

J. W. FRAZIER & J. H. FOX.

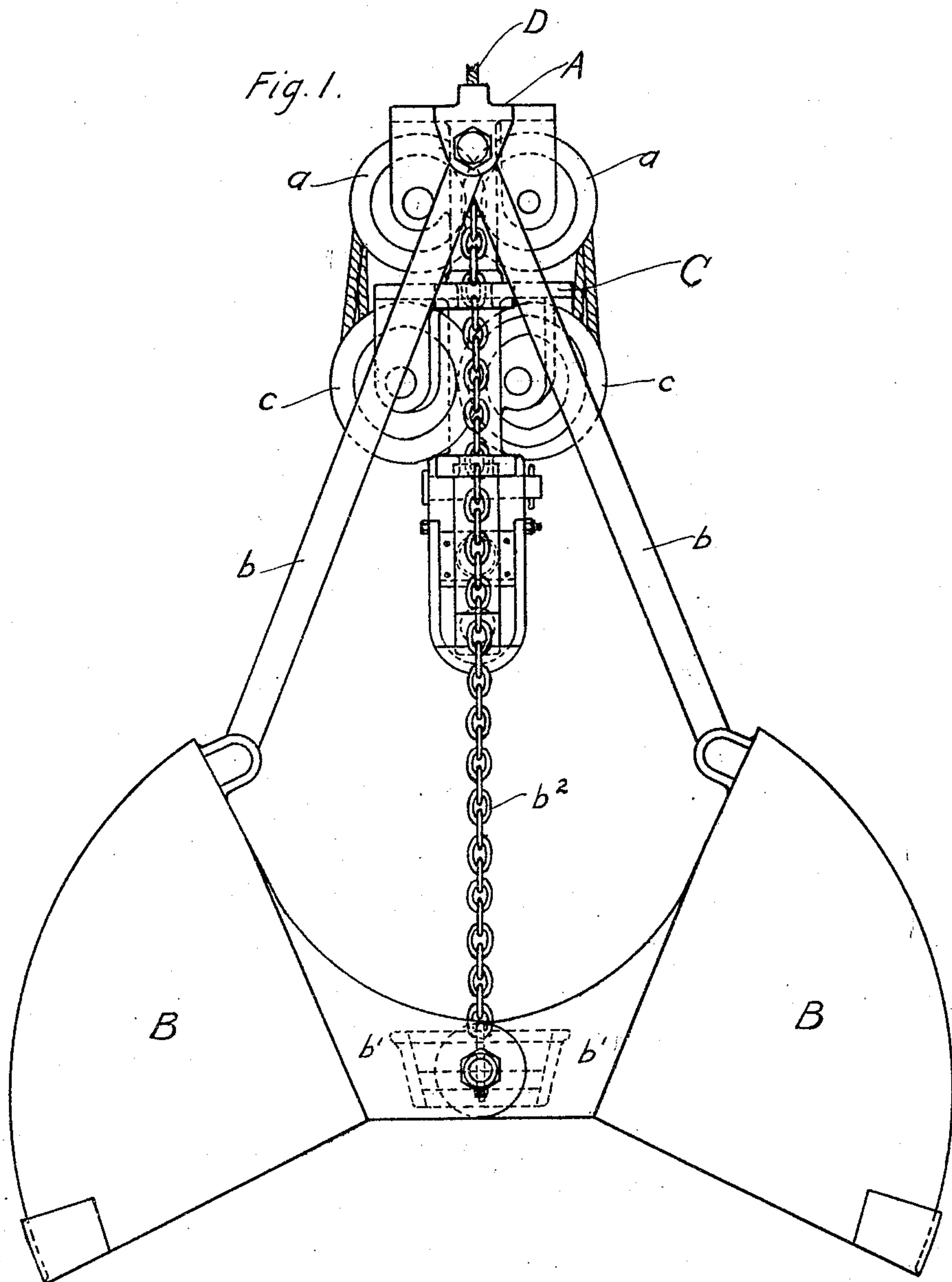
CLAM SHELL BUCKET.

APPLICATION FILED MAR. 16, 1908.

921,821.

Patented May 18, 1909.

4 SHEETS—SHEET 1.



WITNESSES:

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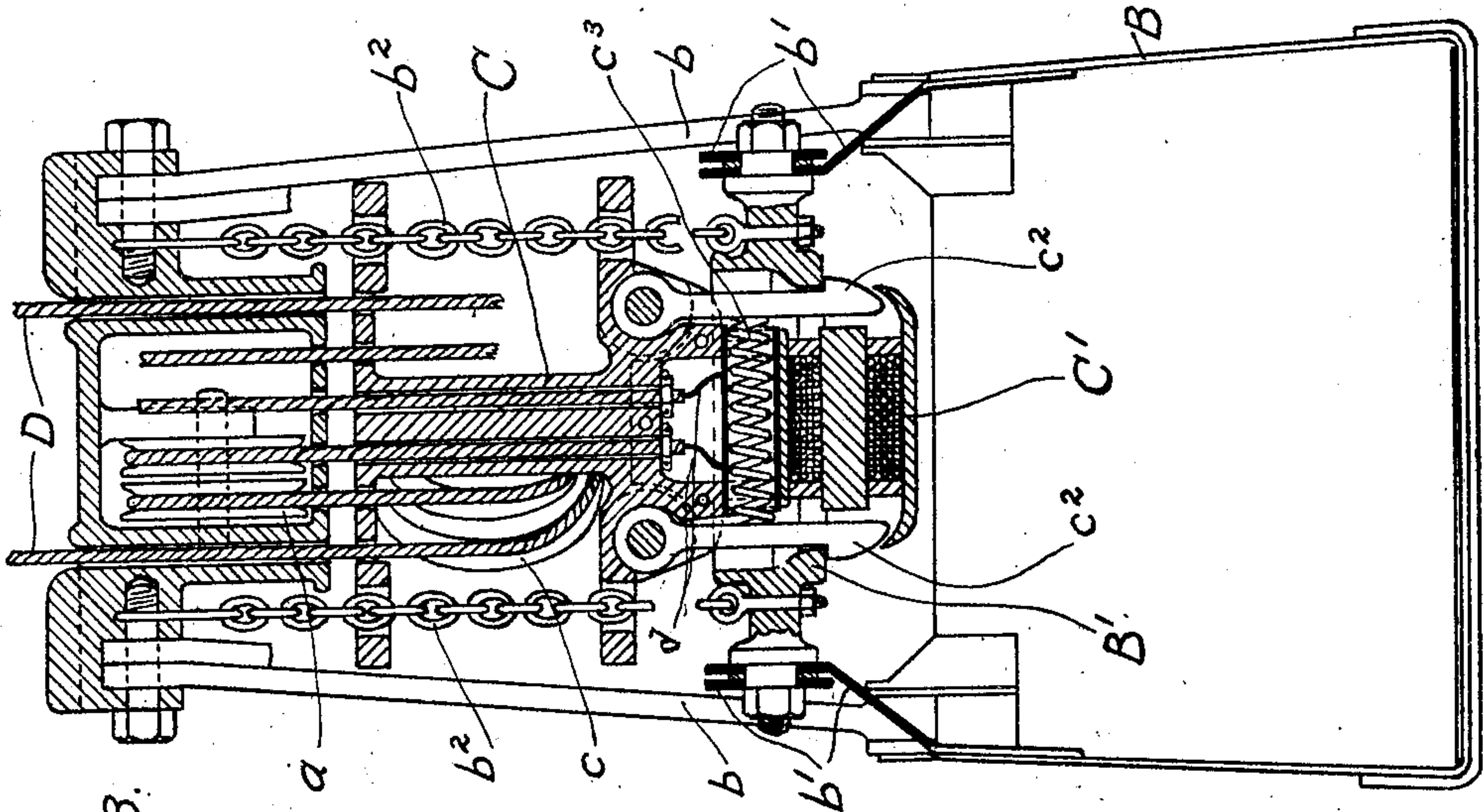


Fig. 3.

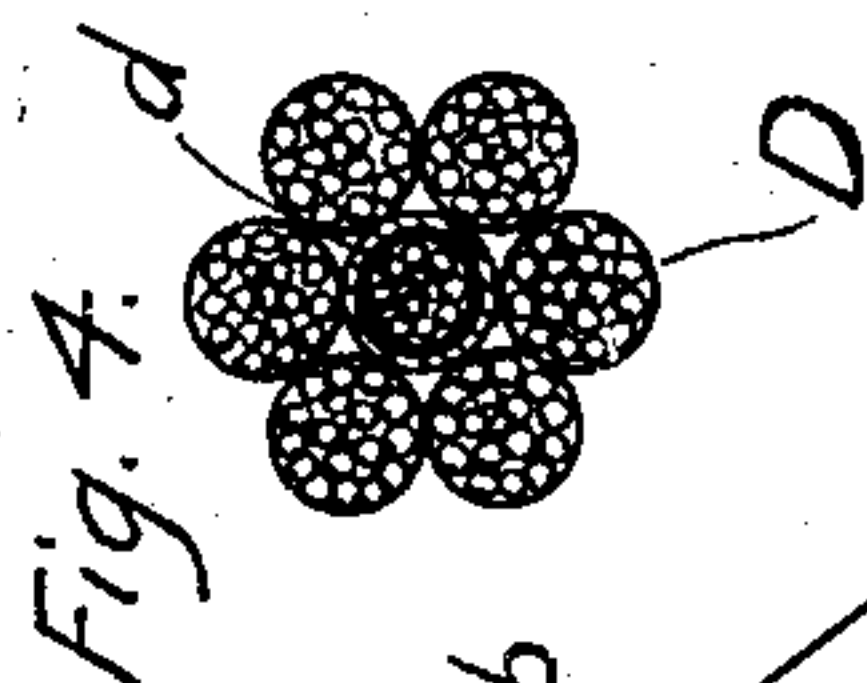


Fig. 4.

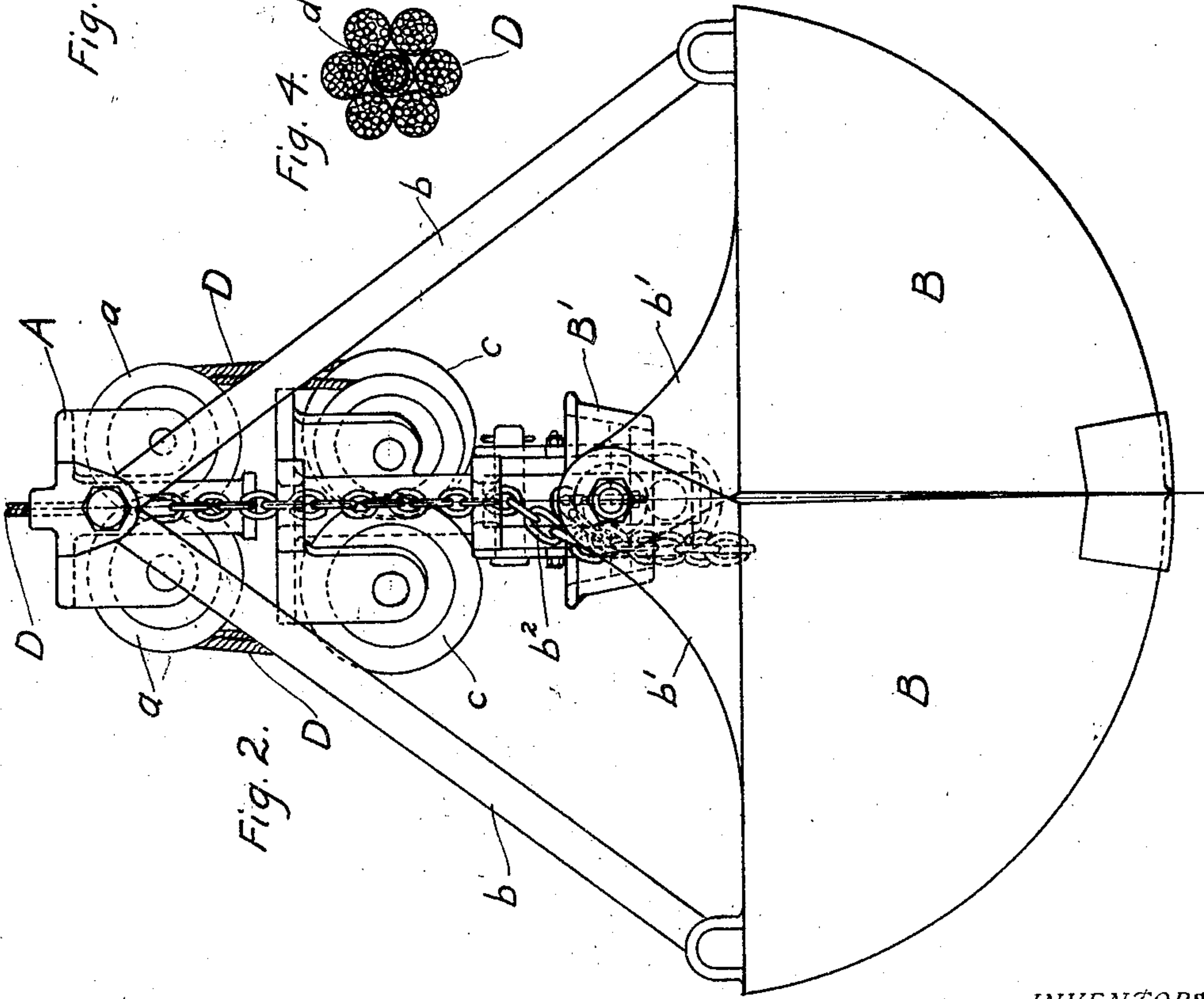


Fig. 2.

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4 SHEETS—SHEET 3.

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Fig. 7.

Fig. 8.

Fig. 8.

Fig. 9.

C⁶

C²

Fig. 9.

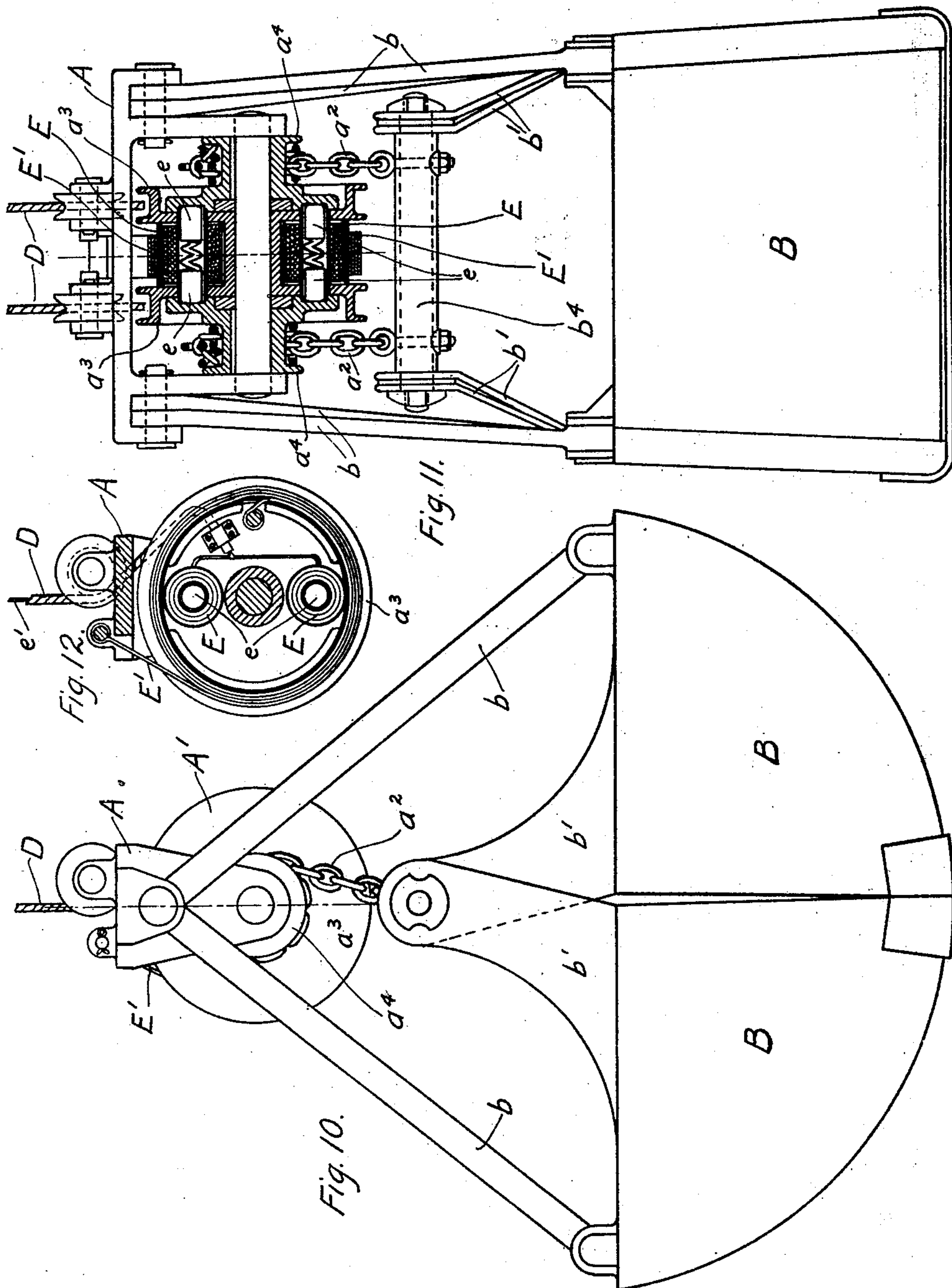
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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CLAM-SHELL BUCKET.

No. 921,821.

Specification of Letters Patent.

Patented May 18, 1909.

Application filed March 16, 1908. Serial No. 421,492.

To all whom it may concern:

Be it known that we, JAMES W. FRAZIER and JOHN H. FOX, citizens of the United States, residents of Cleveland, county of Cuyahoga, State of Ohio, have jointly invented a new and useful Improvement in Clam-Shell Buckets, of which the following is a specification, the principle of the invention being herein explained and the best mode in which we have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention relates to that well known class of loading and unloading mechanism commonly known as clam shell bucket, and characterized by having two pivotally connected scoop members which upon being drawn together are adapted to gather up or scoop in the material which they are then adapted to carry to a point more or less remote, and there, upon being opened, to deposit such load.

In the prevailing construction of clam-shell buckets, two cables are required to operate the same, one regular hoisting cable to support and raise or lower the bucket as a whole, and another to close the scoop members and so retain them until the bucket is to be discharged.

The object of the present invention is the provision of a bucket of the above general type that will require but a single cable to perform both the operation of closing the bucket, and that of supporting the same incidentally to its raising and lowering and to its removal from one point to another.

To the accomplishment of this and related objects, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but several of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings: Figure 1 is a side elevation of one type of clam shell bucket in which has been incorporated our several improvements, such bucket being shown in its open position; Fig. 2 is a side elevation of the same type of bucket, but in its closed position; Fig. 3 is a central vertical transverse section of such bucket likewise in its closed position; Fig. 4 is a section through the hoisting cable utilized in connection with

such bucket, showing the manner of incorporating therein an electrical conductor, the function of which will be hereinafter more fully described; Fig. 5 is a sectional view similar to that in Fig. 3, showing a slight modification in construction; Fig. 6 is a plan view of the top frame constituting a portion of the structure shown in Fig. 5; Figs. 7 and 8 are respectively a plan view and a side elevation showing the arrangement of cables employed in connection with a bucket constructed as in Fig. 5; Fig. 9 is a transverse cross-section of the cable containing the electrical conductors utilized in connection with such bucket; Fig. 10 is a side elevation showing an adaptation of our invention to a second type of bucket; Fig. 11 is a partial vertical transverse cross section and a partial end elevation of such bucket; Fig. 12 is a sectional detail of the same; and Fig. 13 shows the application of our invention to a simple dump-bucket.

Referring first of all to the type of bucket illustrated in Figs. 1 to 5, inclusive, such bucket will be seen to comprise primarily a frame A to which the various other parts of the bucket are either directly or indirectly connected. These other parts include the two scoop members B, the form of which is a matter of indifference, being dependent upon the character of the material which the bucket is to handle. The outer ends of members B are connected to frame A by means of links *b*; the inner ends bear arms *b'* pivotally connected together and joined by means of a chain *b''*, one on each side of the bucket, to the frame A, by means of which the bucket is prevented from opening more widely than is desirable. The disposition of the pivotal axis about which the buckets thus open and close, and the points of pivotal connection of links *b* are so determined that the weight of the scoop members B tends to throw the bucket open. The inclusion in the members of a load of material will of course increase this tendency. Vertically movable beneath frame A is a block C, that is connected with such frame by several turns of the hoisting cable, or rather cables, D, there being two such cables as is ordinarily the case in devices of this sort in order to hold the bucket against rotating. The multiplication of sheaves *a* *c* in frame A and blocks C, respectively, about which such cable passes is governed by the usual considerations, viz. that of the power avail-

able and the character of the service required of the bucket. It is furthermore immaterial whether the outer ends of such hoisting cables be connected as shown in Figs. 3 and 5 with block C or whether they be connected with frame A; their inner ends are of course attached to the winding drum D' of the hoisting engine or motor, Fig. 7 in the usual way. It will be obvious that when block C is drawn approximately against the under side of frame A (see Fig. 2) it is in effect a part of such frame and the bucket is then adapted to be supported or raised by means of the hoisting cable. Embodied in a unitary structure with block C are means for securing the same to the inner pivotally connected arms b' of scoop members B, operation of such means being electrically controlled as will now appear. In the form of device illustrated in Figs. 1 to 3, this engaging mechanism comprises two pendent latch members c² normally held in their outer positions by a spring c³, in which positions they are adapted to hook under a frame B' forming in effect the pivotal axis of arms b'. Located between the two latches is a solenoid or electro-magnet C' so disposed that upon being energized it will draw latch members c² inwardly, disengaging the same from the frame. As shown in the particular form of the device in question, electrical connections to such magnet are had through suitably insulated conductors d embedded one in each of the two hoisting cables D, Fig. 4.

The operation of the form of our bucket just described may now be briefly reviewed. In the inoperative, or open, position of the bucket illustrated in Fig. 1, it may be swung about and finally lowered onto the pile of ore, coal or other material being handled, all by proper movement of the derrick boom or other support over which cables D pass and by paying out such cables. When the bucket thus rests on the pile, any further paying out of cables D will permit block C to drop to its lower position, where it engages frame B' in the manner previously described. Upon now drawing in on said cables the initial effect will be to bring such block back again to its normal position just beneath frame A, and thereby, through its connection with frame B', to close the scoop members B, this being the position of parts shown in Fig. 2. In this condition the bucket may be swung around, or carried in case it is suspended from a trolley, to the place where the material is to be dumped. Thereupon, by simply closing the electric circuit through solenoid C', the frame B' is disengaged from the block and the scoop members allowed to swing open as shown in Fig. 1, which is the position assumed at the beginning of this paragraph.

In the modified construction illustrated in Fig. 5 the same general type of bucket is

shown, the only change being in the arrangement of the electrically controlled device for disengaging the block C from the inner ends of the scoop members. Here the electro-magnet C' is vertically disposed, and the armature c⁴ in the form of a plunger, is connected by means of toggle links c⁵ with the latches c² so that upon energization of the magnet the latches will be disengaged. A further modification incorporated in this same connection consists in the use of a separate cable C² for the conductors c⁶ as shown in Fig. 9. Such cable is kept drawn in and still left free to follow the movements of the bucket by means of a winding drum C³ such as that illustrated in Figs. 7 and 8, or by other equivalent means.

In Figs. 10, 11 and 12, is illustrated the manner of adapting our invention to a clam shell bucket of another type, which is characterized by having a winding drum A' incorporated in the structure of frame A by rotation of which drum the inner ends of the scoop members B are adapted to be drawn upwardly, through the medium of chains a² connected with a shaft b⁴ joining the ends of arms b'. In this bucket as now constructed a separate cable is required to wind in and unwind chains a² in order to open and close the bucket. To adapt our invention to the bucket, we construct the winding drum in effect of two parts, an outer part or parts a³ about which the hoisting cable or cables D are wound (there being two of these as before), and an inner drum a⁴ about which the chains a² are wound. The outer drum is normally connected with the inner drum by means of spring-pressed plungers e, the retraction of which is effected by means of electro-magnets E in the same manner as was the withdrawal of the latches c² in the previously described device. When thus retracted the smaller inner drum is free to rotate and independently of the outer drum and the bucket will open. In conjunction with the outer drums a³ there is provided a coil spring E', Fig. 12, the effect of which is to maintain such drums with a sufficient length of cable wound thereabout, when the bucket is resting on the pile of material, so that when the plungers are again allowed to connect the two drums and the cables D thereupon drawn in, the initial effect will be to rotate the inner drum and draw up the inner ends of the scoop members. When these are finally drawn up further winding in of the cables will operate to raise the bucket as before. Conductors e', embedded in hoisting cables D afford the necessary electrical connections for magnets E; although if desired the arrangement illustrated in Figs. 7 and 8 may be employed here just as well as with the other type of bucket.

While our invention has thus far been shown and described as embodied in a clam-shell bucket, we would not imply that it is

limited in its application to this single type of bucket, or carrier. Accordingly we show in Fig. 13, the same type of hoisting mechanism illustrated in Figs. 10, 11 and 12, but applied to an ordinary dump-bucket, it being connection of the hoisting cable with the trapdoors of the bucket that is here electrically controlled, instead of connection of such cable with the scoop-members of a clam-shell bucket. Obviously the principle of operation remains the same where a single scoop-member, instead of two, is employed, as in the case of hoisting "tub."

In view of the foregoing, it will be understood that the term "scoop-member," as employed herein and in the following claims, is intended to connote all of the several different forms of closure found in devices of the type in hand. It may furthermore be remarked that it is entirely optional whether the spring or solenoid operatively position the latch members whereby connection between the hoisting means and scoops is controlled.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

We therefore particularly point out and distinctly claim as our invention:—

1. In a device of the character described, the combination of a frame; scoop members movably connected with said frame; and electrically controlled means adapted to be mechanically connected with said members to draw the same toward said frame.

2. In a device of the character described, the combination of a frame; scoop members pivotally connected with said frame; hoisting means for the device adapted to be mechanically connected with said members to draw the same toward said frame; and electrical means for controlling such connection.

3. In a device of the character described, the combination of a frame; scoop members having their outer ends pivotally connected with said frame; a hoisting cable attached to said frame and adapted to be mechanically connected with the inner ends of said members to draw the same toward said frame; and electrical means for controlling such connection.

4. In a device of the character described, the combination of a frame; scoop members having their outer ends pivotally connected with said frame; an externally supported block adapted to be mechanically connected with the inner ends of said members to draw the same toward said frame; and electrical means for controlling such connection.

5. In a device of the character described, the combination of a frame; scoop members

having their outer ends pivotally connected with said frame; an externally supported block vertically movable beneath said frame and adapted to engage said frame to support and raise the same; means borne by said block adapted normally to mechanically engage the inner ends of said members; and electrical means adapted to render said engaging means inoperative.

6. In a device of the character described, the combination of a frame; scoop members having their outer ends pivotally connected with said frame; a block vertically movable beneath said frame and adapted to engage said frame to support and raise the same; means borne by said block adapted normally to mechanically engage the inner ends of said members; electrical means adapted to render said engaging means inoperative; and a cable connected with said block and adapted to draw the same against said frame.

7. In a device of the character described, the combination of a frame; scoop members having their outer ends pivotally connected with said frame; a block vertically movable beneath said frame and adapted to engage said frame to support and raise the same; latch members borne by said block and adapted normally to engage the inner ends of said scoop members; electrical means adapted to withdraw said latch members from such engagement; and a cable connected with said block and adapted to draw the same against said frame.

8. In a device of the character described, the combination of a frame; scoop members having their outer ends pivotally connected with said frame; a block vertically movable beneath said frame and adapted to engage said frame to support and raise the same; latch members borne by said block and adapted normally to engage the inner ends of said scoop members; an electro-magnet adapted, when energized, to withdraw said latch members from such engagement; a cable passing a plurality of times between said frame and block and adapted to draw the latter against said frame; and electrical connections for said magnet provided in conjunction with said cable.

9. In a device of the character described, the combination of a frame; scoop members; links pivotally connecting the outer ends of said members with said frame; a transverse member forming a pivotal connection for the inner ends of said scoop members; a block vertically movable beneath said frame and adapted to engage said frame to support and raise the same; pendent latch members adapted normally to engage the member connecting the inner ends of said scoop members; an electro-magnet adapted, when energized, to withdraw said latch members from such engagement; a cable passing a plurality of times between said frame and block and

adapted to draw the latter against said frame; and electrical connections for said magnet provided in conjunction with said cable.

- 5 10. In a device of the character described, the combination of a frame; scoop members movably connected with said frame; hoisting means for the device, such means including two cables adapted to be connected with said
10 members to draw the same toward said frame; electrical means for controlling such connection; and electrical connections for said means including two conductors embedded in said hoisting cables respectively.

11. The combination with a device of the character described; of hoisting means therefor, such means including a cable; and electrical connections to said device including a conductor embedded in said hoisting cable. 15 20

Signed by us this 28th day of February, 1908.

JAMES W. FRAZIER.
JOHN H. FOX.

Attested by—

MARY ISRAEL,
JNO. F. OBERLIN.