

No. 897,246.

PATENTED AUG. 25, 1908.

H. P. ANDRESEN.

GRAB BUCKET.

APPLICATION FILED OCT. 16, 1907.

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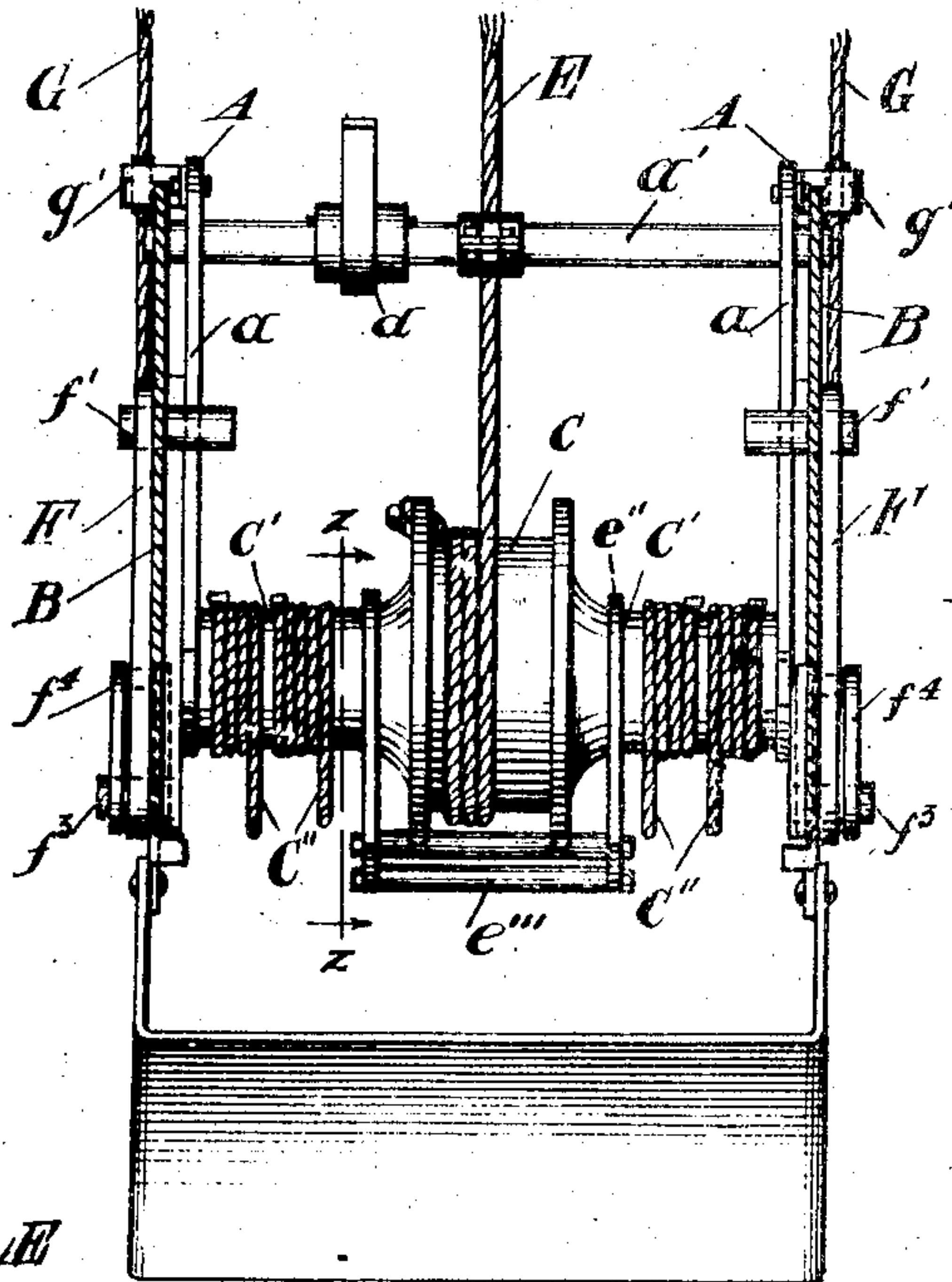


Fig. 2.

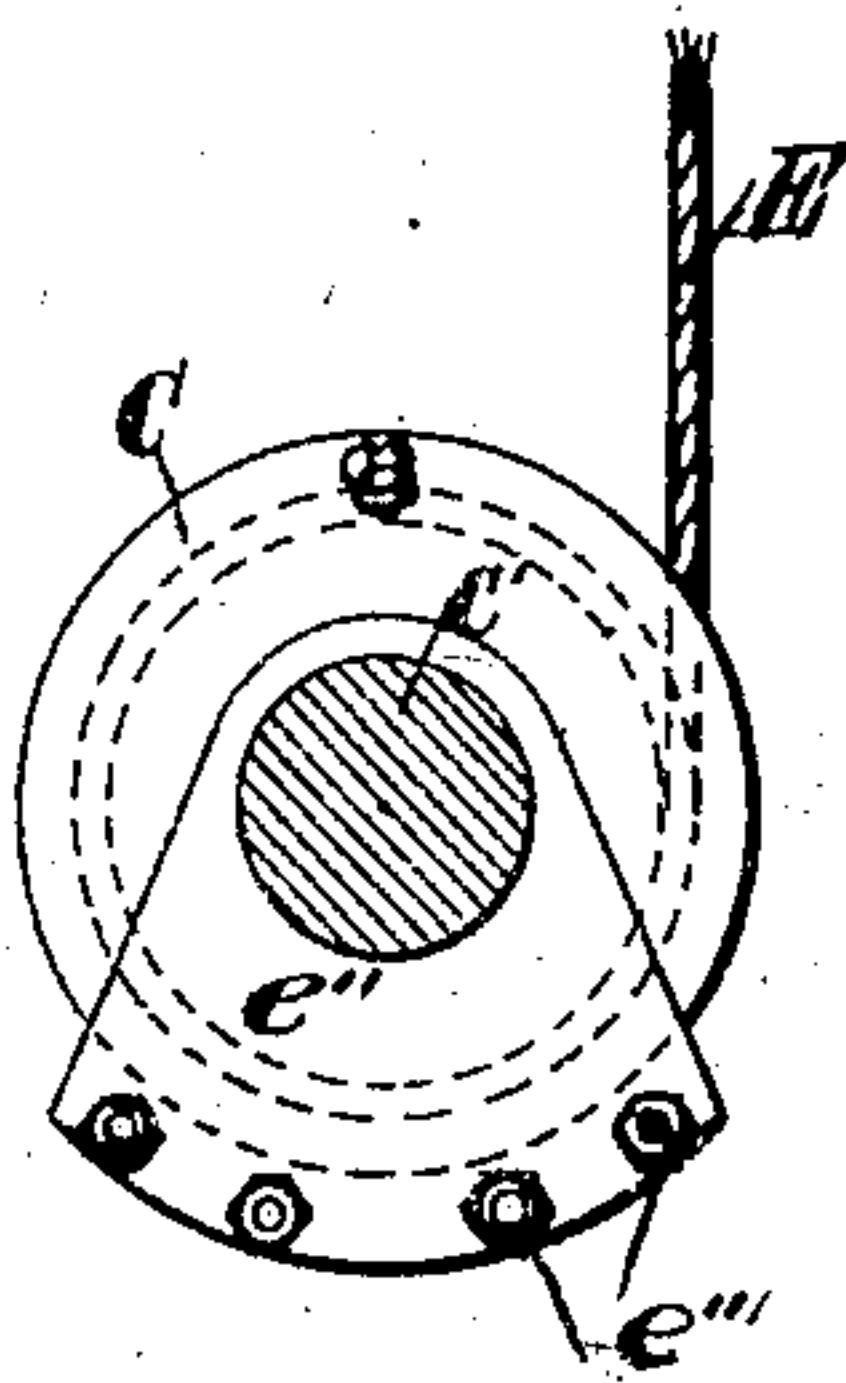


Fig. 6.

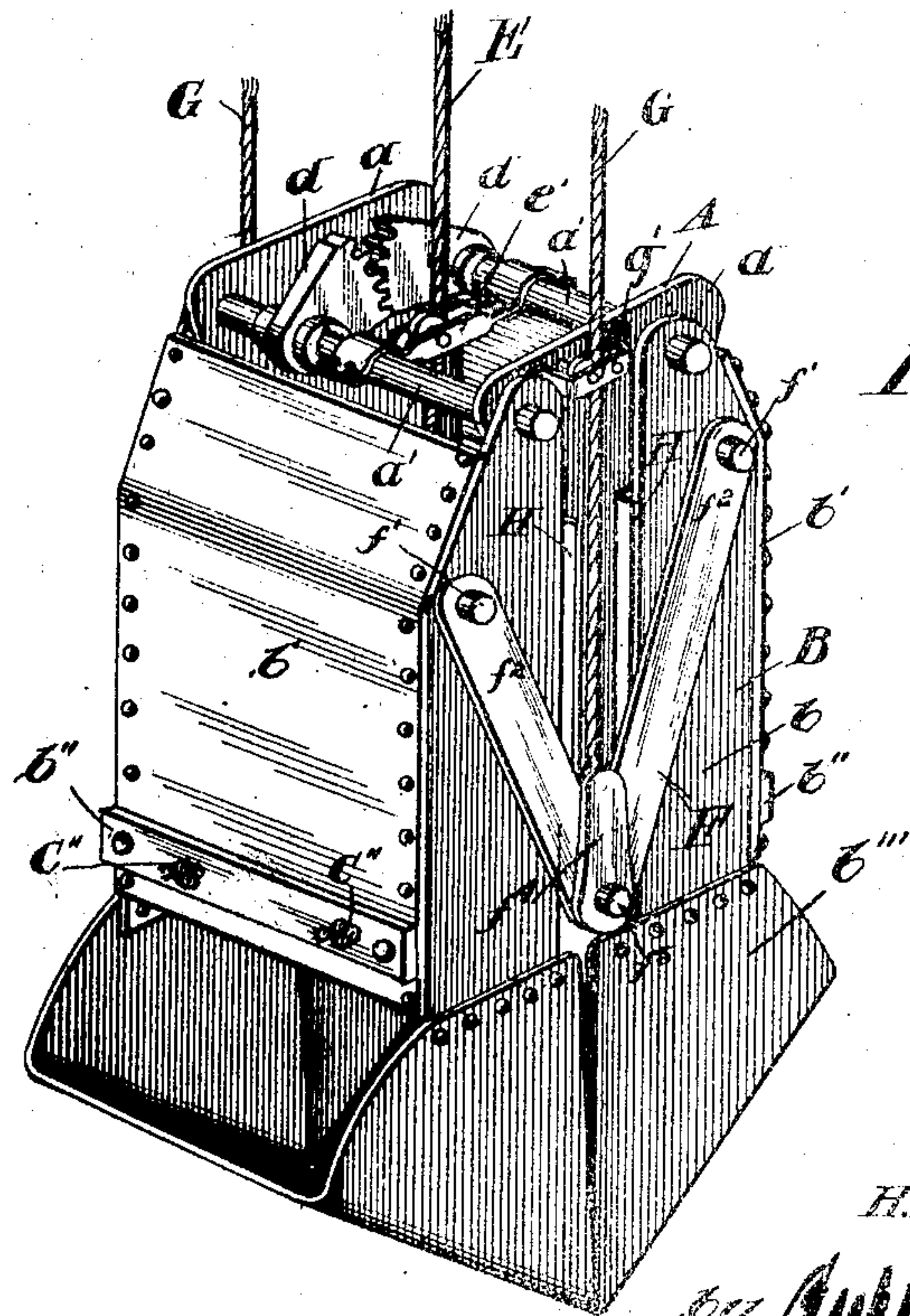


Fig. 1.

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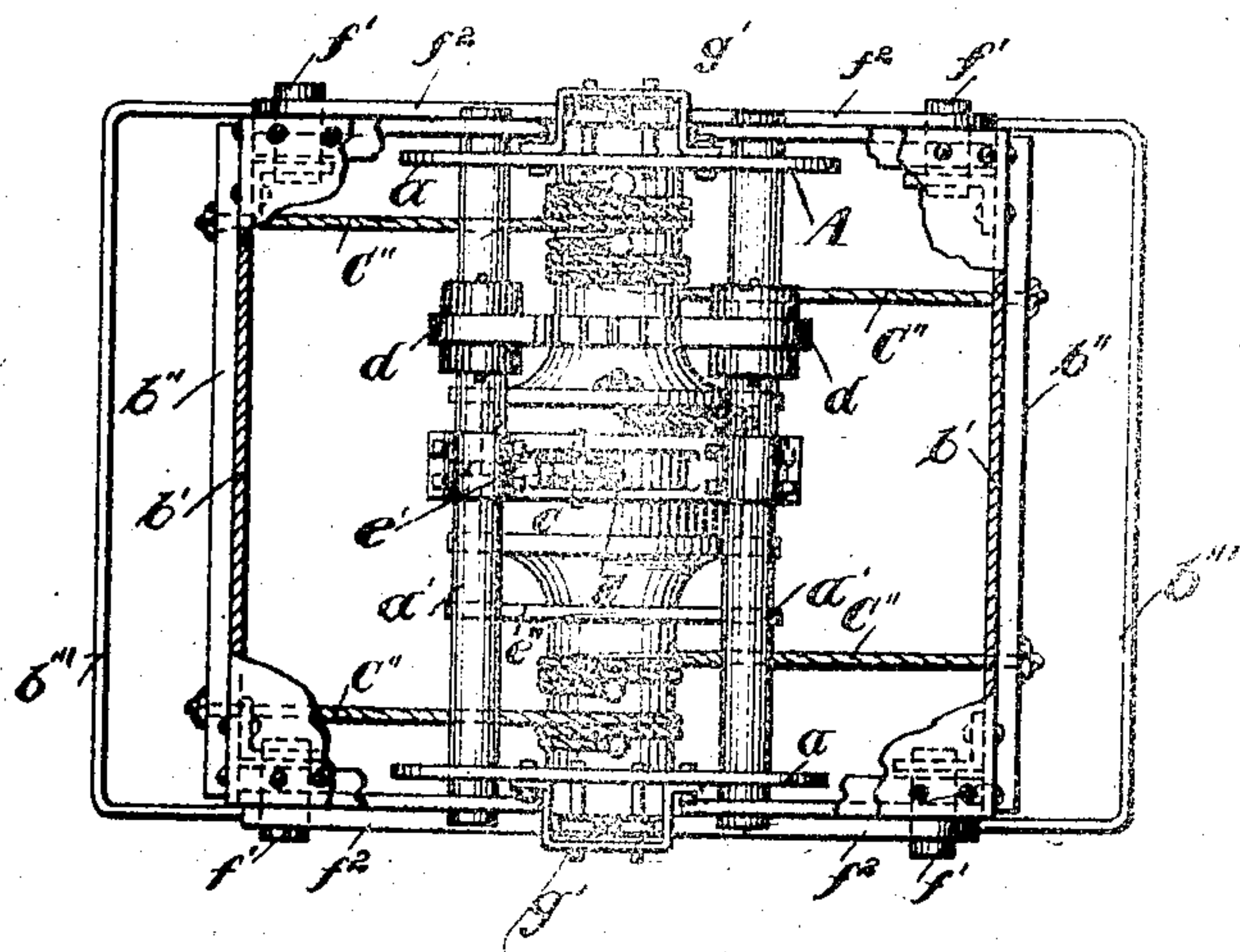
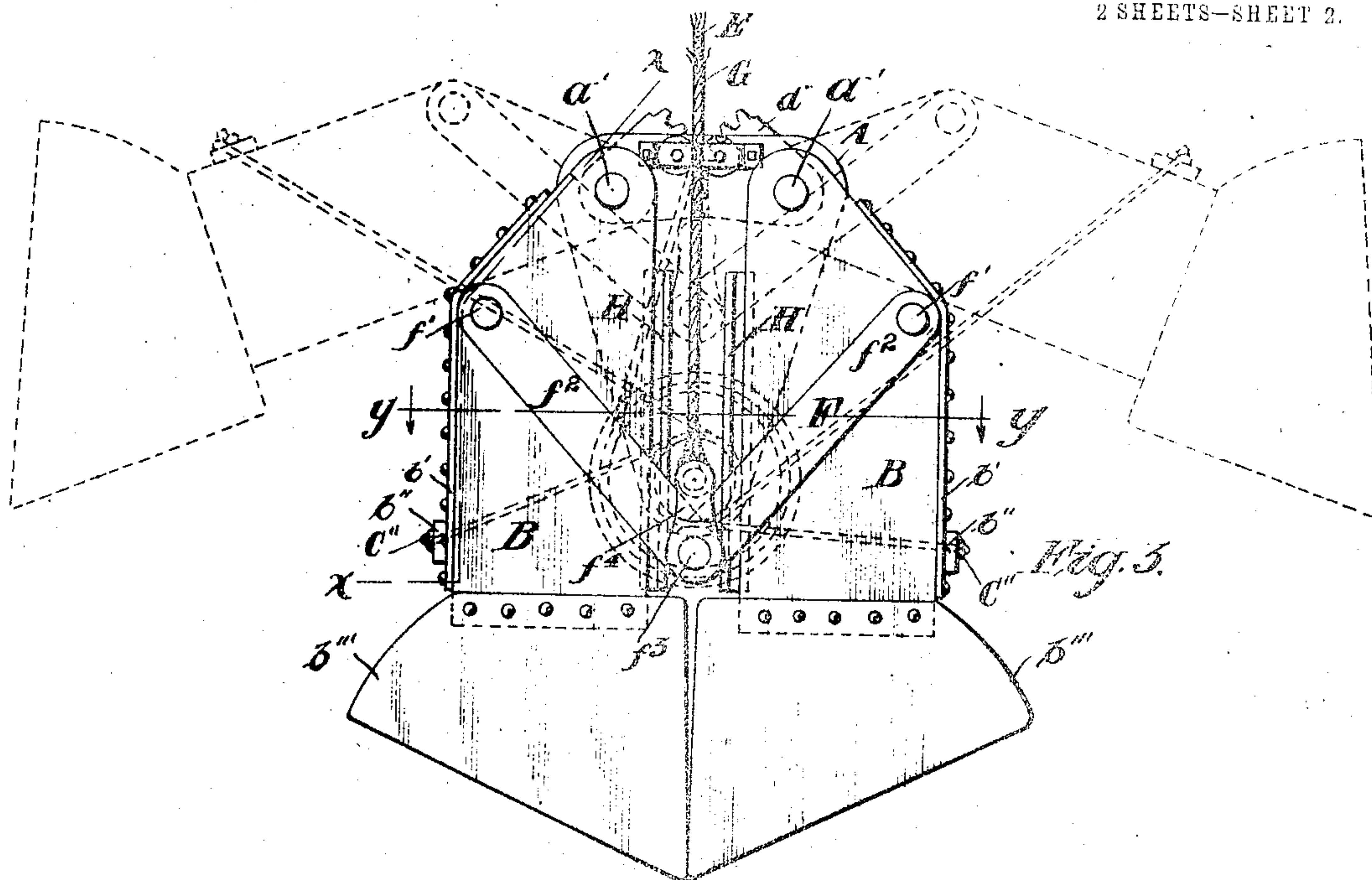
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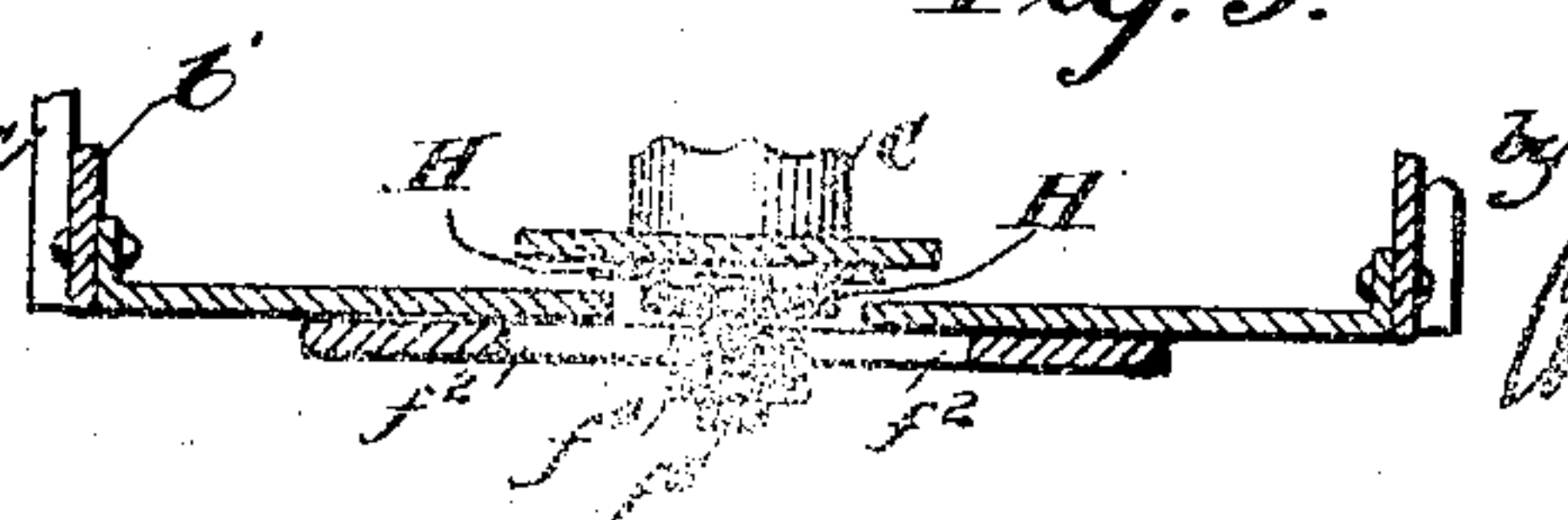
2 SHEETS—SHEET 2.



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Fig. 5.

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Att'y.



# UNITED STATES PATENT OFFICE.

HERMAN P. ANDRESEN, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO DAVID J. EVANS,  
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## GRAB-BUCKET.

No. 897,246.

Specification of Letters Patent.

Patented Aug. 25, 1908.

Application filed October 16, 1907. Serial No. 397,741.

*To all whom it may concern:*

Be it known that I, HERMAN P. ANDRESEN, a citizen of the United States, and a resident of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Grab-Buckets, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in grab buckets and the object of my invention is to provide improved means for excavating and hoisting such materials as ore, coal and the like.

The special objects of the invention are to provide a powerful, wide opening grab bucket that shall be strong and durable; which shall have maximum closing and digging power; and, which shall be provided with positive and effective opening means comprising a minimum number of parts.

A further and special object of the invention is to improve or modify the construction of grab buckets of the type disclosed in Letters Patent No. 870,812, granted to me November 12, 1907.

My invention consists generally in a grab bucket comprising a frame which carries the closing mechanism of the bucket, in combination with bucket members or scoops having their upper ends pivoted upon said frame, a toggle device having its ends pivoted upon said scoops, a stirrup at the knee of the toggle and an operating cable or cables extending upwardly therefrom.

The invention also consists in various features of construction and in combinations of parts, all as hereinafter described and particularly pointed out in the claims.

The invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification and in which;

Figure 1 is a perspective view of a grab bucket embodying my invention; Fig. 2 is a vertical section on the irregular line  $x-x$  of Fig. 3; Fig. 3 is a side elevation of the bucket; Fig. 4 is a plan view of the bucket, portions of the side plates being broken away to fully disclose the closing mechanism; Fig. 5 is a sectional detail on the line  $y-y$  of Fig. 3; and Fig. 6 is a sectional detail on the line  $z-z$  of Fig. 2.

My improved grab bucket is particularly

intended and adapted for handling coal, ore and other heavy bulk materials. It usually comprises two scoops or bucket portions, which are adapted to form a single receptacle when their lower or cutting edges are brought together. A differential winding mechanism, usually referred to as the closing mechanism, is arranged between the scoops. The opening mechanism or mechanisms comprise powerful toggle levers which are arranged on the sides of the scoops. Several cables are used for operating the bucket, at least one being employed in connection with the closing mechanism and at least one for opening the bucket. At times, when the bucket is held suspended by the cables, it may be opened by drawing up on the opening cable or cables or by slackening the closing cable. When this is done the weight of the bucket plus the weight of the load therein, if any, is exerted upon the scoops through the powerful leverage of the toggles, and the scoops are forced open. In this condition the bucket is dropped upon the material to be excavated and hoisted and the closing cable is then drawn taut and operates upon the closing mechanism to forcibly draw or close the scoops together and inclose the load of material. The scoops are constructed in such manner as to have a wide spread and a decided tendency to dig into the material when being closed thereon. After the bucket is closed, it is raised and moved to the point where the load is to be dumped. During the transit of the bucket its weight is supported by the closing cable, assisted by the opening cables, which latter may also be drawn taut; as at such times, the bucket is held shut by the tension of the closing cable on the closing mechanism. On reaching the dumping point the closing cable is slackened or allowed to run free or the opening cables are wound on the hoisting drum. Either action places the weight on the opening cables; which, operating through the opening mechanism, cause the opening of the scoops.

In handling heavy, sticky material, such as clay and some kinds of ore, it is often difficult to dislodge the material and the same, remaining in the scoops, opposes the spreading effort of the opening mechanism. For this reason, as well as for reasons of general efficiency, it is necessary to interpose the powerful opening mechanism, before re-



ferred to, between the bucket members or scoops. This present invention is particularly concerned with such opening mechanism. The principal members of the bucket, to-wit, the scoops, the frame and the closing mechanism here illustrated are substantially identical with the corresponding members shown in the patent before referred to.

Referring now to the drawings for the details of construction, it will be seen that the grab bucket comprises three principal members, namely the frame, A, and the two halves or scoops, B—B. The frame A comprises the triangular vertical members,  $a—a$ , two pivot shafts,  $a'—a'$ , connecting the tops of the members,  $a—a$ , and a third shaft which supports the differential winding drum, C. Each scoop, B, is a rigid structure, comprising the side plates,  $b—b$ , the back plate,  $b'$ , a cross bar,  $b''$ , and a scoop or shovel section,  $b'''$ . The upper ends of the scoops are rigidly attached to the ends of respective shafts,  $a'—a'$ , and are thereby pivoted to the frame. The scoops are preferably joined by an equalizer in the form of gear segments,  $d$ , fastened on the shafts,  $a'—a'$ , and intermeshing as shown in Figs. 1 and 4. The winding drum comprises a large drum, C, for the main hoisting and closing cable, E, together with two small drums,  $C'—C'$ , for the short, closing cables or chains,  $C''$ . The main cable, E, is wrapped upon the drum, C, and has its end attached thereto. The short cables,  $C''$ , are attached to the small drums and their outer ends are secured in respective cross bars,  $b''$ , near the lower ends of the scoops.

The winding mechanism is of the differential order and its arrangement and manner of operation are well shown by dotted lines in Fig. 3.  $e'$  represents a centrally located guide for the closing cable, E, said guide being supported by the parallel shafts,  $a'—a'$ . As a guard for the winding drum and as a means to prevent the cable, E, from dropping away from the drum, C, I employ a pendant guard, shown in Figs. 2, 4 and 6. This guard comprises the end sections,  $e''$ ,  $e''$ , and several cross bars,  $e'''$ , which connect them at points below the drum, C. The bars  $e'''$  form a grating which prevents the gathering of material in the space between the guard and the drum, permitting the same to drop away when the bucket is opened. This guard is journaled loosely on the small drum, C, and may therefore swing beneath the drum.

I preferably employ two opening mechanisms, each comprising a toggle lever, F, one on each side of the bucket. At points relatively below and outside of the shafts,  $a'—a'$ , I provide the sides of the scoops with pivots,  $f'—f'$ . The toggle lever sections,  $f^2—f^2$ , have their ends secured by respective pivots,  $f'$ . The middle pivot,  $f^3$ , which joins the sections,  $f^2$ , serves also as the means for the

attachment of a stirrup,  $f^4$ , at the knee of the lever. To this stirrup I attach the lower end of the opening cable, G.

$g'$  represents an anti-friction guide provided on the side of the frame, A, for the opening cable, G.

As before stated, I employ two of the toggle levers, one on each side of the bucket and the guides and cables, G, are therefore duplicated, as clearly shown in Figs. 1, 2 and 4.

As a means of assisting the equalizing action of the segmental gears,  $d$ , I prefer to use the parallel guides, H, on the sides of frame, A. The inner sides of the stirrups work between these vertical guides, as best shown in Fig. 5, and the knees of the toggle levers being thus held against movement, except on vertical lines, the desired relations are maintained between the scoops, B—B, and the frame, A. The lifting or the closing of one scoop in advance of the other is thus prevented. While the best practice may dictate the employment of both the segmental gears and the vertical guides, H, they may be used separately, without departing from the scope of my invention.

In carrying out my invention I prefer to use the widely separated pivots,  $a'—a'$ , for the scoops, but under special conditions and for certain uses, both scoops may be attached to a single center or pivot. To meet special requirements I may join the two opening cables in one at a point above the bucket. Again, I may attach two cables to each stirrup, for the purpose of twisting the bucket, as described in Letters Patent No. 870,812.

The opening operation of the bucket is as follows: The bucket being closed and held suspended by the cables, the only operation which is necessary to open it consists in either slackening the closing cable, E, or pulling on the opening cables, G. This throws the weight upon the opening cables and leaves the bucket suspended therefrom through the medium of the toggle levers. The weight of the bucket or of the bucket and its load causes the same to fall between the ends of the toggle levers, as illustrated by the dotted lines in Fig. 3, and obviously the toggle levers, which act upon intermediate points on the scoops, serve as fulcrums whereon the scoops pivot; thus the scoops are thrown open. A particular advantage of my invention resides in the fact that the bucket is of low height and has no projecting parts that are likely to be struck during use in the holds of ships. In this connection, I direct attention to the fact that the back plates,  $b'$ , of my bucket extend upwardly and are inclined toward the closing cable, affording an inclined top, which if it strikes a deck beam glances off without damaging it.

As various modifications of my invention will readily suggest themselves to one skilled in the art, I do not confine the invention to



the specific structure herein shown and described.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A grab bucket comprising pivotally joined scoops and a frame, in combination with a closing mechanism arranged upon said frame beneath the pivoted ends of said scoops, a toggle lever pivotally interposed between said scoops, a closing cable connected with said closing mechanism, and an opening cable connected with the knee of said toggle lever, substantially as described.
2. A grab bucket comprising a frame, in combination with scoops pivoted thereon, a mechanism carried by said frame for closing said scoops, a toggle lever having its ends attached to respective scoops and a stirrup at the knee of said lever, substantially as described.
3. A grab bucket comprising a frame, in combination with scoops pivoted thereon, a closing mechanism carried by said frame, toggle levers having their ends attached to respective scoops, a closing cable connected to said closing mechanism and opening cables connected to respective toggle levers, substantially as described.
4. A grab bucket comprising a frame, in combination with scoops pivoted thereon, a closing mechanism carried by said frame, toggle levers having their ends attached to respective scoops, means for equalizing the movements of said scoops, a closing cable connected to said closing mechanism and opening cables connected to respective toggle levers, substantially as described.
5. A grab bucket comprising a frame, in combination with scoops pivoted thereon, a closing mechanism carried by said frame, and an opening mechanism composed of toggle levers having their ends pivoted to respective scoops and having their knees guided by said frame, substantially as described.
6. A grab bucket comprising a frame, in combination with scoops pivoted on said frame, a closing mechanism, toggle levers interposed between the scoops and having stirrups at their knees, and stirrup guides on said frame, substantially as described.
7. A grab bucket comprising a frame, in combination with two rigid scoops, shafts having bearings in said frame and whereon respective scoops are fixed, an equalizer which operatively connects said shafts, a closing mechanism, toggle levers having their ends intermediately pivoted upon respective scoops, cable stirrups for said toggles and stirrup guides on said frame, substantially as described.
8. A grab bucket comprising a frame, in combination with a differential winding mechanism thereon, scoops pivoted on said

frame above said mechanism and adapted to close beneath said mechanism, a toggle lever or levers interposed between said scoops, beneath the pivots thereof, cable stirrups thereon and suitable equalizing means, substantially as described.

9. A grab bucket comprising a frame, in combination with two rigid scoops having their upper ends pivoted to said frame, the end or back plates of said scoops being inclined at the top, a closing mechanism on the frame between said scoops and opening devices on the sides of said scoops, substantially as described.

10. A grab bucket comprising pivotally connected scoops, in combination with a closing mechanism, a cable connected to said mechanism and occupying a central position in the bucket, toggle levers having their ends pivoted to the sides of respective scoops and opening cables connected to said toggle levers at the sides of the bucket, substantially as described.

11. A grab bucket comprising a frame, in combination with scoops pivoted thereon, a closing mechanism carried by said frame, a closing or hoisting cable attached to said closing mechanism and occupying the vertical axis of the bucket, toggle lever opening mechanisms, and an opening cable or cables attached to said toggle mechanisms at the sides of the bucket, substantially as described.

12. A grab bucket comprising a frame, in combination with scoops pivoted thereon, a closing mechanism carried by said frame, a closing or hoisting cable attached to said closing mechanism and occupying the vertical axis of the bucket, toggle lever opening mechanisms, an opening cable or cables attached to said toggle lever mechanisms at the sides of the bucket, and suitable means for equalizing the movement of said scoops, substantially as described.

13. A grab bucket comprising a frame, in combination with scoops pivoted thereon, a closing mechanism arranged in said frame beneath the pivots of the scoops, said closing mechanism comprising a differential winding drum and cables or chains extending from the smaller portions thereof to fastenings upon the scoops near the lower ends thereof, a closing cable wound upon the larger part of said drum, and means for opening said scoops, said means including an opening cable or cables, substantially as described.

14. A grab bucket comprising a frame, in combination with scoops pivoted thereon, a differential winding drum arranged on said frame beneath the pivots of said scoops, a pendent guard or grating arranged beneath said drum, and suitable opening mechanism, substantially as described.

15. A grab bucket comprising a frame, in



combination with scoops pivoted thereon, an equalizer which operatively connects said scoops, closing means for said scoops, and a toggle lever or levers interposed between  
5 the scoops adapted to open the same, substantially as described.

16. A grab bucket comprising pivotally connected scoops, in combination with means for closing the scoops, toggle levers  
10 having their ends pivoted to the sides of

respective scoops, and opening cables connected to said toggle levers at the sides of the bucket, substantially as described.

In testimony whereof, I have hereunto set my hand, this 12th day of October, 1907, in 15 the presence of two subscribing witnesses.

HERMAN P. ANDRESEN.

Witnesses:

CHARLES GILBERT HAWLEY,  
M. SIMON.