung into position close to a wall. This form of shovel possesses advantage also when the shovel is to be used for unloading coal or ore from cars.

What I regard as new, and desire to secure by Letters Patent, is—

1. The combination of a pair of opposed shovel-sections equipped with suitably-actuated arms, and an additional pair of opposed shovel-sections connected with and actuated through the medium of said arms.

2. The combination of a pair of opposed shovel-sections equipped with suitably-actuated arms, an additional set of opposed shovel-sections, and actuating-links for said last-named sections connected with the upper portions thereof and with said arms, for the purpose set forth.

3. The combination of a pair of opposed shovel-sections equipped with inwardly-extending arms fixed against vertical movement with relation to the shovel-sections, an additional set of opposed shovel-sections, and links pivotally connected with said last-named shovel-sections and with said arms and actuated through the medium of said arms.

4. The combination of two opposed shovel-sections equipped with inwardly-extending rigid arms, two additional opposed shovel-sections equipped with pivoted links incapable of movement vertically with relation thereto, and universal connections between said arms and the inner ends of said links, for the purpose set forth.

5. The combination of two opposed shovel-sections equipped with inwardly-extending arms, two additional shovel-sections actuated through the medium of said arms, a top piece, links connecting said top piece with the upper portions of said shovel-sections, a lifting-cable serving in the actuation of said arms,



and a dump-cable connected with said top piece, for the purpose set forth.

6. The combination of two opposed shovel-sections each equipped with two inwardly-extending rigid arms, a shaft connected with the inner ends of said arms, two additional shovel-sections, actuating members for said last-named sections movably connected with said sections and with said arms, a top piece, links connecting the upper portions of said shovel-sections with said top piece, a hoisting-cable, and a dump-cable, for the purpose set forth.

7. The combination of two opposed shovel-sections, each provided with a set of inwardly-extending rigid arms, a shaft pivotally connected with the inner ends of said arms, levers on said shaft linked to said shovel-sections, another set of shovel-sections arranged substantially at right angles to the first set, links having pivotal connections with said second-named shovel-sections and universal connections with said arms, a top piece, links pivotally connected with said top piece and with the upper portions of said shovel-sections, a dump-cable connected with said top piece, and a hoisting-cable connected with said levers.

8. The combination of a set of opposed suitably-connected shovel-sections provided with suitable actuating means, and an additional set of suitably-actuated shovel-sections arranged at substantially right angles thereto and having their points located some distance above the points of the first-named shovel-sections in the open position of the shovel, whereby the first-named set of shovel-sections

are caused to perform the first portion of the digging operation.

9. The combination of a set of opposed suitably-connected and suitably-actuated shovel-sections provided with elongated lower edges at their tips, and a second set of shovel-sections arranged at substantially right angles thereto and having their bottom points located above the bottom points of the first-named shovel-sections in the open position of the shovel.

10. The combination of a set of shovel-sections having elongated edges at their lower ends and having oblique lateral edges and equipped with rigid inwardly-projecting arms, a shaft connecting said arms, a second set of shovel-sections having their lower extremities located above the lower extremities of the first-named sections in the open position, links connecting said last-named sections with said arms, levers on said shaft linked to said first-named sections, a lifting-cable serving to actuate said levers, a top plate, a dump-cable connected therewith, and links connecting said top plate with said shovel-sections.

11. The combination of two opposed relatively wide shovel-sections having oblique inwardly-curved lateral edges, suitable actuating means therefor, and a set of relatively narrow end sections arranged at substantially right angles to the first-named sections and provided with suitable actuating means, for the purpose set forth.

JOSEPH KIESLER.

In presence of—

A. C. KITTLESON,

WALTER N. WINBERG.