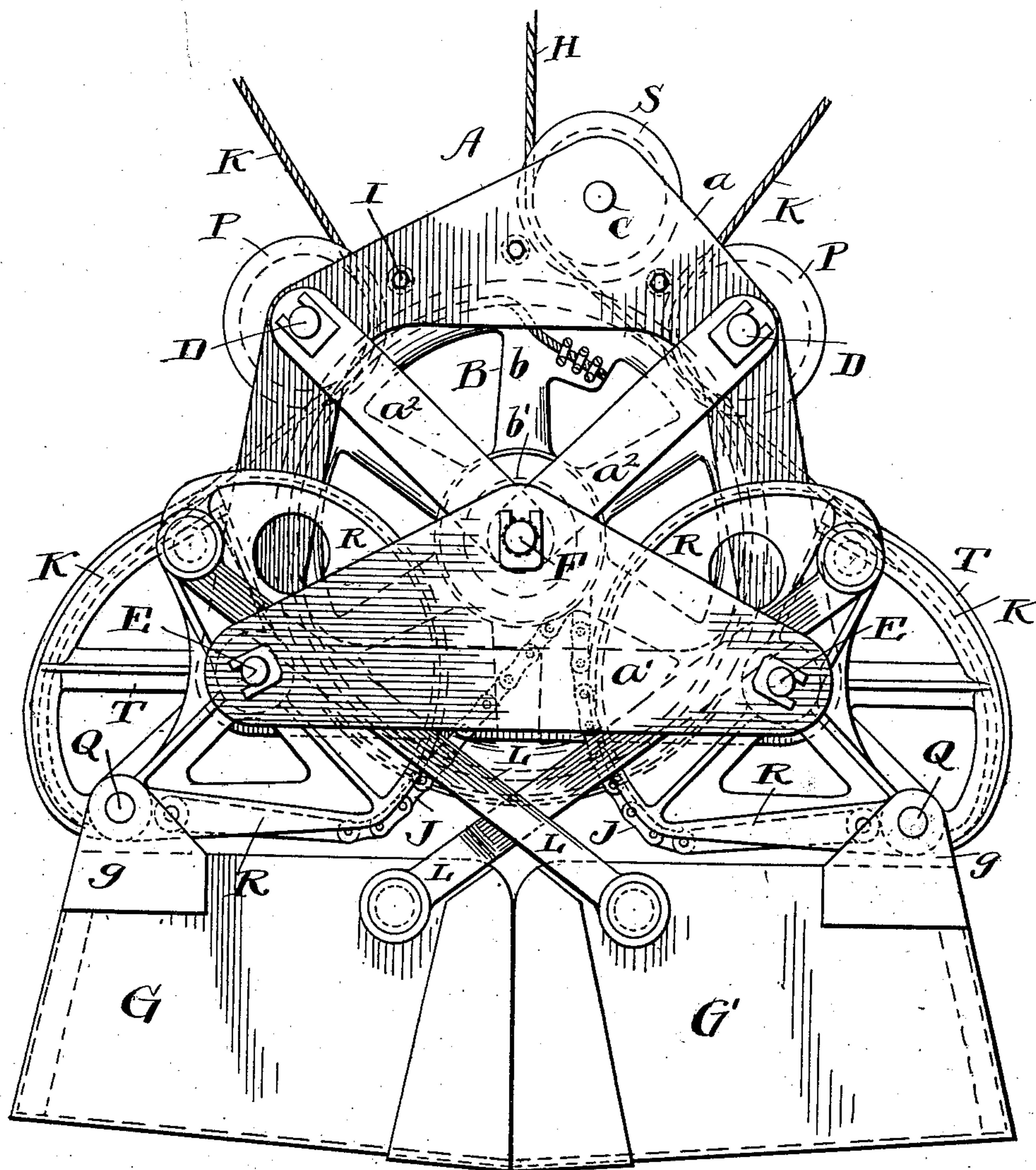


PATENTED JULY 28, 1908.

F. W. LOVELL.
CLAM SHELL BUCKET.
APPLICATION FILED MAY 18, 1904.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
E. B. Gilchrist.
J. M. Welles.

Inventor
Frederick W. Lovell
By his attorneys
Thurston Bates

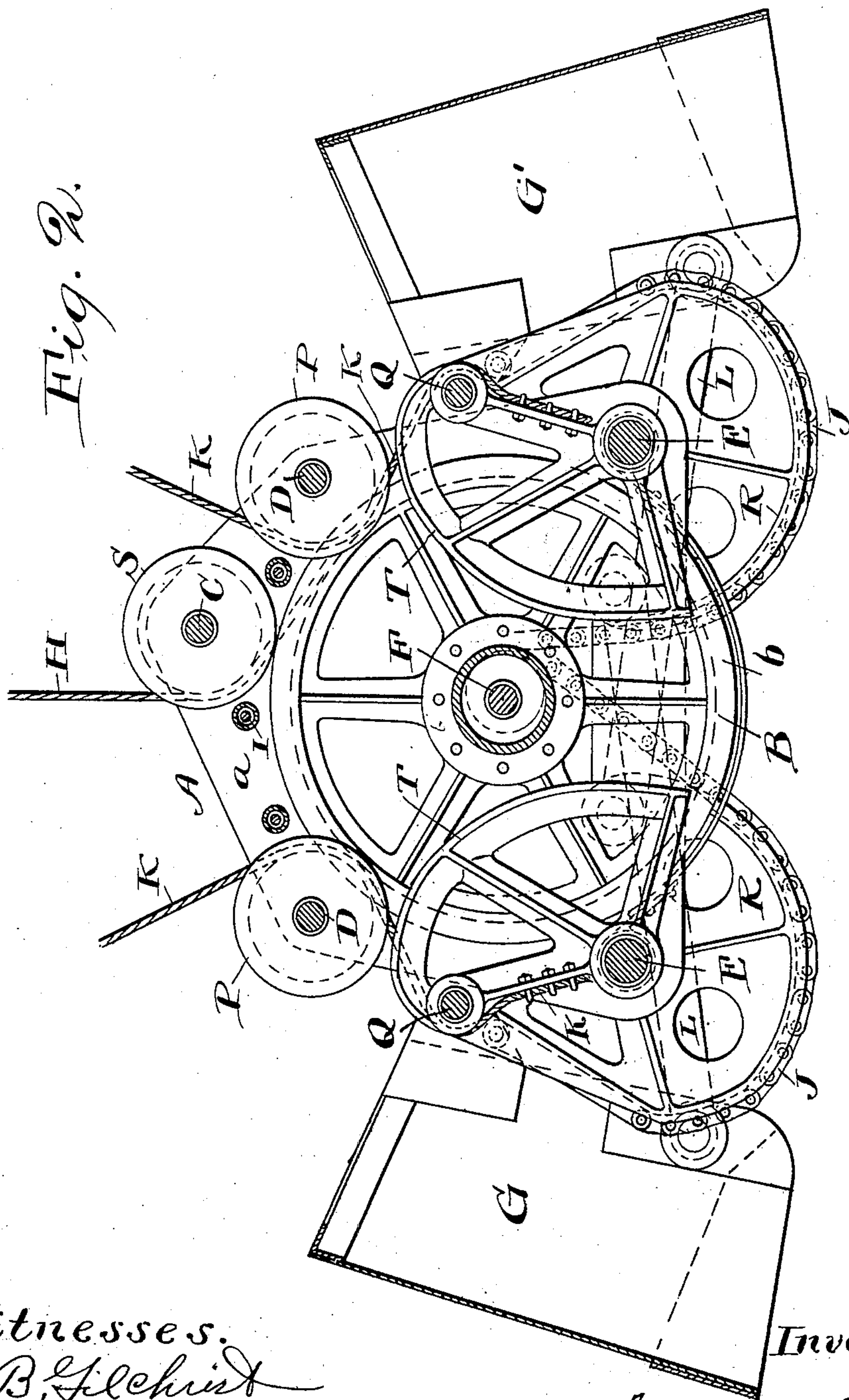
No. 894,219.

PATENTED JULY 28, 1908.

F. W. LOVELL.
CLAM SHELL BUCKET.

APPLICATION FILED MAY 18, 1904.

4 SHEETS—SHEET 2.



Witnesses.
E. B. Gilchrist
J. A. Willes.

Inventor:
Frederick W. Lovell
By his attorneys
Thurston & Bates

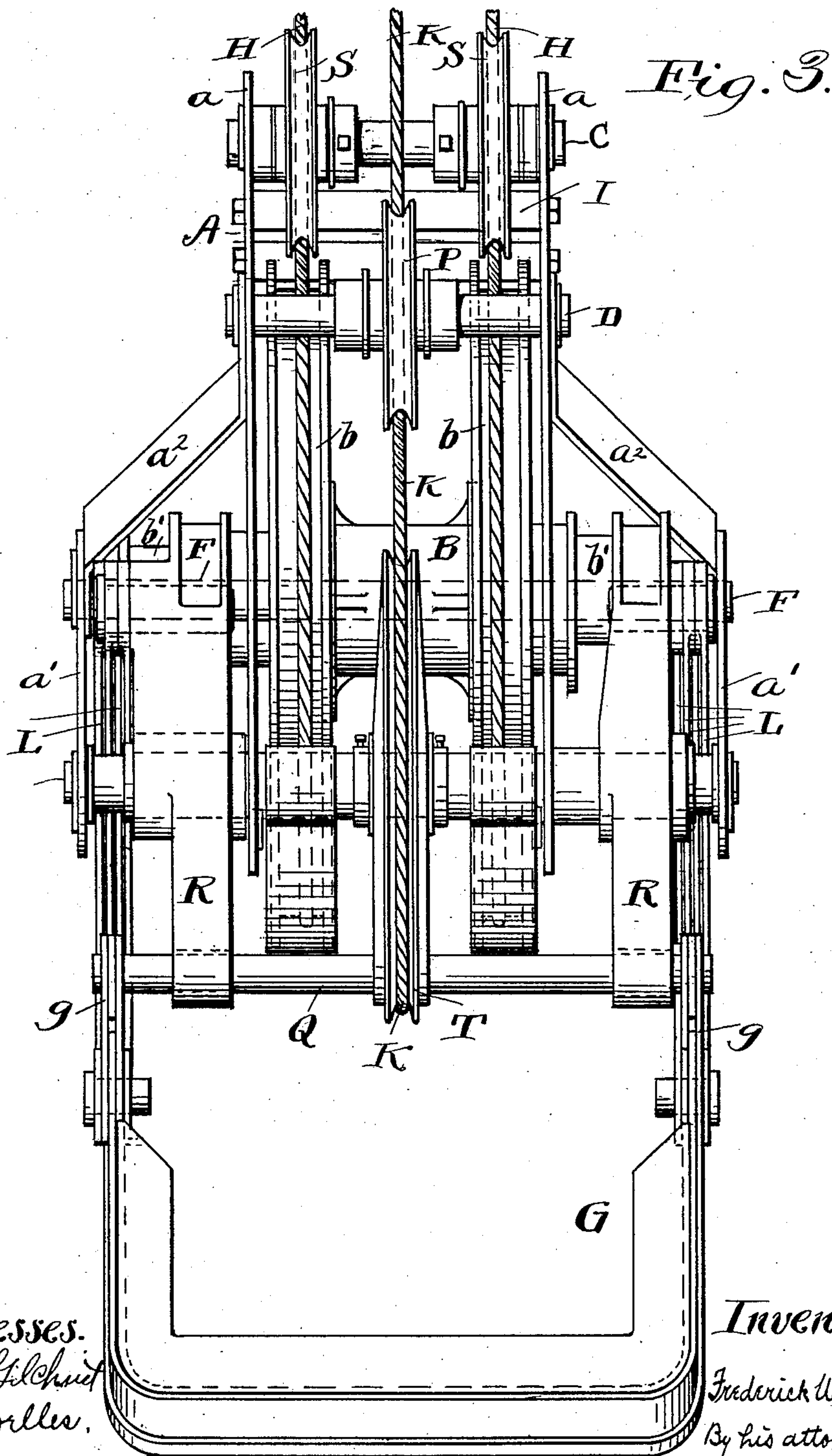
No. 894,219.

PATENTED JULY 28, 1908.

F. W. LOVELL.
CLAM SHELL BUCKET.

APPLICATION FILED MAY 18, 1904.

4 SHEETS—SHEET 3.



Witnesses.

E. B. Gilchrist
J. W. Miller.

Inventor.

Frederick W. Lovell.

By his attorneys

Thurston & Bates

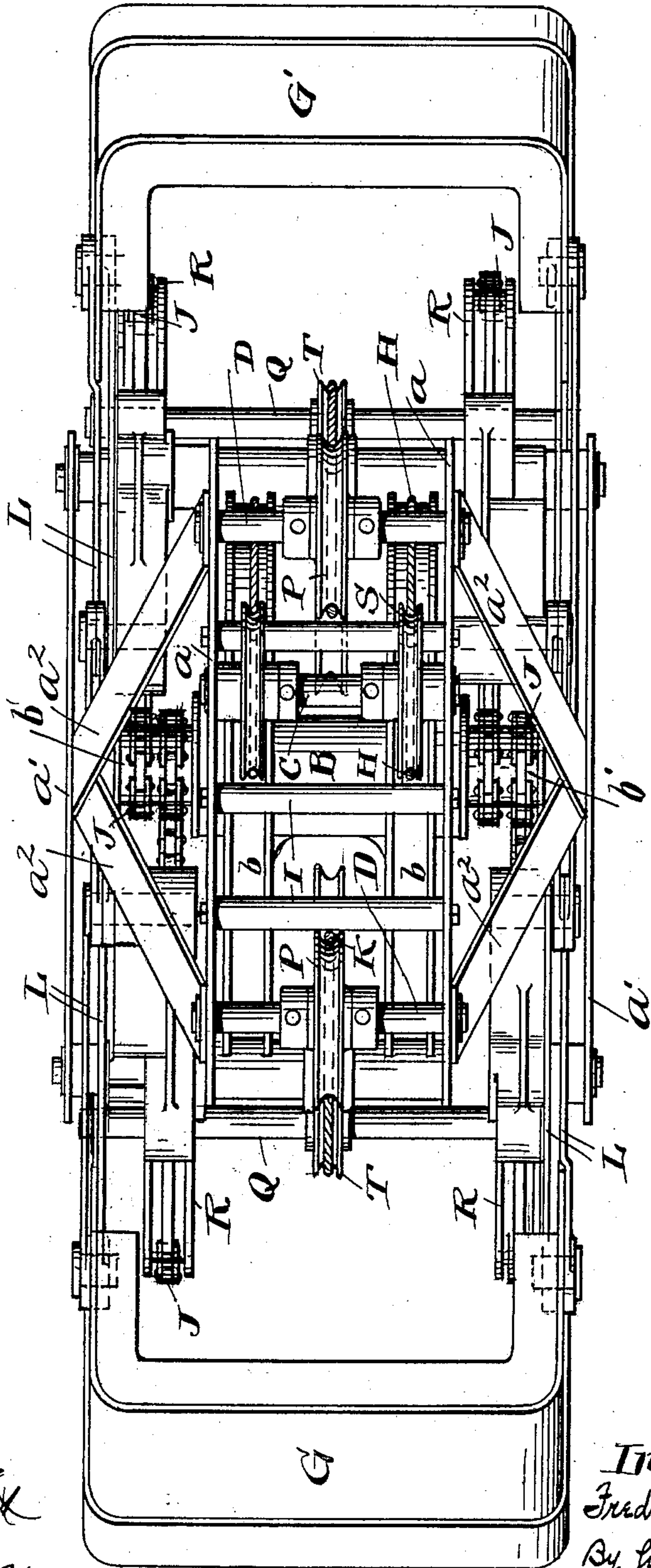
No. 894,219.

PATENTED JULY 28, 1908.

F. W. LOVELL.
CLAM SHELL BUCKET.
APPLICATION FILED MAY 18, 1904.

4 SHEETS—SHEET 4.

Fig. 1.



Witnesses,
E. B. Gilchrist
J. M. Wiles.

Inventor
Frederick W. Lovell
By his attorneys
Thurston & Bates

UNITED STATES PATENT OFFICE.

FREDERICK W. LOVELL, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE
McMYLER MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

CLAM-SHELL BUCKET.

No. 894,219.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed May 18, 1904. Serial No. 208,531.

To all whom it may concern:

Be it known that I, FREDERICK W. LOVELL, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Clam-Shell Buckets, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The invention relates to the kind of clam shell buckets which are much used in handling ore, especially for automatically picking such ore up from and lifting it out of the holds of vessels.

The object of the invention is to provide a novel and practical bucket construction easily opened and closed by the same ropes, operated from a distance overhead, by which the bucket is raised and lowered.

The invention consists in the construction and combination of parts hereinafter described and pointed out definitely in the claims.

In the drawing, Figure 1 is a side elevation of the bucket when closed; Fig. 2 is a sectional side elevation when open; Fig. 3 is an end view of the closed bucket, and Fig. 4 is a plan view of the open bucket.

The frame or head A of the bucket, as shown, consists of four parallel vertical plates or frame members, viz. the two inner plates *a, a*, and the two smaller outer plates *a'*,—which plates are connected and spaced by the horizontal non-rotating shafts C, D, D, F and E E, and a suitable number of rods I I. The outer plates are also secured to the inner plates by the braces *a*².

A drum structure B is rotatably mounted upon shaft F and extends substantially the entire distance between the two plates *a' a'*,—the middle part of the plates *a a* being cut away to permit this. This drum structure consists of two large drums *b* which receive the closing ropes H, H, and two smaller drums *b'*, *b'*, upon which are wound the chains J by which the bucket jaws are closed.

G G' represent the bucket jaws. Each has, projecting up from its sides, near its rear end, the ears *g g*. A pivot bar Q extends transversely over each bucket and through the aforesaid ears; and each of these pivot bars pass loosely through holes in sheave sectors R R and T which are associated with

each bucket. Two of the sectors R and one sector T are loosely mounted on each of the shafts E E and therefore associated with each bucket.

The front ends of the bucket jaws are supported by links L whose lower ends are pivotally connected with the sides of said jaws. The links which support the front ends of each jaw extend over to and are pivoted to the sectors R R which support the rear end of the opposite jaw,—the pivotal points being above the axes on which the sectors turn. The chains J which are wound upon the drums *b' b'* are also connected with and run in the peripheral grooves of the sectors R R. Opening ropes K are secured to and partly wound upon the sectors T, and these ropes extend upward being guided by their engagement with the idler sheaves P which are mounted on the shafts D. The two closing ropes H which are wound on the large drums B B also extend upward, being guided by the idler sheaves S mounted on the shaft C.

In order to open the bucket jaws the weight of the bucket structure is allowed to come on the ropes K,—the ropes H being loosened. The sectors T are thereby turned and the sectors R being connected thereto by the cross rods Q turn also, and as a result the rear ends of the buckets are swung outward and upward by the described movement of those sectors R to which they are connected. At the same time the front end of each bucket jaw is swung downward and outward by the action of those sectors R which are on the opposite side of the frame, namely to those which the opposite jaw is directly connected.

To close the bucket jaws ropes H are tightened so that the weight of the bucket structure comes upon them; the ropes K are slackened and the ropes H are pulled up. This turns the drum structure and thereby, through the chains J, the sectors R are moved in the contrary direction and such movements cause the closing movement of the bucket jaws.

The bucket herein shown is an improvement on that shown in my prior application No. 188,439, filed January 11, 1904, wherein the features are more broadly claimed. The present invention differs from the former, among other things, by having an additional

opening mechanism associated with each bucket jaw or scoop. This opening mechanism for each scoop includes an oscillating sector T, a rope K by which it is operated, and the connections between the sector and the rear end of the associated scoop. The closing of the scoops is effected by means of other oscillating mechanism, namely, in the specific form shown the oscillating sectors R, the connections between them and the scoops, and the chains J by which these oscillating sectors are turned in that direction which causes the closing of the scoops. This construction allows the power to be applied more efficiently, and the distribution of material in the various parts to be better proportioned to withstand their strains.

It will be seen that the closing members R while being sectors in form, to better adapt them to receive the operating chains, are, in fact, levers so far as concerns their functions in operating the scoops. One lever arm of each of the members R extends from shaft E to the associated scoop, to the rear end of which it is connected by means of the pivoted rod Q. The other arm extends from shaft E to the point where link L is pivoted to said sector.

Having described my invention, I claim:

1. In a clam shell bucket, the combination of a frame having near its lower outer corners the horizontal shafts E E, two sheave sectors mounted on each shaft and connected together, and two bucket jaws whose rear ends are respectively pivoted to the sectors above them, links which are pivotally connected with said sectors and with the front ends of the opposite buckets, opening and closing ropes, and mechanism for turning said sectors in either direction, substantially as and for the purpose specified.

2. In a clam shell bucket, the combination of a frame having near its lower outer corners two non-rotatable shafts E E, the sectors R R and T loosely mounted on each of said shafts, two bucket jaws,—the rear end of each of which is pivoted to the three sectors above it by the pivot bar Q, links pivotally connected with the sectors R and crossing each other and pivoted at their lower ends to the front ends of the opposite buckets, a drum structure rotatably mounted in said frame, a rope or cable wound thereon and extending upward above the frame, flexible connections between the sectors R and with said drum structure, ropes or cables connected with the sectors T, and guide sheaves in the upper ends of the frame for said ropes or cables, substantially as and for the purpose specified.

3. In a clam shell bucket, the combination of a frame consisting of four parallel plates, to wit, the plates *a a* whose center portions are cut away and the plates *a', a'*, and the

braces *a²*, with a drum structure rotatably mounted between the outer plates, transverse non-rotatable shafts E E extending through the four plate members of the frame, two sheave sectors R R rotatably mounted on each of said shafts and lying between the plates *a* and the plates *a'*, a sheave sector T loosely mounted on each of said shafts between the two middle plates of the frame, bucket jaws the rear end of each being pivotally connected with the three sectors above it by a transverse pivot bar, links pivotally connected with the sectors R above the shafts E, which links cross each other and are pivotally connected with the opposite buckets near their front ends, ropes or chains secured to the sectors R, and the drum structure, ropes or cables secured to the sectors R and extending upwardly therefrom, guide sheaves with which said ropes engage, and a closing rope wound upon the drum structure and extending upward therefrom, and a guide sheave with which said closing rope engages, substantially as and for the purpose specified.

4. In a clam shell bucket, the combination of a frame consisting of four plates, to wit, the plates *a a* which are centrally cut away, the outer plates *a' a'*, braces *a²*, and transverse members which tie said plates together and keep them properly spaced with sectors R R mounted on opposite sides of said frame, bucket jaws, to the rear ends of which said sectors are pivoted, links also pivoted to said sectors and crossing each other and pivoted to the front ends of opposite buckets, a winding drum structure, ropes connecting said sectors with said winding drum, sectors T mounted axially with respect to the sectors above referred to and rigidly connected therewith, ropes secured thereto for operating them to open the jaws, and other ropes secured to said winding drum for turning it to close the jaws, substantially as and for the purpose specified.

5. In a clam shell bucket, the combination of a frame, a drum structure centrally mounted thereon, and three sheave sectors on each side of said frame mounted in axial alinement and connected together, with two bucket jaws each of which has its rear end pivotally connected with the two outside sectors above it, and links whose upper ends are pivotally connected with said outside sectors, and whose lower ends are pivotally connected with the front ends of opposite buckets, opening ropes secured to the intermediate sectors, flexible connection between the outer sectors and the drum structure, and closing ropes wound on said drum structure, substantially as and for the purpose specified.

6. A frame for clam shell buckets, consisting of four plates, to wit, the plates *a a*

which are centrally cut away, the outer plates a' a' the braces a^2 , and transverse members which tie said plates together and keep them properly spaced, substantially as and for the purpose specified.

7. In a clam shell bucket, the combination with a pair of scoops, of supporting and closing mechanism therefor, and means independently supported and having a part thereof connected directly to its corresponding scoop for shifting the same to open the bucket.

8. In a clam shell bucket, the combination with a pair of scoops, of supporting and closing mechanism therefor, and a device in connection with each scoop, independently mounted and having a part thereof connected directly with its corresponding scoop, for shifting the same to open the bucket.

9. In a clam shell bucket, the combination with a pair of scoops, of supporting and closing mechanism therefor, a pair of sheave members loosely pivoted and having a part thereof connected directly with their corresponding scoops, and means for operating said sheaves.

10. In a clam shell bucket, the combination with a pair of scoops, of a frame, supporting and closing mechanism for said scoops, a pair of shafts mounted in said frame, a sheave member loose upon said shaft and having a portion thereof connected directly to its corresponding scoop, and means for operating said members.

11. In a clam shell bucket, the combination with a pair of scoops, of operating mechanism independently pivoted and having parts which are connected to the scoop at a point which is in the rear of its forward end, links connecting the operating mechanism of one scoop with approximately the forward end of the opposite scoop, means for rocking said mechanism, and means independent thereof for opening the bucket.

12. In a clam shell bucket, the combination with a pair of scoops, a frame, shafts mounted on said frame, operating levers mounted upon said shafts, each lever having two arms of which one is pivoted to an associated scoop near the rear end thereof, links respectively pivoted to the other arms of said levers and with the front ends of the opposite scoops, opening members extending down and engaging the rear ends of said scoops respectively, means for rocking said levers, and means for rocking the opening members.

13. In a clam shell bucket, the combination of a pair of scoops, a frame, a pair of shafts mounted on the frame, a pair of operating levers mounted upon each shaft, each of said levers having one arm which is connected with the corresponding scoop at a point in the rear of its front end, said levers also having other arms, links pivoted to said

other arms at one end and pivoted at the opposite end to the opposite scoop near the front end thereof, an opening member pivoted upon each of said shafts and having a portion thereof engaging the corresponding scoop near the rear end thereof, means for rocking said levers, and means for rocking said opening members.

14. In a clam shell bucket, the combination of a pair of scoops, a frame, a pair of shafts mounted in said frame, a pair of operating levers mounted upon each of said shafts,—each lever having two arms, a shaft carried by each scoop and being pivoted with one arm of the corresponding lever, links connected with the other arms of said levers and with opposite scoops near the front ends thereof, a sheave segment mounted upon each of said shafts and connected with corresponding scoops respectively, means for operating said levers, and means for operating said sheave segments.

15. In a clam shell bucket, the combination of a pair of scoops, a frame, operating levers loosely pivoted to said frame, each having one arm which extends down and is pivoted to the corresponding scoop, a pair of drums for manipulating the operating levers of one scoop, another pair of drums for operating the operating levers of the opposite scoop, means for rotating both of said drums in unison, and means for opening said bucket.

16. In a clam shell bucket, the combination of a pair of scoops, a frame, shafts mounted in said frame, operating levers mounted on said shafts, each lever having two arms, one of which is pivoted to the corresponding scoop, links connected with the other arms of said levers and with the front ends of the opposite scoop, suitably mounted drums, flexible connections between said drums and levers, a sheave segment loosely mounted upon each of said shafts and having an arm which extends down and is pivotally connected with the corresponding scoop.

17. In a clam shell bucket, the combination of a pair of scoops, a shaft carried by each scoop, a frame, supporting shafts mounted in said frame, operating levers mounted upon said supporting shafts, each of said levers having two arms, one of which is pivoted to the shaft of the corresponding scoop, links connecting the other arms of said levers with the front ends of opposite scoops, drums mounted in said frame, flexible connections between said drums and levers, a sheave segment upon each of said supporting shafts and connected with the shaft carried by the corresponding scoop, ropes for operating said sheave segments, and sheaves for guiding said ropes.

18. In a clam shell bucket, the combination, with two scoops, of two closing mechanisms, each connected with the rear end of

one scoop and the forward end of the other, and two opening mechanisms connected with the rear ends of the respective scoops.

19. In a clam shell bucket, the combination with scoops of closing mechanism which is connected with both ends of the scoops and opening mechanism which is connected with the rear ends only of the respective scoops.

20. In a clam shell bucket, the combination of one oscillatory mechanism for opening

the bucket and another oscillatory mechanism for closing it, and cables for operating said mechanisms.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses. 15

FREDERICK W. LOVELL.

Witnesses:

E. B. GILCHRIST,

E. L. THURSTON.