

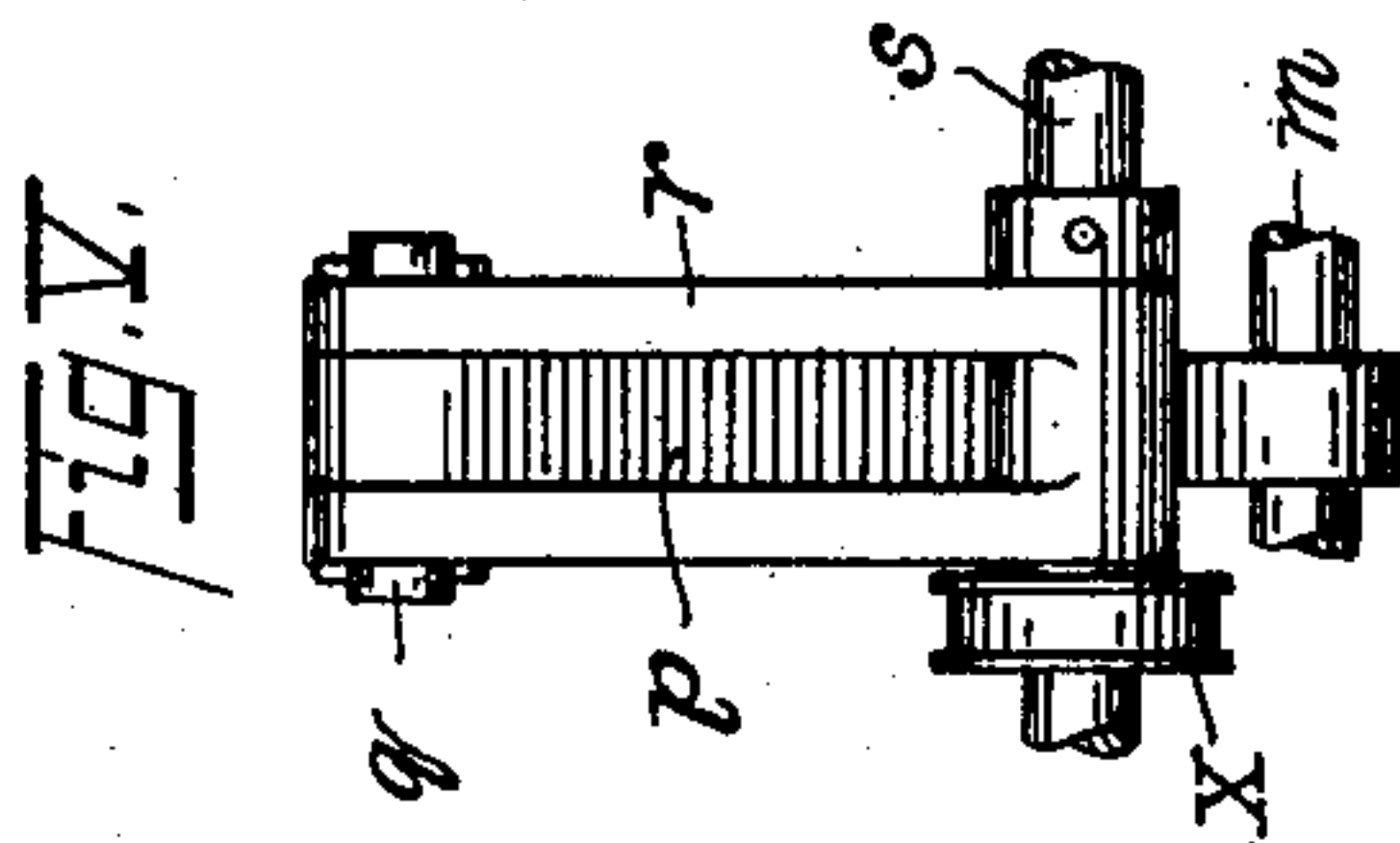
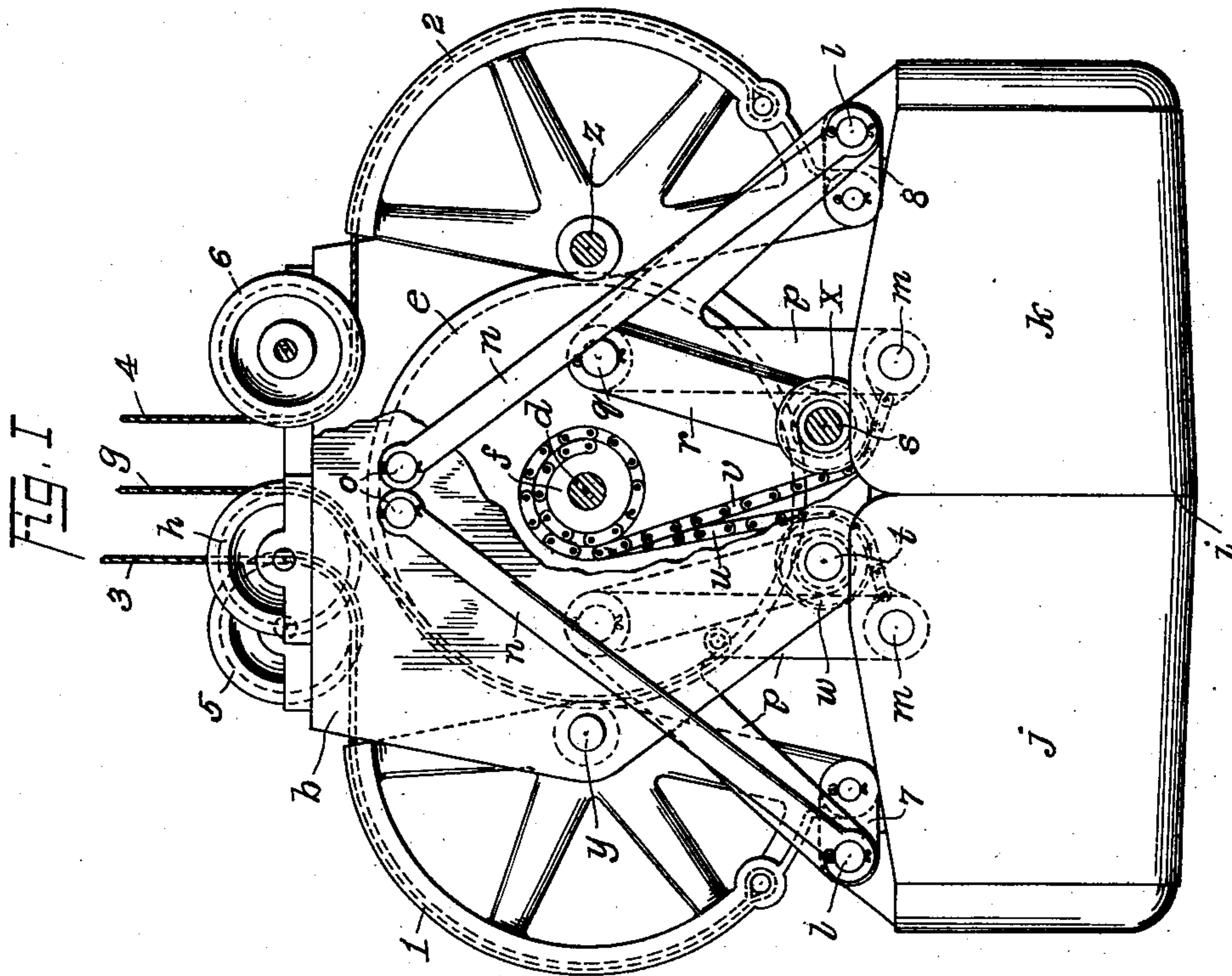
No. 755,912.

PATENTED MAR. 29, 1904.

W. K. MONROE.
CLAM SHELL BUCKET.
APPLICATION FILED OCT. 7, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:
Elsie M. Hopper.
Prof. Stearns

Inventor.
Will K. Monroe,
by *Luther G. Hopper,*
Attorney.

No. 755,912.

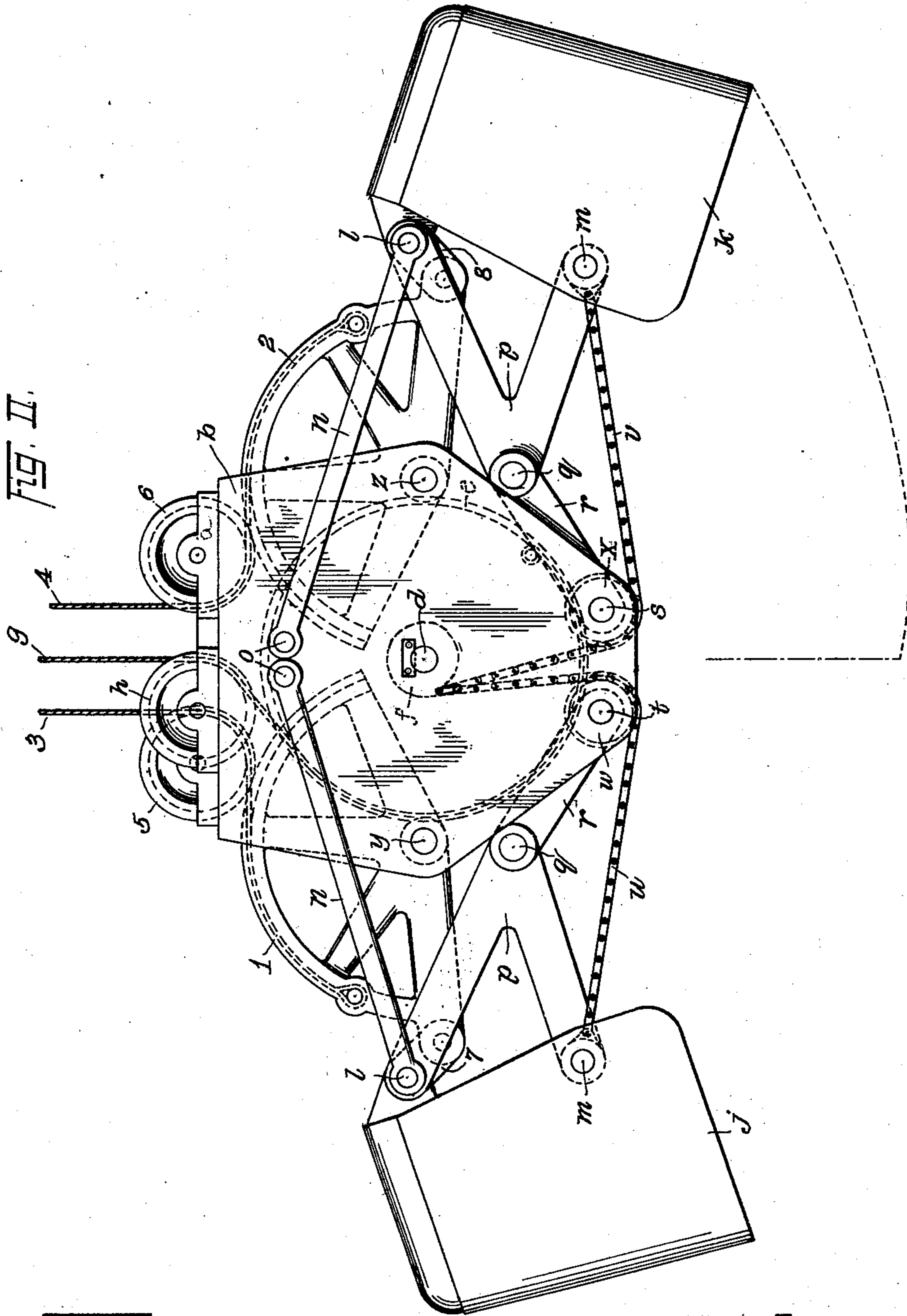
PATENTED MAR. 29, 1904.

W. K. MONROE.
CLAM SHELL BUCKET.

APPLICATION FILED OCT. 7, 1903.

NO MODEL.

3 SHEETS—SHEET 2.



Witnesses:
Elsie M. Hopper
Jno. F. Stearns

Inventor.
Will K. Monroe,
by *Luther G. Hopper,*
Attorney.

No. 755,912.

PATENTED MAR. 29, 1904.

W. K. MONROE.
CLAM SHELL BUCKET.
APPLICATION FILED OCT. 7, 1903.

NO MODEL.

3 SHEETS—SHEET 3.

FIG. IV.

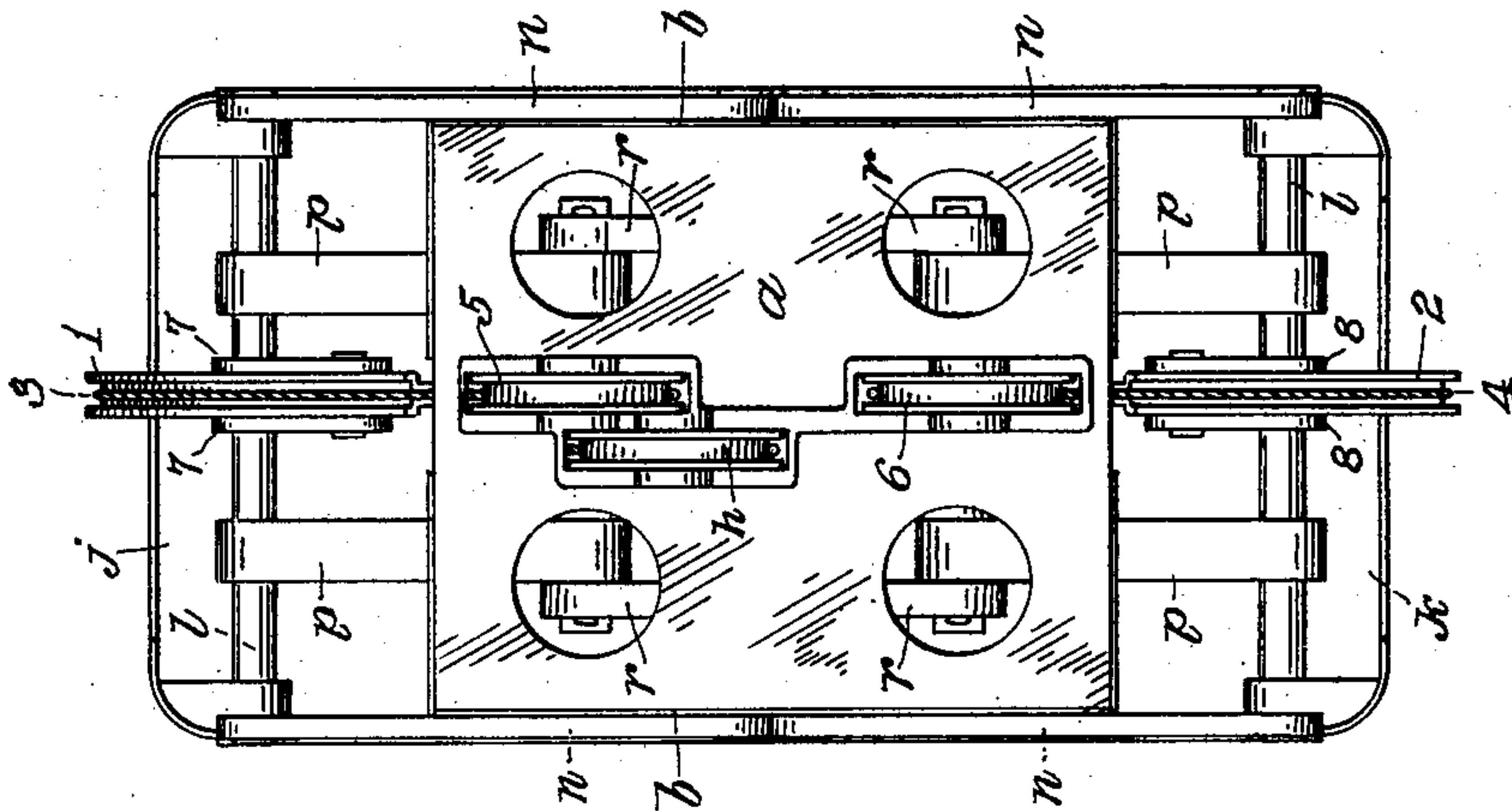
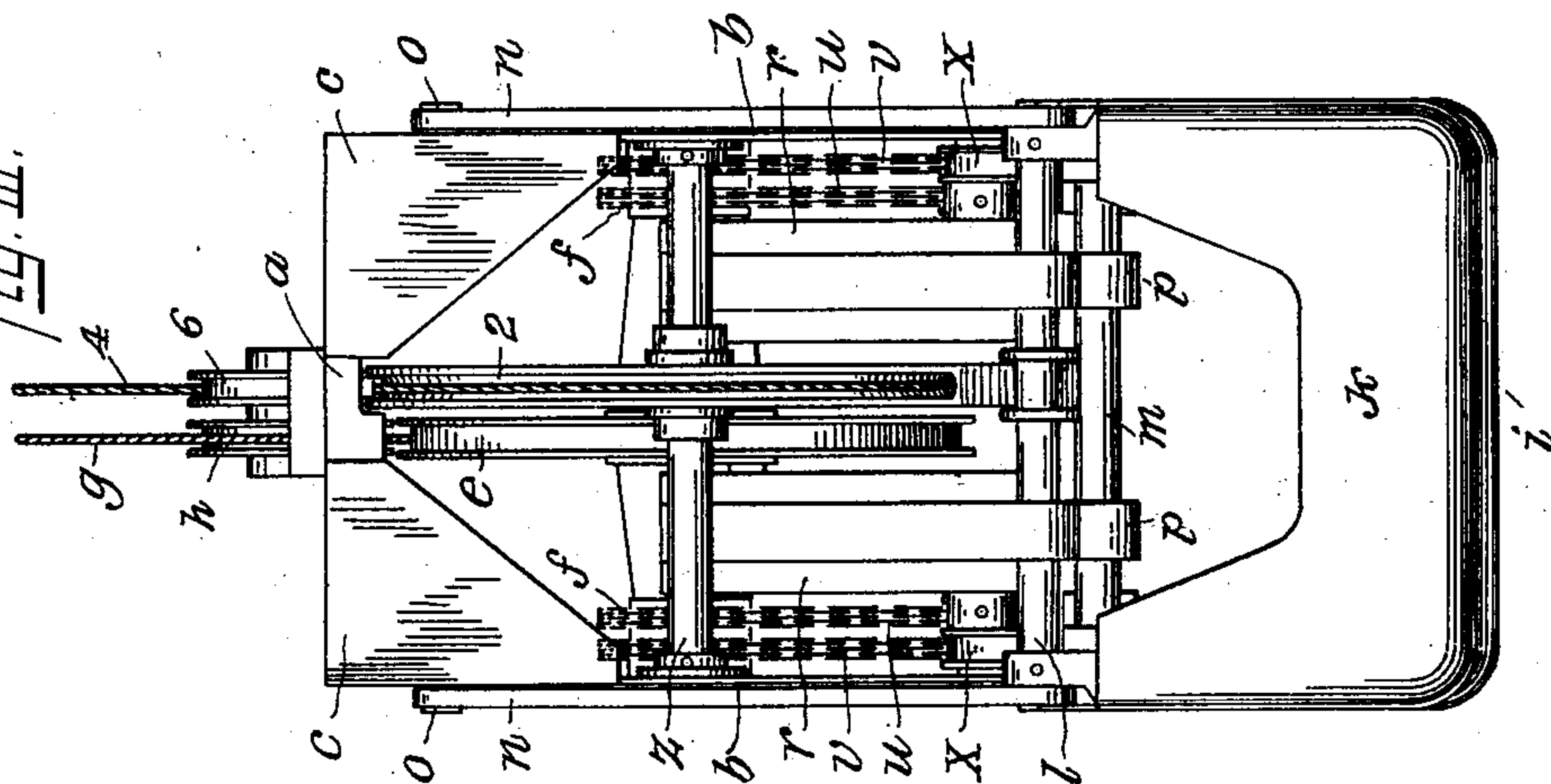


FIG. III.



Witnesses:
Elsie M. Hopper.
Geo. J. Stearns

Inventor,
Will K. Monroe,
by Luther H. Hopper,
Attorney.

UNITED STATES PATENT OFFICE.

WILL K. MONROE, OF CLEVELAND, OHIO.

CLAM-SHELL BUCKET.

SPECIFICATION forming part of Letters Patent No. 755,912, dated March 29, 1904.

Application filed October 7, 1903. Serial No. 176,071. (No model.)

To all whom it may concern:

Be it known that I, WILL K. MONROE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Clam-Shell Buckets, of which the following is a specification.

This invention relates to clam-shell or grab buckets and operating mechanism therefor especially designed for handling rough and heavy materials, such as iron ores, limestone, and coal.

The object of my invention is to produce a bucket and mechanism for operating it which will work readily into and clean up a pile of material to be moved with less expenditure of power and time than has been required with devices heretofore employed.

The class of devices commonly known as "clam-shell" or "grab" buckets to which this invention relates comprises a pair of oppositely-disposed scoops adapted to swing apart to release their contents and to be brought together upon the pile of material to be moved, so that their opposing edges cut into said material, thereby filling the said scoops and forming a single receptacle, which is then hoisted away from the pile.

The present invention consists in improved means for supporting and operating the scoops, whereby the cutting edges of the same are swung in a long flat curve approximating to horizontal as the edges approach each other, while the scoops are suspended in such a manner that their constantly-varying angular positions during their advance toward each other facilitates both the introduction of their cutting edges into the mass of material to be moved and the flowing of said material into the scoops. This feature, together with the direct application of the closing-chains shown herein, results in a considerable reduction in the power required for operating this class of buckets. The suspension means also forms positive guides and stops for the front edges of the scoops, preventing their being displaced laterally in closing or overlapping each other.

The invention further consists in improved means for opening the bucket to a wide angle with a comparatively slight dropping thereof,

and the scoops are designed to relieve themselves of an excessive load of material.

An embodiment of my invention is illustrated in the accompanying drawings, in which—

Figure I is a side elevation showing the bucket closed. Fig. II is a side elevation with the bucket open. Fig. III is an end elevation of the closed bucket and operating mechanism, and Fig. IV is a plan view of the same. Fig. V is a view of the levers *p* and *r* in end elevation.

Referring to the drawings, the framework for supporting the bucket and operating mechanism comprises a top plate *a*, two depending side plates *b*, and gusset-plates *c* upon the ends. A shaft *d* is mounted centrally in the frame projecting through the side plates *b* and rigidly keyed or otherwise secured thereto. Mounted loosely upon the shaft *d* is a sheave-wheel *e*, which carries upon each end of its hub a chain-wheel *f*. A cable *g* is secured to and passes around the periphery of the wheel *e*, and from thence, guided by the idler-wheel *h*, it is carried to one of the drums of a suitable hoisting-engine.

The bucket *i* comprises two approximately rectangular scoops *j* and *k*, with the edges of their open front ends designed to register with each other when the bucket is closed, as in Fig. I. Mounted in suitable hangers projecting slightly above the sides and near the rear ends of the respective scoops are transverse shafts *l*, and suitably mounted between the sides of each scoop well forward thereon and near the upper edges thereof is a transverse shaft *m*. The shafts *m* are rigidly secured to the sides of the scoops. The shafts *l* are preferably made tight in their hangers and project therethrough to form journals for the four suspension-arms *n*, the upper ends of said arms being journaled upon pins *o*, projecting outward from the frame-plates *b* near the upper ends and flanking the center lines of the latter, as shown. A pair of elbow-levers *p* is attached to each scoop *j* and *k*, the inner arms thereof being secured upon the shafts *m* and their outer arms upon the shafts *l*. The vertices of said elbow-levers are respectively journaled upon pins *q*, carried by

the swinging ends of the double-armed levers r , and the elbow-levers are fitted to swing closely between the arms of the levers r to prevent lateral displacement of the scoops.

5 The hubs of the levers r are loosely mounted upon the transverse shafts s and t , two of said levers upon each of said shafts, and suitable collars are provided to hold them in place. The shafts s and t project through and are fastened

10 rigidly to the frame-plates b adjacent to the lower ends of the latter and at such equal distances from the center line that when the bucket i is closed the inner arms of the elbow-levers p will abut against the hubs of the

15 double-armed levers r , respectively, so as to prevent injury or overlapping of the opposing edges of the scoops j and k .

Upon each end of the hub of the sheave-wheel e is secured the ends of two chains u

20 and v , designed and arranged, as plainly shown, so that upon the rotation of said wheel in one direction said chains will wrap about said hub and upon themselves. The two chains u lead around the respective idler-

25 wheels w , mounted loosely upon the shaft t , and are suitably secured at their lower ends to the shaft m of the scoop j , and the two chains v lead around idler-wheels x , similarly mounted upon the shaft s , and are secured to

30 the shaft m of the scoop k . It will be observed that should the mechanism be suspended upon the cable g the weight of the device will serve to close the bucket i , as in Fig. I.

Fixedly secured to the side plates b of the

35 frame equidistant from the center line thereof are two transverse shafts y and z , having journaled, respectively, between fixed collars thereon segmental sheave-wheels 1 and 2. Cables 3 and 4 are secured to the peripheries

40 of the respective segmental wheels near the lower ends thereof and are carried through the peripheral grooves of said wheels and around their respective idler-wheels 5 and 6, journaled in the top of the frame, and thence

45 to the drums of a suitable hoisting-engine. The said cables 3 and 4 may be yoked together above the idler-wheels and suspended by a single cable leading to the hoisting-engine, if desired. Hinged, preferably, to short arms

50 projecting radially from the lower ends of the segmental wheels, respectively, are short links 7 and 8, the outer ends of which are journaled upon the respective shafts l of the scoops.

In the operation of the device it will now

55 be readily understood that the apparatus being suspended by the cables 3 and 4, the cable g being slack, the mechanism will through its own weight assume the position shown in Fig. II, with the scoops j and k held wide apart.

60 Should it now be lowered upon a pile of material to be moved and a pull exerted upon the cable g , while at the same time the cables 3 and 4 are slacked off, the cable g instead of lifting the entire apparatus at once will re-

65 volve the sheave-wheel e , winding up the

chains upon its hub, and thereby drawing the scoops j and k toward each other until the bucket i is closed, as in Fig. I, whereupon the cable g will raise the device with its load. In closing, the inner edges of the scoop-bottoms

70 will describe a flat curve approximating to horizontal as the scoops approach each other, as indicated by the dotted line in Fig. II, which curve, together with the angular posi-

75 tions of the scoops throughout their travel, obviously facilitates the introduction therein of the material to be moved. For use in soft or granular material it is preferred to cut away a portion of the upper parts of the outer

80 ends of the scoops, as shown in Fig. III, so that the bucket will readily relieve itself of any excessive load which it may gather up.

Modifications and changes may be made in the details of the mechanism herein disclosed without departing from the spirit of my in-

85 vention, provided the principles of construction set forth, respectively, in the following claims are employed.

I therefore particularly point out and distinctly claim as my invention—

90

1. In apparatus of the class described, the combination with a bucket comprising two oppositely-disposed scoops, of a frame having power-transmission mechanism mounted therein, swinging arms depending from said

95 frame and supporting the outer ends of said scoops, lever-arms rotatably supported at their lower ends near the bottom of said frame, suitable supporting-arms of said scoops hinged respectively to the upper ends of said lever-

100 arms, and suitable means for opening and closing said bucket, substantially as set forth.

2. In apparatus of the class described, the combination with a bucket comprising two oppositely-disposed scoops, of a frame hav-

105 ing power-transmission mechanism mounted therein, swinging arms depending from said frame and supporting the outer ends of said scoops, bifurcated lever-arms rotatably supported at their lower ends near the bottom of

110 said frame, suitable supporting-arms of said scoops hinged respectively to the upper ends and between the branches of said bifurcated arms, and suitable means for opening and closing said bucket, substantially as set forth.

115

3. In apparatus of the class described, the combination with a bucket comprising a pair of scoops adapted to form a single receptacle, of a frame having power-transmission mechanism mounted therein, swinging arms depend-

120 ing from said frame and supporting the outer ends of said scoops, lever-arms rotatably supported at their lower ends near the bottom of said frame, elbow-levers hinged respectively at their vertices to the upper ends of said le-

125 ver-arms and having their branches secured to said scoops near the outer and inner ends of the latter respectively, and suitable means for opening and closing said bucket, substantially as set forth.

130

4. In apparatus of the class described, the combination with a bucket comprising a pair of scoops adapted to form a single receptacle, of a frame having power-transmission mechanism mounted therein, swinging arms depending from said frame and supporting the outer ends of said scoops, a pair of transverse shafts secured in the lower end of said frame, a pair of hubs having double projecting arms and rotatably secured upon each of said shafts, suitable supporting-arms of said scoops hinged between the double arms of said hubs respectively and adapted to abut against the said hubs when said bucket is closed, and suitable means for opening and closing said bucket, substantially as set forth.

5. In apparatus of the class described, the combination with a bucket comprising a pair of oppositely-disposed scoops, and a frame provided with suitable swinging arms for suspending the outer ends of said scoops therefrom, of lever-arms journaled at their lower ends near the bottom of said frame, supporting-arms of said scoops hinged respectively to the upper ends of said lever-arms, a power-wheel mounted in said frame provided with means for rotating it, chain-wheels upon the hub of said power-wheel, chains secured at their upper ends to said chain-wheels adapted

to wrap thereon and having their lower ends secured respectively to the upper and inner portions of said scoops, suitable guide-wheels for said chains, and means for opening said bucket, substantially as set forth.

6. In apparatus of the class described, the combination with a bucket comprising a pair of oppositely-disposed scoops, of a frame having a power-wheel mounted therein provided with suitable means for closing said bucket, swinging arms depending from said frame and supporting the outer ends of said scoops, lever-arms journaled at their lower ends near the bottom of said frame, supporting-arms of said scoops hinged respectively to the upper ends of said lever-arms, segmental wheels mounted one in each end of said frame and means for rotating them, and operative connections between the lower ends of said segmental wheels and the outer ends of the respective scoops, substantially as set forth.

In testimony whereof I affix my signature, in the presence of two subscribing witnesses, at Cleveland, Ohio, this 1st day of October, 1903.

WILL K. MONROE.

Witnesses:

JNO. T. SULLIVAN,
JOHN LINDEN.