

No. 667,975.

Patented Feb. 12, 1901.

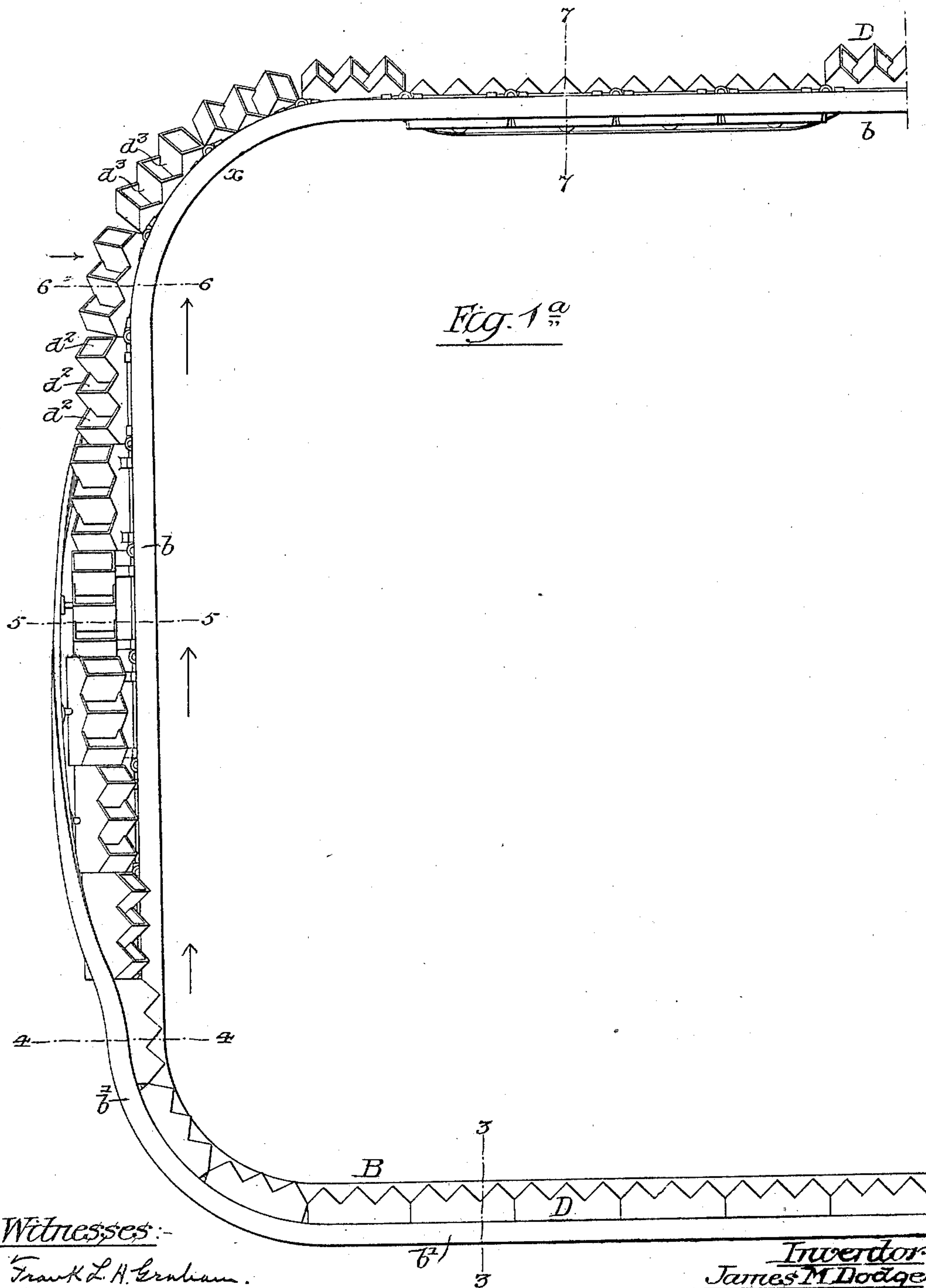
J. M. DODGE.

ELEVATING AND CONVEYING APPARATUS.

(Application filed Jan. 27, 1899.)

(No Model.)

7 Sheets—Sheet 1.



Witnesses:-

Frank L. H. Graham.
Wm. A. Barn.

Inventor:
James M. Dodge.
by His Attorneys:
Howson & Howson

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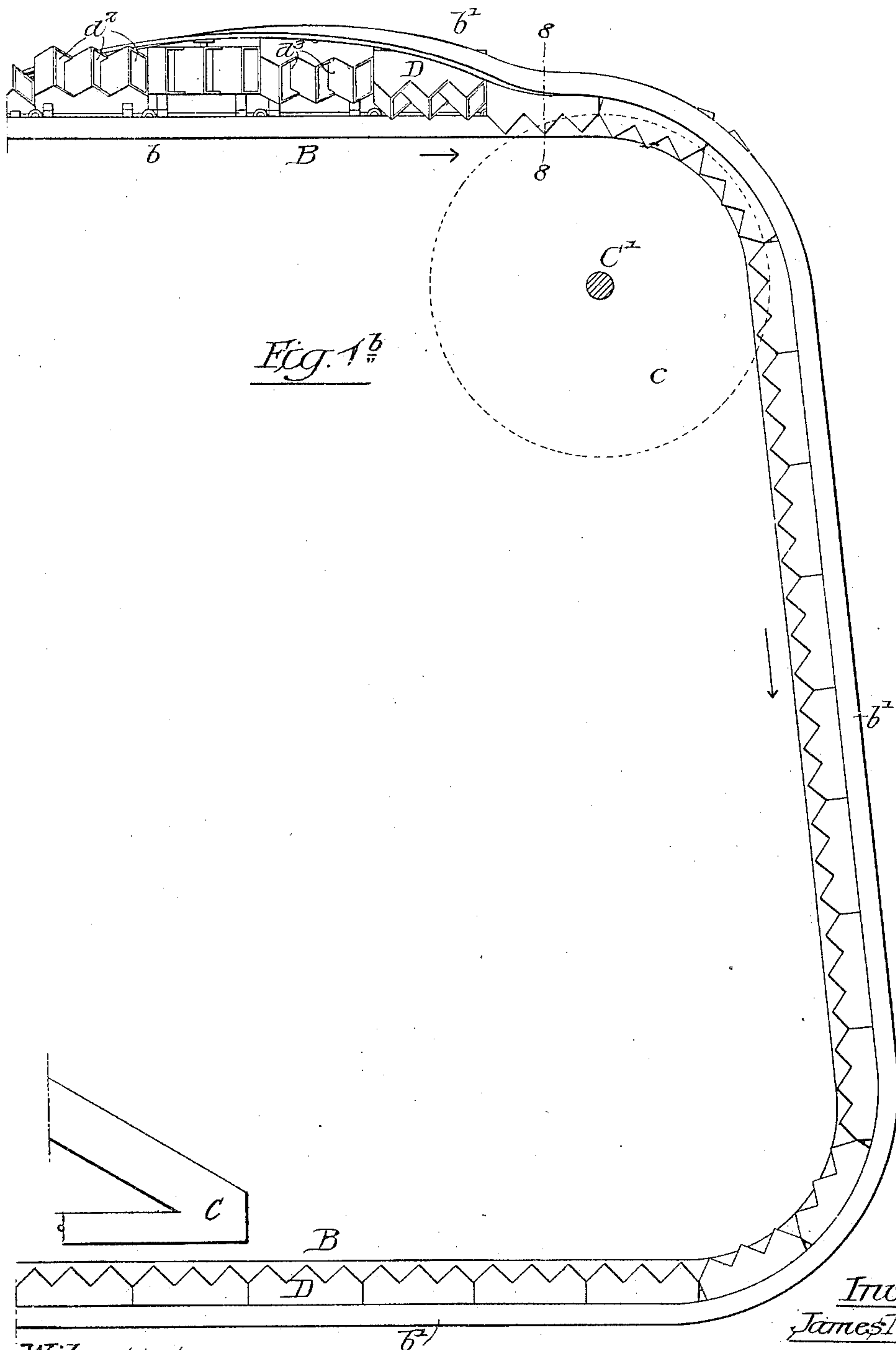
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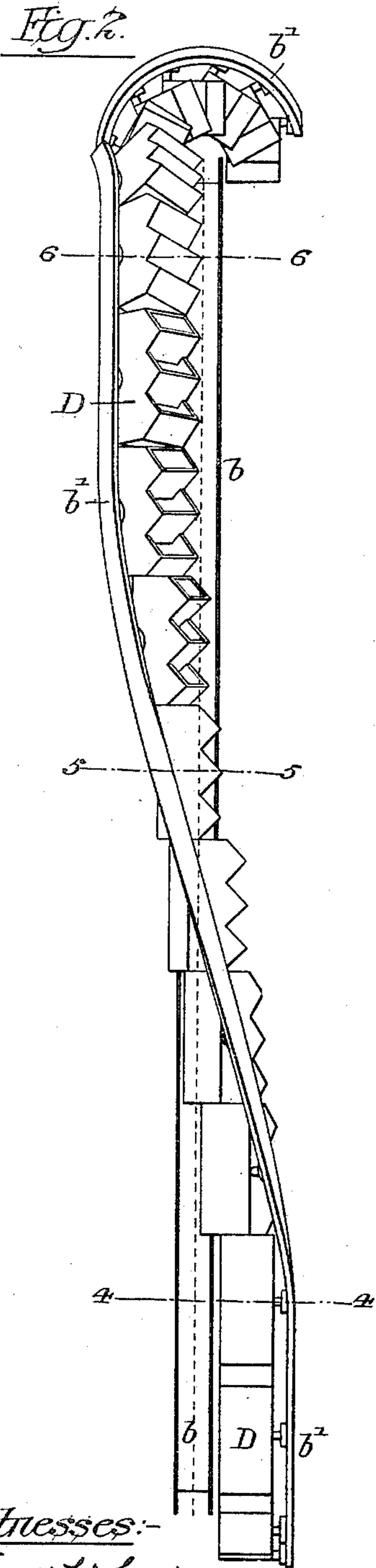
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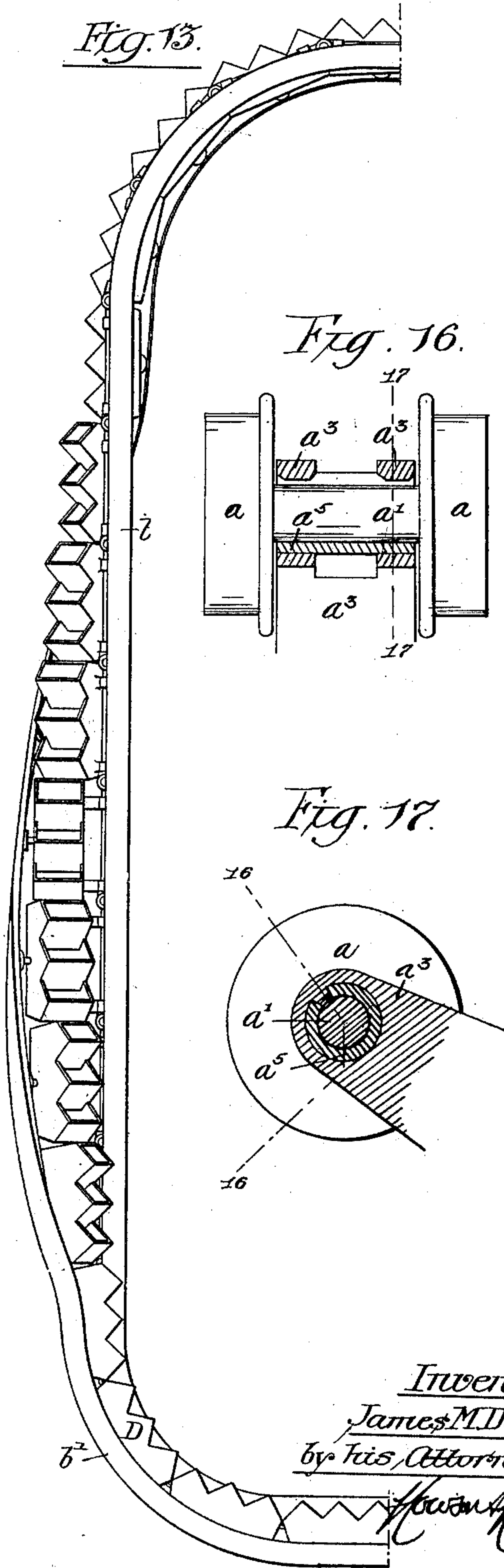
(No Model.)

7 Sheets—Sheet 3.



Witnesses:-

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Fig. 3.

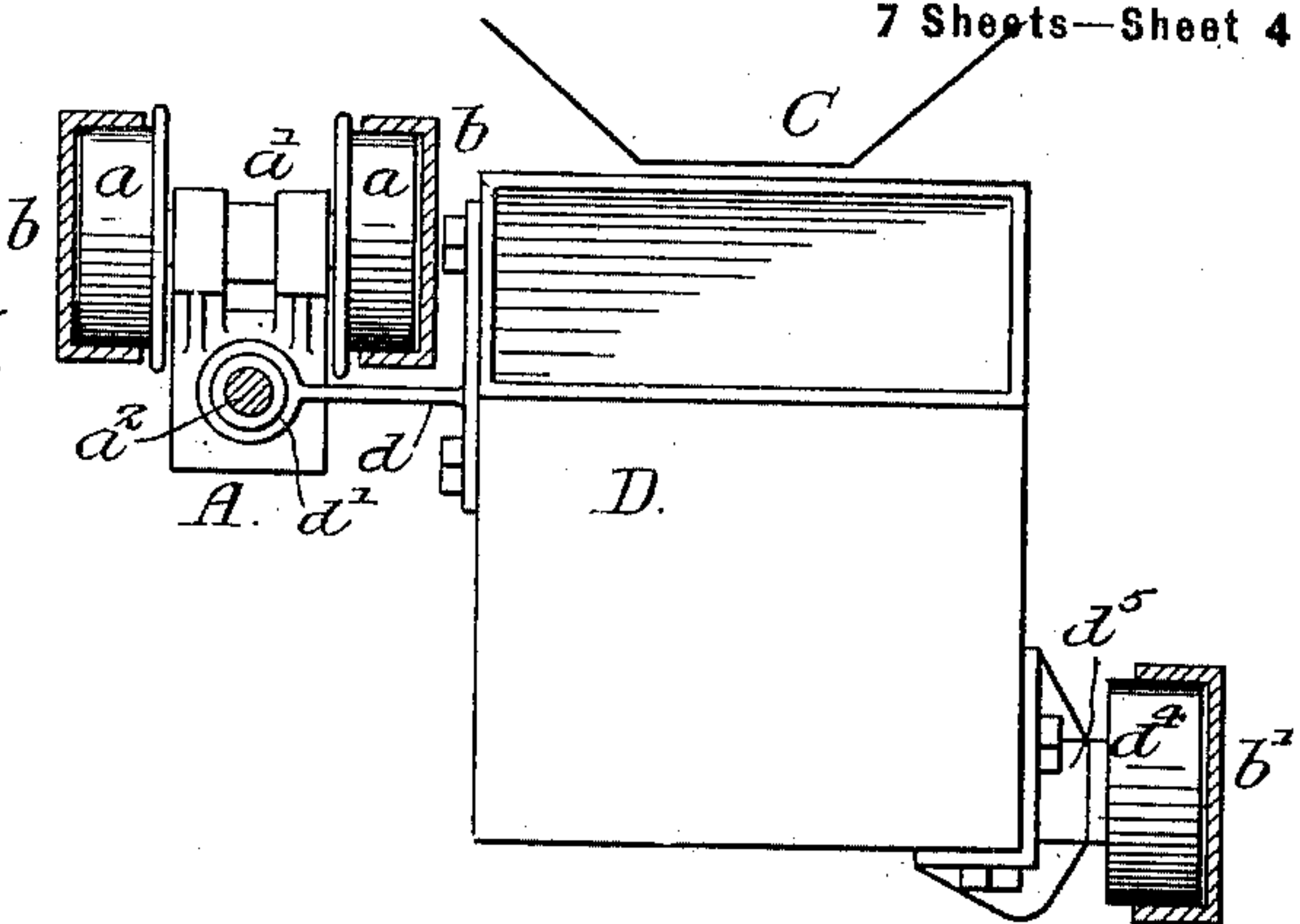


Fig. 4.

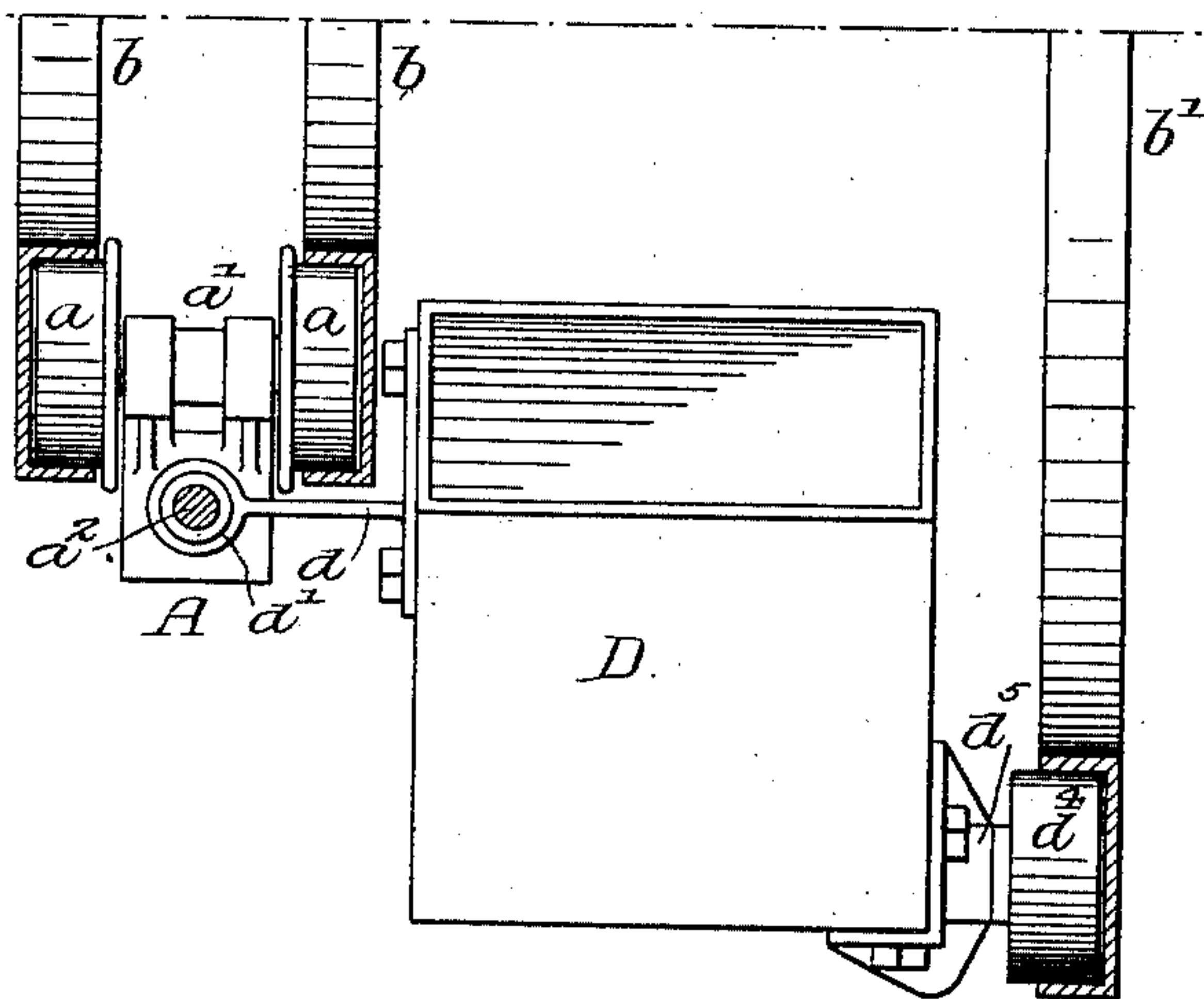
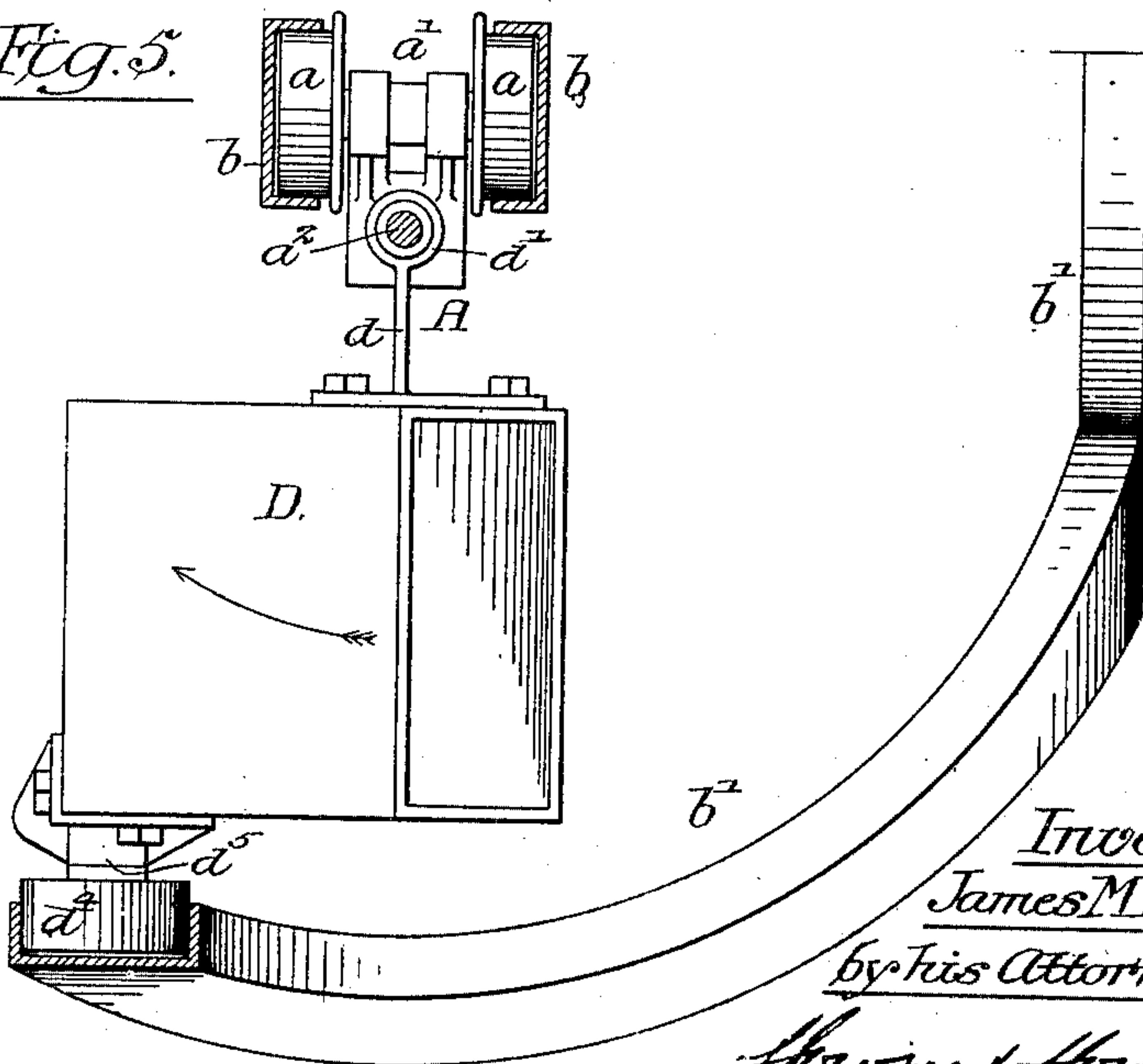


Fig. 5.



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7 Sheets—Sheet 5

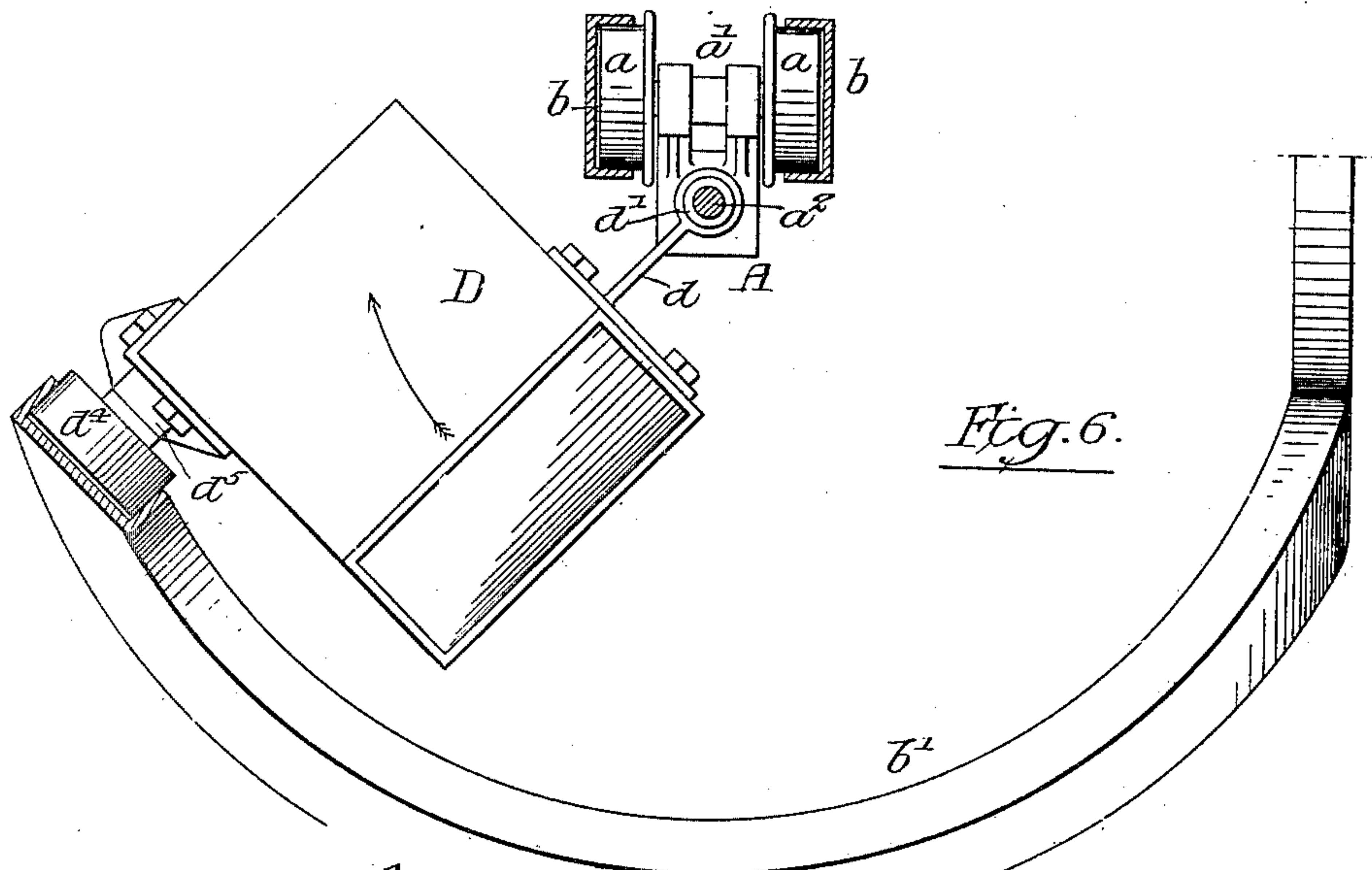


Fig. 6.

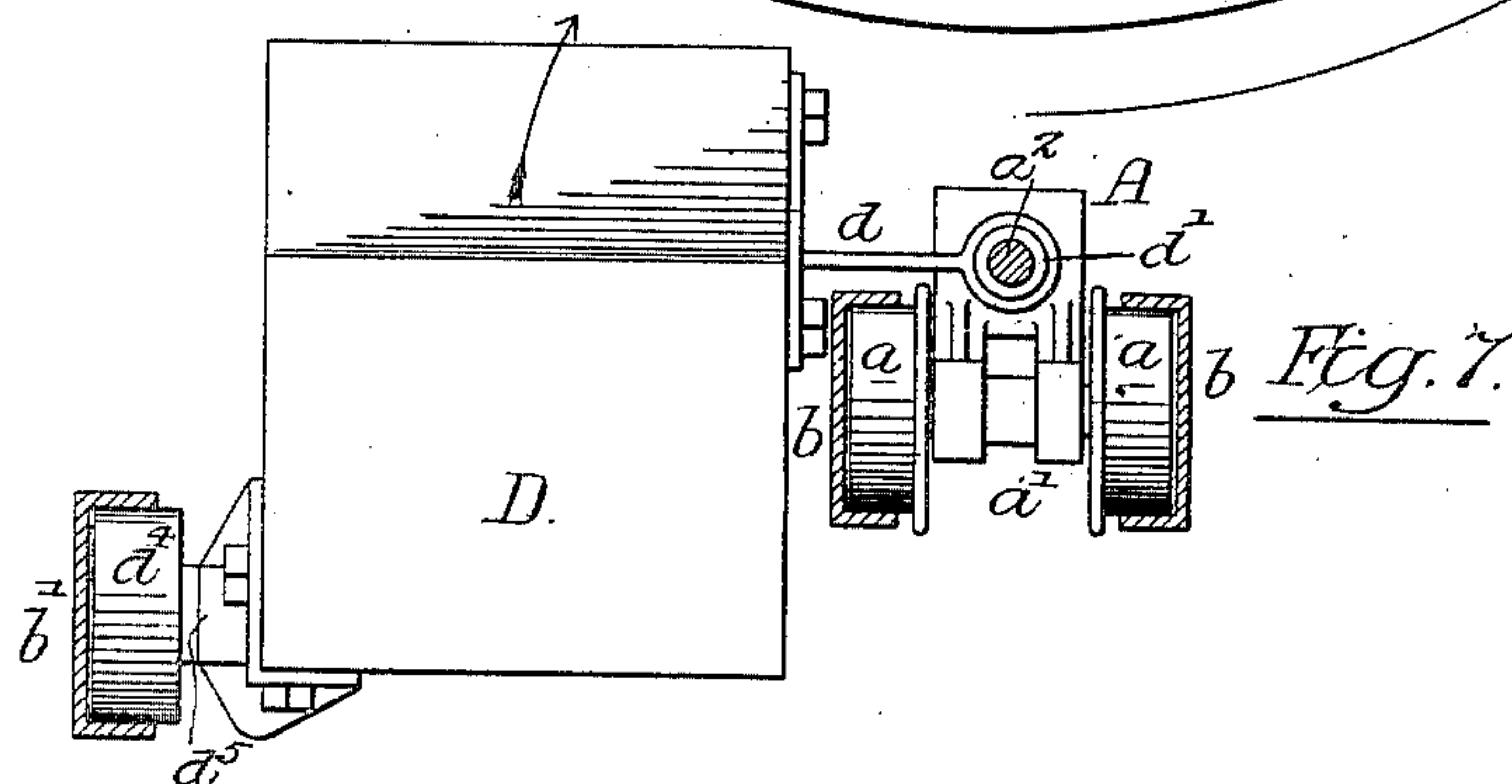


Fig. 7.

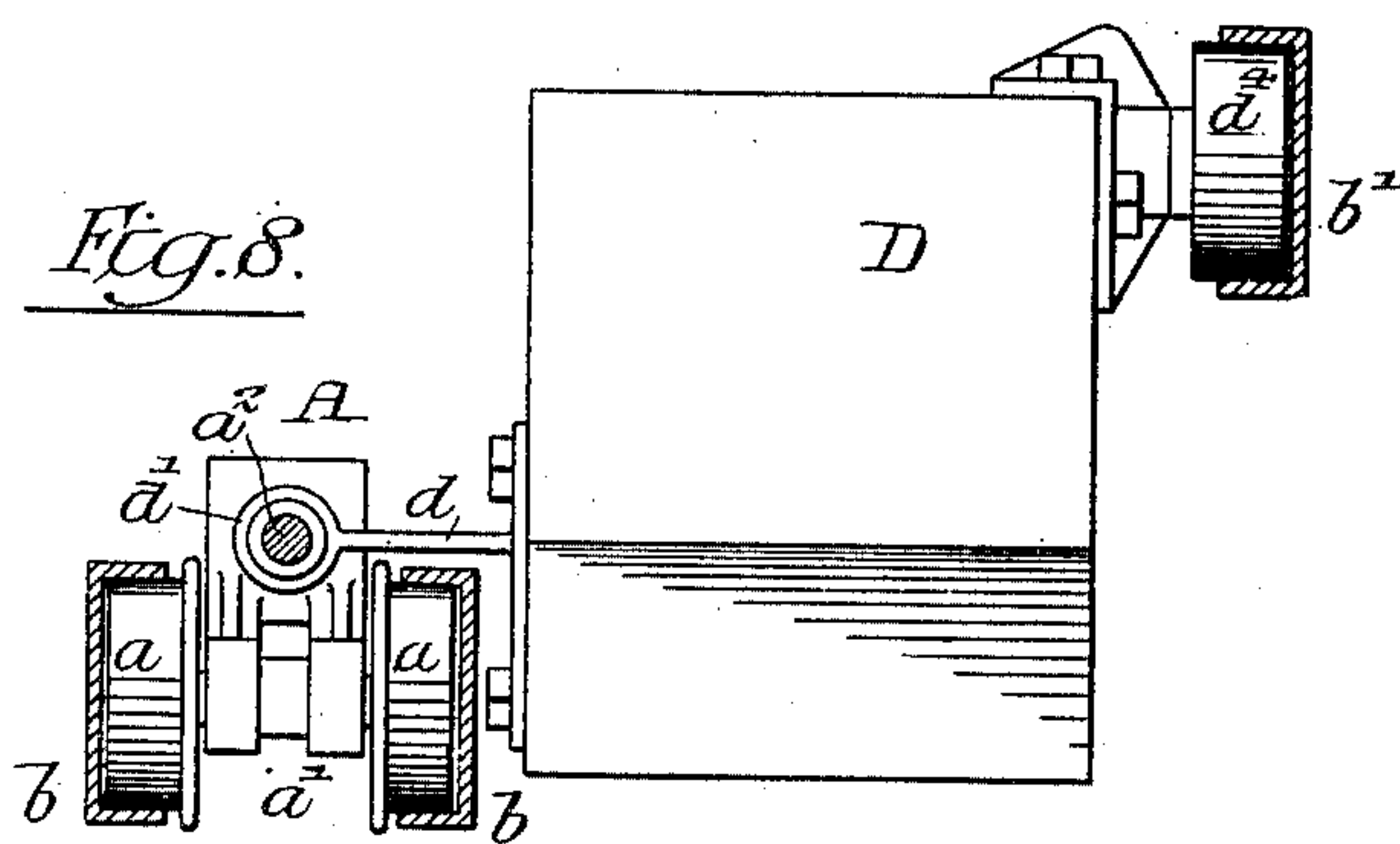


Fig. 8.

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7 Sheets—Sheet 6.

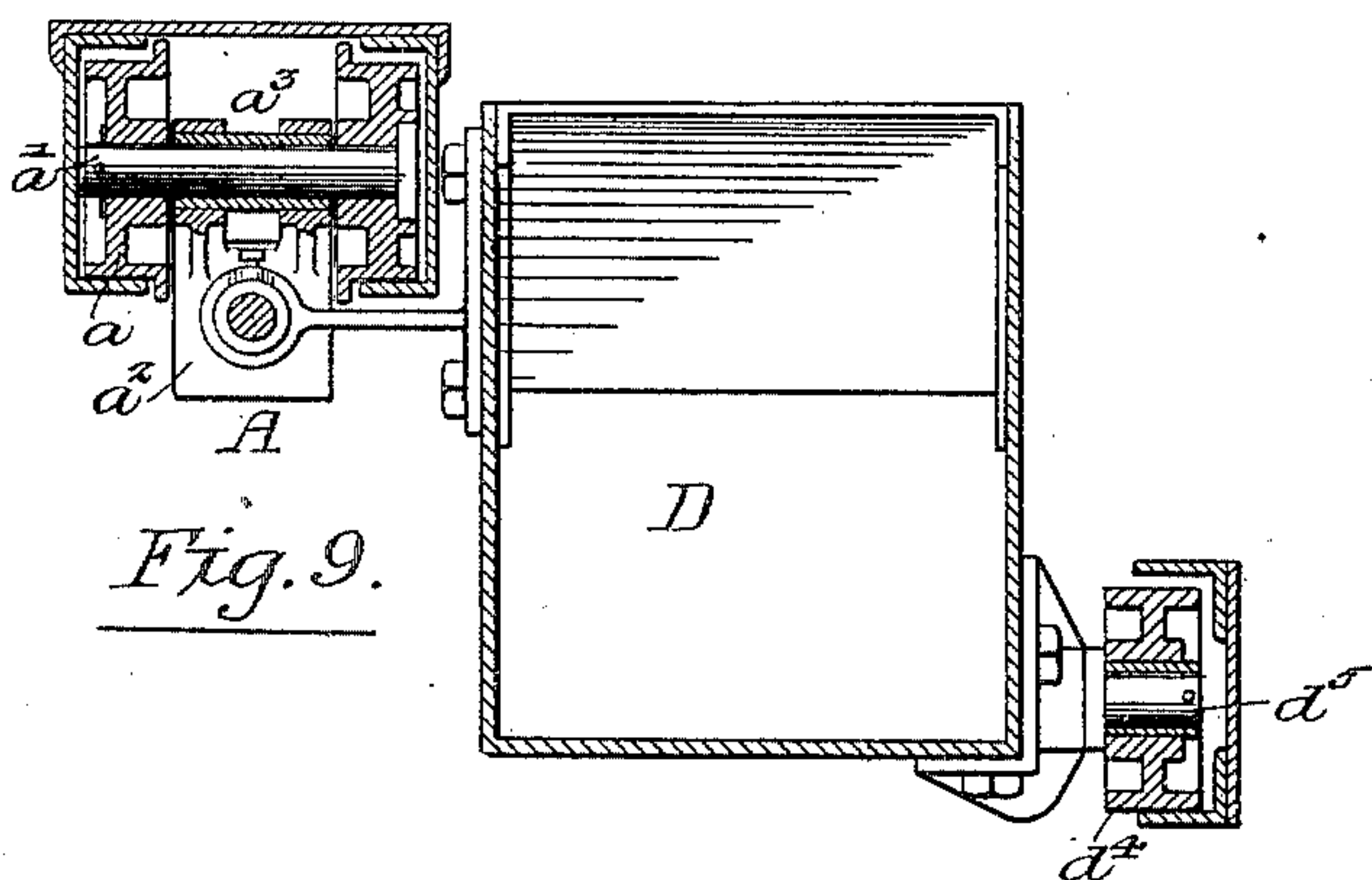


Fig. 9.

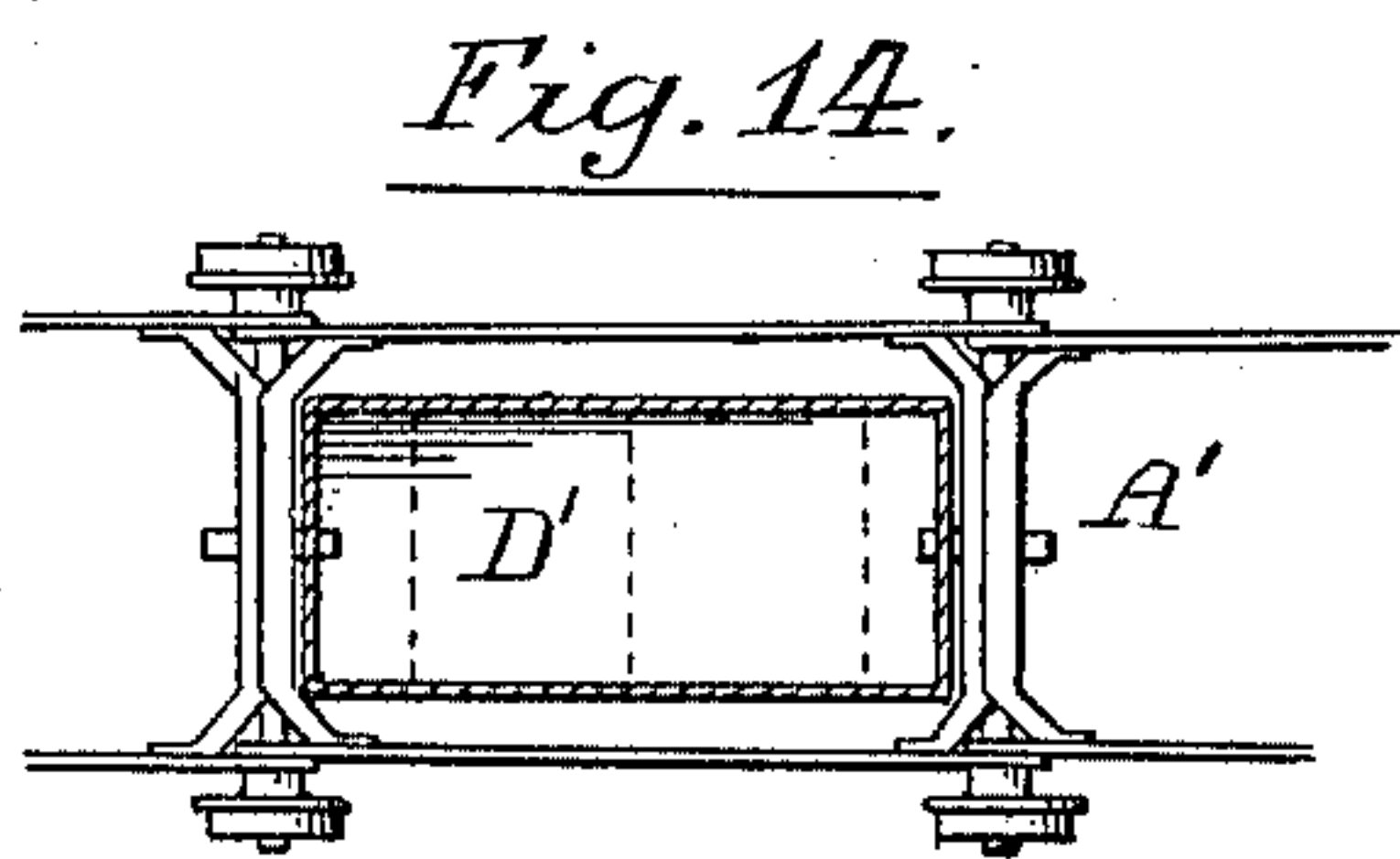


Fig. 14.

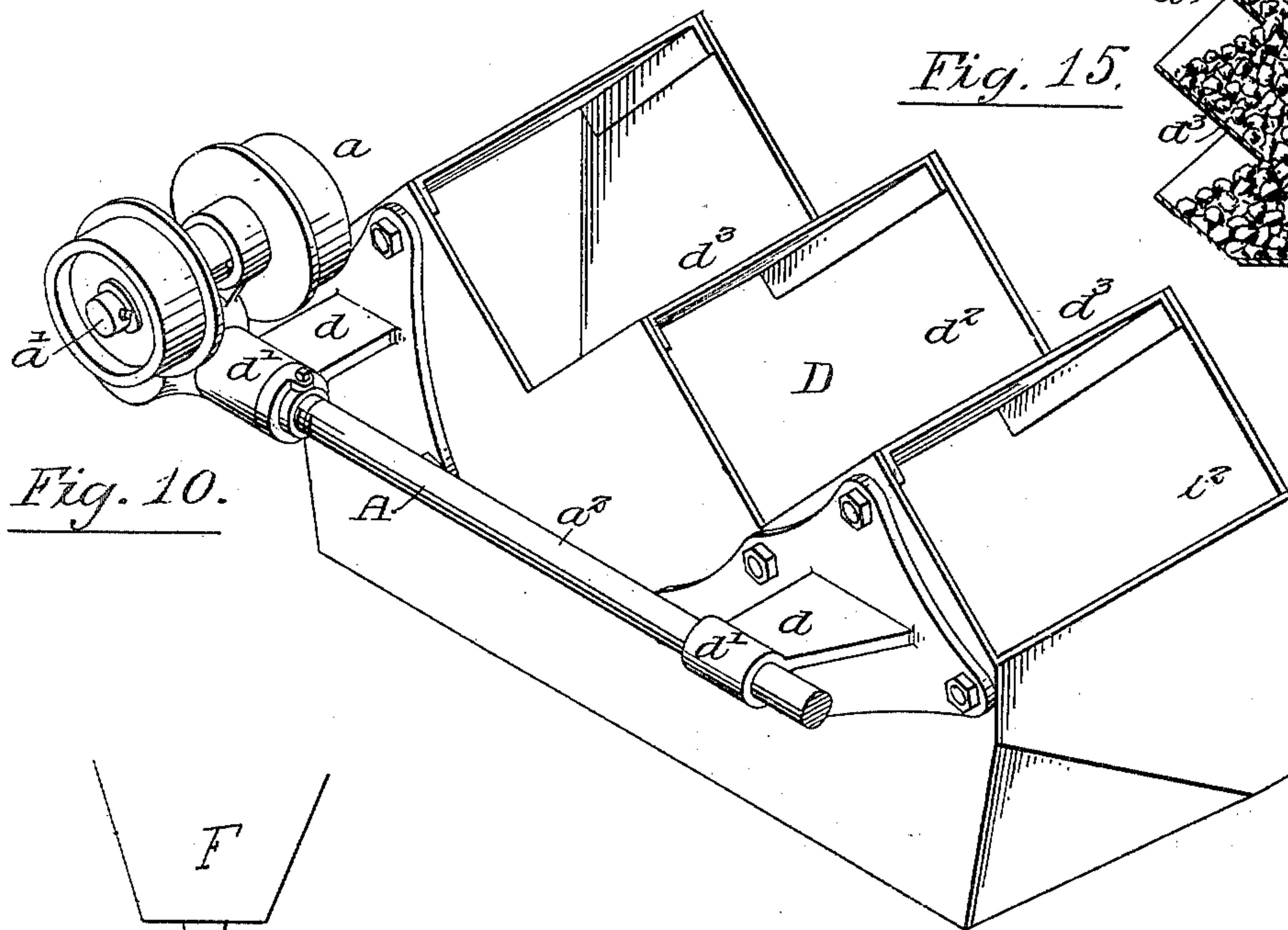


Fig. 10.

Fig. 15.

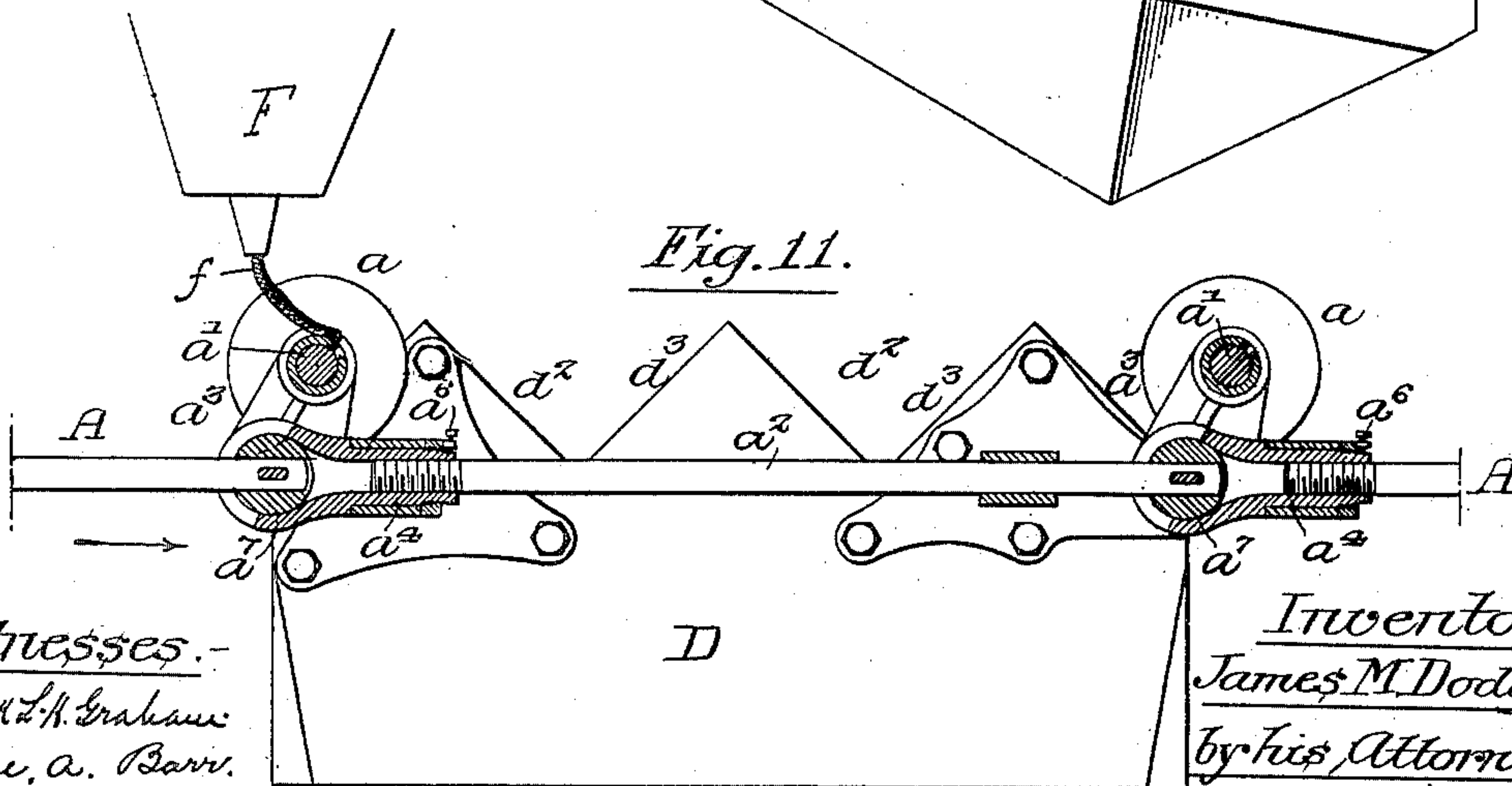
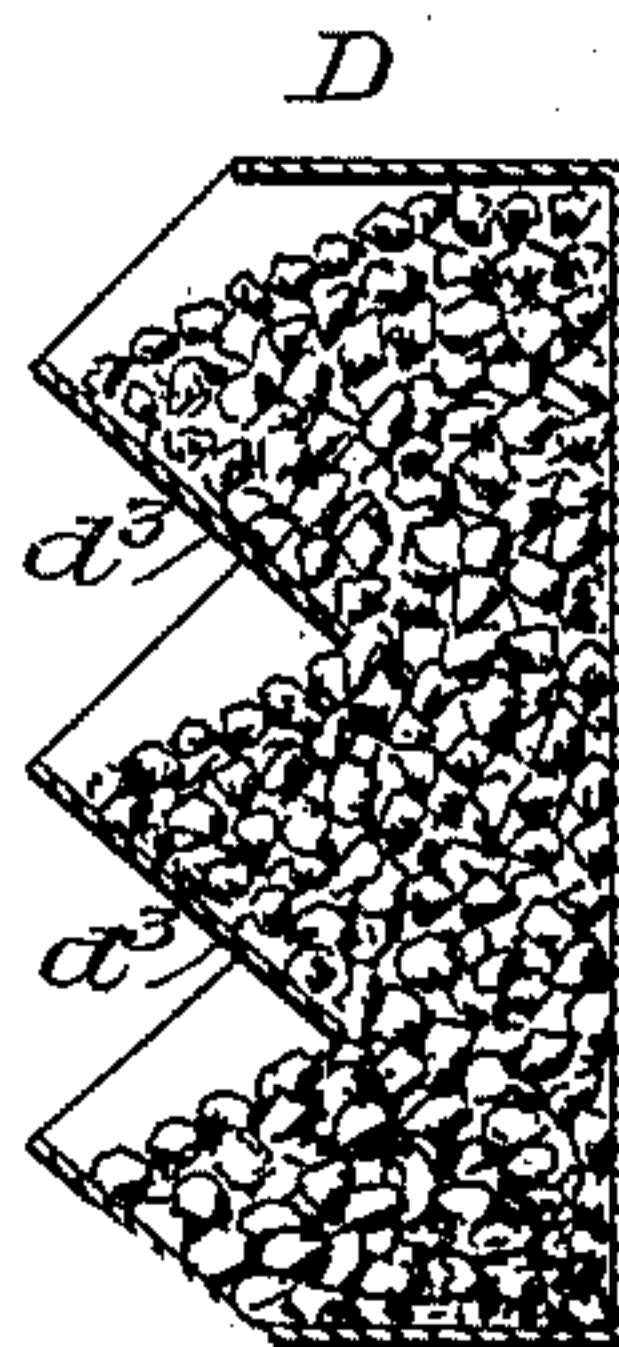


Fig. 11.

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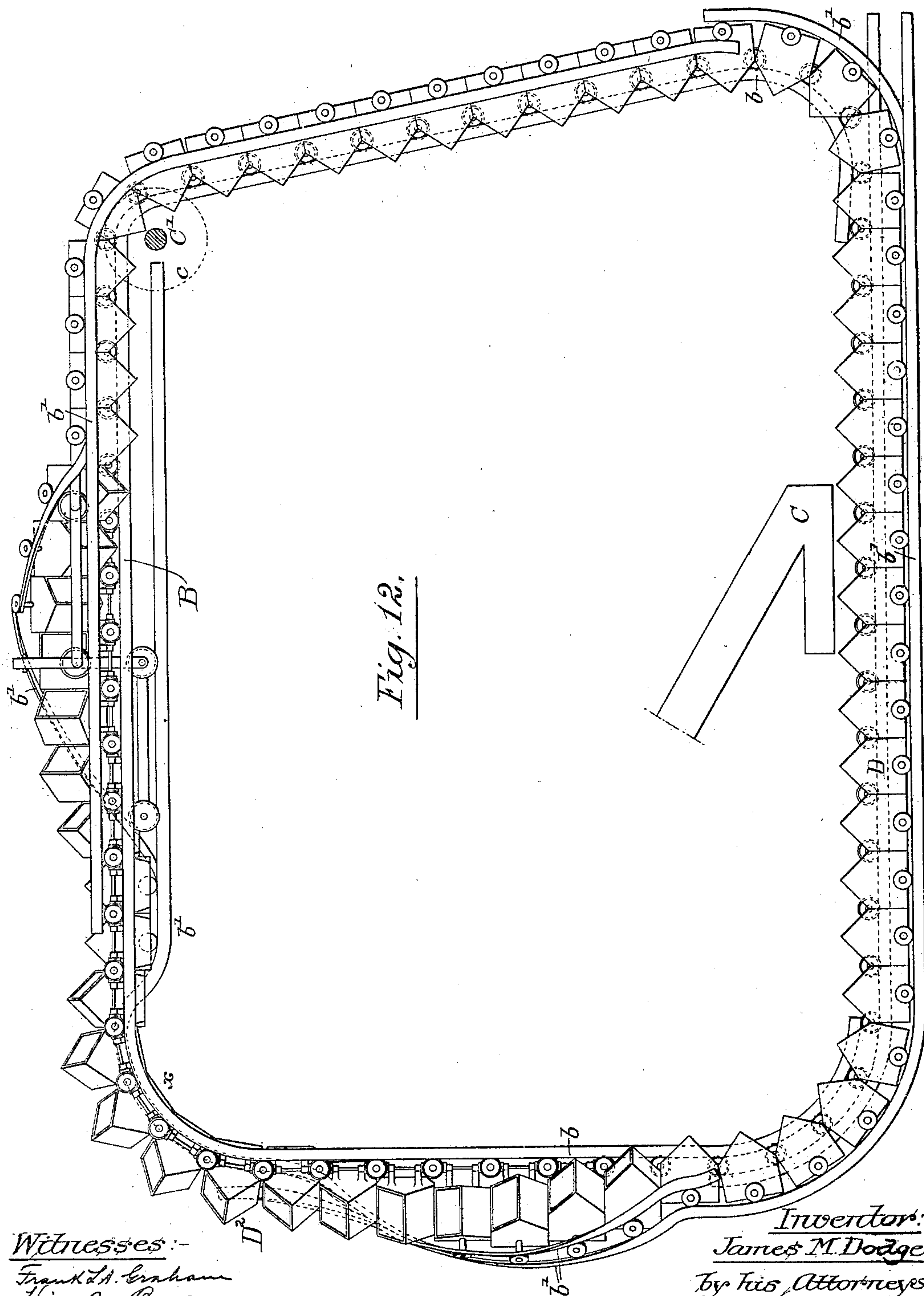
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7 Sheets—Sheet 7.



Witnesses :-

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UNITED STATES PATENT OFFICE.

JAMES M. DODGE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE
LINK BELT ENGINEERING COMPANY, OF SAME PLACE.

ELEVATING AND CONVEYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 667,975, dated February 12, 1901.

Application filed January 27, 1899. Serial No. 703,584. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. DODGE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Elevating and Conveying Mechanism, of which the following is a specification.

The object of my invention is to construct
10 a pivoted bucket elevator in such a manner that the buckets will carry a load to nearly their full capacity without spilling during transit from the lower run to the upper run.

In the accompanying drawings, Figures 1^a
15 and 1^b show a side view of one form of my improved conveying apparatus. Fig. 2 is an end view looking in the direction of the arrow, Fig. 1^a. Fig. 3 is a transverse sectional view of the lower run on the line 3 3, Fig. 1^a. Fig. 4 is a sectional view on the line 4 4, Fig. 1^a,
20 of the vertical run. Fig. 5 is a sectional view on the line 5 5, Fig. 1^a, of the vertical run. Fig. 6 is a sectional view on the line 6 6, Fig. 1^a, of the vertical run. Fig. 7 is a sectional view on the line 7 7, Fig. 1^a, of the upper run.
25 Fig. 8 is a sectional view on the line 8 8, Fig. 1^b, of the upper run, showing the bucket discharged. Fig. 9 is a section through one of the buckets and rails. Fig. 10 is a perspective view showing a bucket secured to a bar
30 of the chain. Fig. 11 is a side view of the bucket with the chain partly in section. Fig. 12 is a view showing the conveyer with a series of single-mouthed buckets. Fig. 13 is a view showing the turning of the bucket in
35 the vertical run only. Fig. 14 is a view showing a double chain with a centrally-pivoted bucket. Fig. 15 is a diagram view of one of the buckets, and Figs. 16 and 17 are views illustrating details of my invention.

40 A is a conveyer chain or rope, in the present instance a single link-chain. This chain has at intervals axles *a'*, on which are wheels *a*, adapted to the rails *b*, made in the present instance in the form of channels connected by plates, forming a frame B, around
45 which the chain travels. It will be understood that this frame can be of any shape, depending altogether upon the location of the conveyer, and the rails may be made in a
50 number of sections, as shown in Fig. 12. The conveyer is driven in the direction of

the arrows, Fig. 1^b, in the present instance by a suitable sprocket-wheel *c* on a driving-shaft *C'*.

D D are the buckets or carriers. These
55 buckets are preferably made as shown in the detailed views, Figs. 9, 10, and 11, and have two arms *d d*, provided with bearings *d'*, which are adapted to the bar or link *a'* of the chain. These buckets are held against
60 longitudinal movement on the chain, as clearly shown in Fig. 11, but are free to swing thereon, as described hereinafter. The mouth *d'* of the bucket in the present instance is made in three divisions, although it
65 will be understood that a bucket *D* with a single opening may be provided, as shown in Fig. 12, or two or more openings may be provided, depending greatly upon the material
70 to be carried by the conveyer. The greater number of division-plates *d'* the larger quantity of material will the bucket carry without spilling.

*d*⁴ is a wheel journaled on a stud *d*⁵ on the
75 opposite side of the bucket to the arms *d d*. This wheel is adapted to a guide-rail *b'*, curved as shown in Figs. 1^a and 1^b of the drawings, so that as the buckets travel forward they are either held in position or turned
80 on their axes around the chain, for the purpose described hereinafter.

It will be understood that the shape of the buckets while quadrangular in the present instance may be modified and that the details of construction may also be modified
85 without departing from my invention, which is broadly for pivoting a bucket on a longitudinal axis that it can be turned thereon, so that the mouth of the bucket will be presented uppermost on the bottom and top runs.
90

It will be noticed in referring to Figs. 1^a, 2, and 3 that the buckets on the lower run are held in position with their mouths uppermost, so that they can receive material continuously from a suitable chute C.
95

The buckets are so arranged that when they are turned at right angles to the lower run, as shown in Fig. 4, the contents will not spill, and in order to present the mouths of the buckets uppermost on the upper run they
100 are gradually turned on their axes by the rail *b'*, which is curved, Fig. 5 showing a bucket

turned one-quarter way around its axis and Fig. 6 showing a bucket turned nearly one-half way around and in position to pass around the upper curve α . While passing around the upper curve the bucket gradually turns on its axis until it is well on the upper run, as in Fig. 7, when it assumes a position, with its mouth uppermost, on the opposite side of the rail b to that occupied by it on the lower run. By continuing the turning of the buckets while on the upper curve α I am enabled to make a bucket practically quadrangular in shape, with a slight bevel at two corners, as shown in Figs. 10 and 11, whereas if the turn were made, as in Fig. 13, entirely within the vertical run the bevel at the corners would have to be increased and the capacity of the buckets decreased in order to allow the buckets to make the turn on the upper curve.

When it is wished to discharge the material from the buckets, the rail b' is curved over the rail b , as shown in Fig. 1^b, on the upper run, so that the buckets in their forward movement will be gradually turned over the chains on their axes, and they will then be in such position, as shown in Fig. 8, to discharge the material into a suitable hopper or bin.

While I have shown the discharging mechanism for the buckets in a fixed position on the upper run in Figs. 1^a and 1^b and in the form of a curved rail, in Fig. 12 I have shown it movable, and it will be understood that any suitable discharging mechanism may be used either on the lower or upper run. The mechanism shown is simple, and the bucket is under the control of the rail b' at all times.

In place of using a continuous rail b' to turn the buckets I may use a series of rail-sections, as shown in Fig. 12, and in some instances instead of relying entirely upon the rail b' to turn the buckets on the upward run the frame B and its rails b may be slightly canted, so that when the buckets reach a certain position on the upward run they will swing around by gravity.

I prefer to make the buckets, as shown in Figs. 10 and 11, with angular division-plates d^3 , so that when the buckets are on the vertical carrying-run the material will be held by the division-plates, as shown in the section diagram view, Fig. 15. The size of the buckets and the number of division-plates will depend greatly upon the character of the material to be conveyed. The bearing a^3 of the axle a' is open at the center, and extending from one portion of the bearing to the other is a split bush a^4 . A key in the bearing enters the slot of the bush and prevents it from turning. (See Figs. 16 and 17.) The open portion of the bearing exposes the slot, so that a lubricant can be introduced to the axle a' by a wick f , extending from a can F, Fig. 11. The axle a' has a square head adapted to one wheel a and extends through the other wheel

and has a spring-cotter, as clearly shown in Fig. 9. The head or bearing a^3 has a threaded extension a^4 , into which is screwed the bar a^2 . This extension also carries one of the bearings of the bucket D, which is held between a shoulder and a tapped collar a^6 , which has a set-screw to prevent it from turning after adjustment. The other bearing d' of the bucket is carried by the bar a^2 , and this bar is keyed to a head a^7 in the socket of the head a^3 .

Fig. 14 shows a double-chain conveyor A', having centrally-arranged buckets D', pivoted on a longitudinal axis. The buckets turn within the chain in this instance and are turned by rails engaging lugs on the buckets.

While I have used the term "chain" in the claims, it will be understood that a rope or other substitute may be used for the chain without departing from my invention.

I claim as my invention—

1. The combination in an elevating-conveyor having upper and lower runs, of a chain, a carrier mounted thereon, and guides for causing said carrier to turn laterally so that the mouth of the carrier will be uppermost both on the upper and lower runs, substantially as described.

2. The combination in an elevating-conveyor having upper and lower runs, of an endless chain, buckets pivoted thereto, the pivot for each bucket being longitudinal, with means for swinging each bucket laterally on the chain so that the mouths of the buckets will be uppermost on the upper and lower runs, substantially as described.

3. The combination in a conveyor, of a chain, buckets pivoted to said chain and hung to one side thereof and adapted to swing around the chain as a pivot, substantially as described.

4. The combination of a conveyor having upper and lower runs, a chain, a bucket longitudinally pivoted thereto, the mouth of the bucket being uppermost on the lower run of the conveyor, means for laterally turning the bucket on the chain, as it traverses the ascending run so that the bucket will assume a position on the opposite side of the chain with its mouth uppermost when on the upper run, substantially as described.

5. The combination in an elevating-conveyor, of a single longitudinal chain, carrying-wheels mounted thereon, rails adapted to guide the wheels, buckets, each bucket having bearings adapted to encircle a single link of the chain, a wheel on the opposite side of the bucket from the bearings, guiding-rails engaging with the wheel, said guiding-rails being curved on the elevating-run so as to turn the bucket from one side of the chain to the opposite side, substantially as described.

6. The combination in an elevating-conveyor, of a chain, buckets pivoted thereto on a longitudinal line, means for guiding the chain, and means for turning the buckets around the chain partly on the elevating-run

and partly on the curve at the junction of the elevating-run and the upper run, substantially as and for the purpose described.

5 7. The combination in a conveyer-chain, a bucket pivoted thereto, the pivot of the bucket being longitudinal the mouth of the bucket being uppermost on the upper and lower runs and being at the side on the elevating-run, said bucket having an inclined plate partly
10 closing the mouth of the bucket and acting to retain the material in the bucket when being elevated, substantially as described.

15 8. The combination of a conveyer-chain, a bucket pivoted thereto, a series of inclined plates extending across the mouth of the bucket and acting to retain the material being carried when on the elevating-run, substantially as described.

20 9. The combination of a conveyer-chain, a bucket pivoted thereto and hung to one side thereof, said bucket being quadrangular in shape and having the corners nearest the chain beveled, substantially as described.

25 10. The combination in a conveyer, of a chain, buckets thereon, said chain having bearings, a split bush adapted to each bearing and held therein by a projection on the bearing, an axle mounted in the bushing and

carrying-wheels by which the chain is guided, substantially as described.

30 11. The combination in a conveyer, of a chain, buckets thereon, said chain having bearings, a split bush adapted to each bearing, and a projection on the bearing adapted to enter the split portion of the bush, an axle
35 mounted in the bush, a lubricant-container, a wick projecting from the container in the path of the conveyer so that each bush will strike the wick and receive lubricant therefrom, substantially as described.

40 12. The combination of a chain made up of sockets, heads and rods, a socket being secured to one end of each rod and a head being secured to the opposite end of each rod, a bucket having arms, one arm adapted to
45 the rod and the other arm adapted to an extension of the socket and confined between the shoulder on the socket and a removable collar, substantially as described.

In testimony whereof I have signed my
50 name to this specification in the presence of two subscribing witnesses.

JAMES M. DODGE.

Witnesses:

WILL. A. BARR,
JOS. H. KLEIN.