

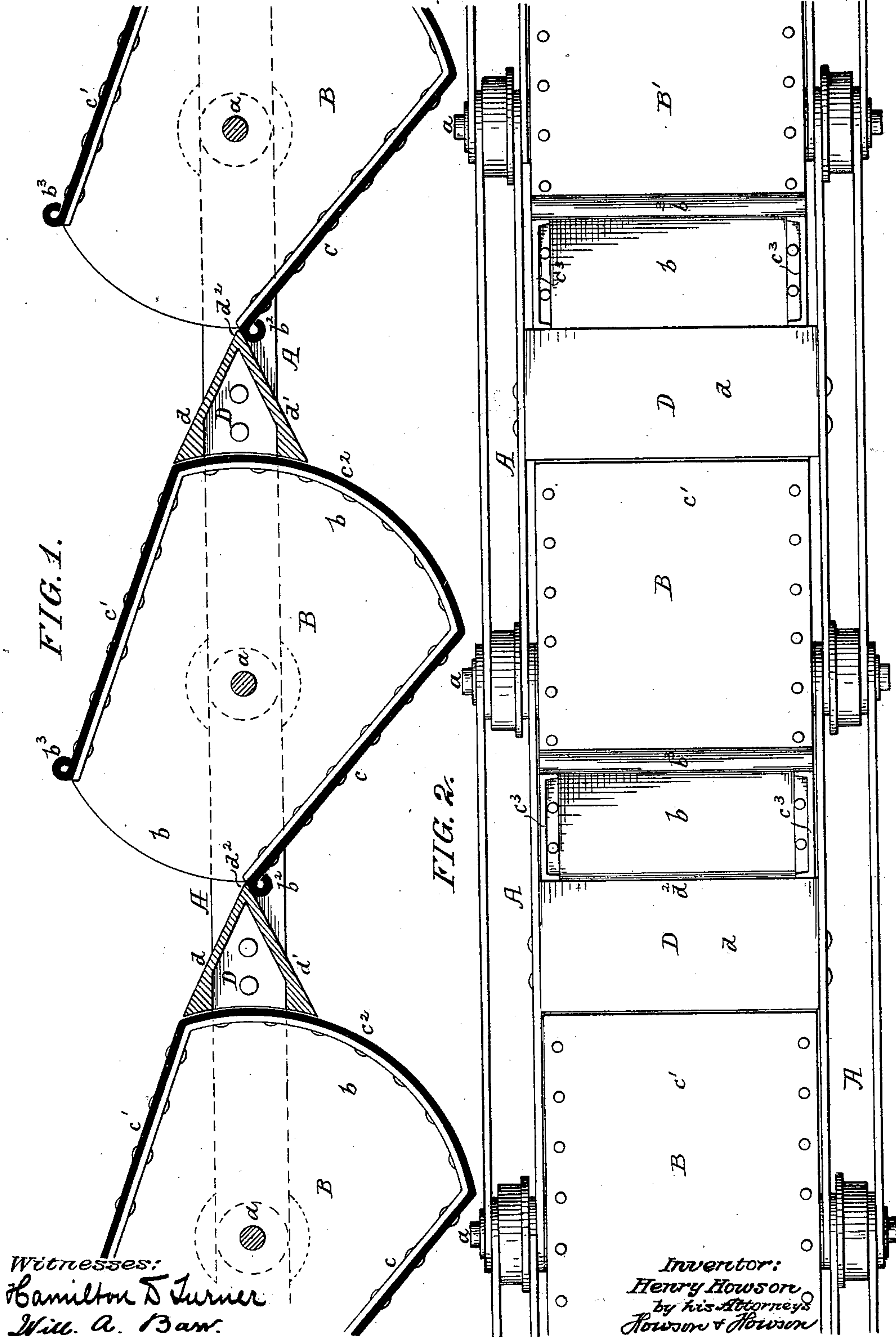
(No Model.)

4 Sheets—Sheet 1.

H. HOWSON.
CONVEYER.

No. 592,709.

Patented Oct. 26, 1897.



(No Model.)

4 Sheets—Sheet 2.

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FIG. 10.

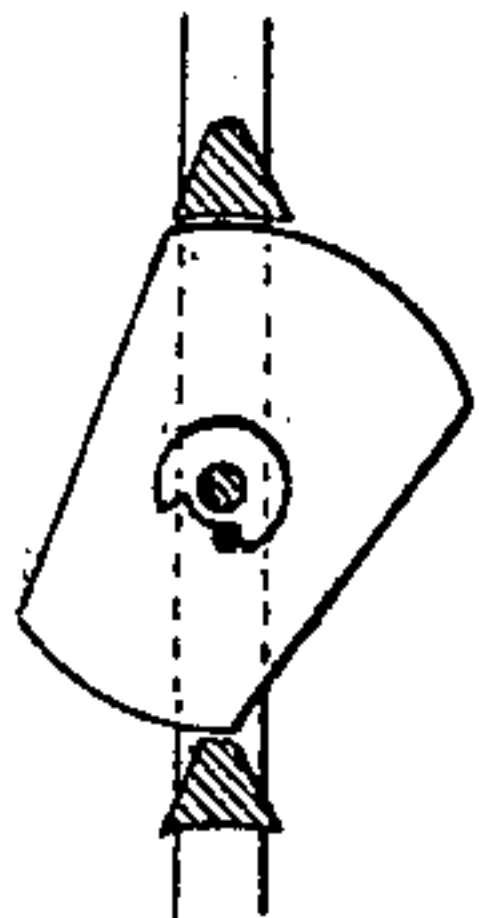


FIG. 3.

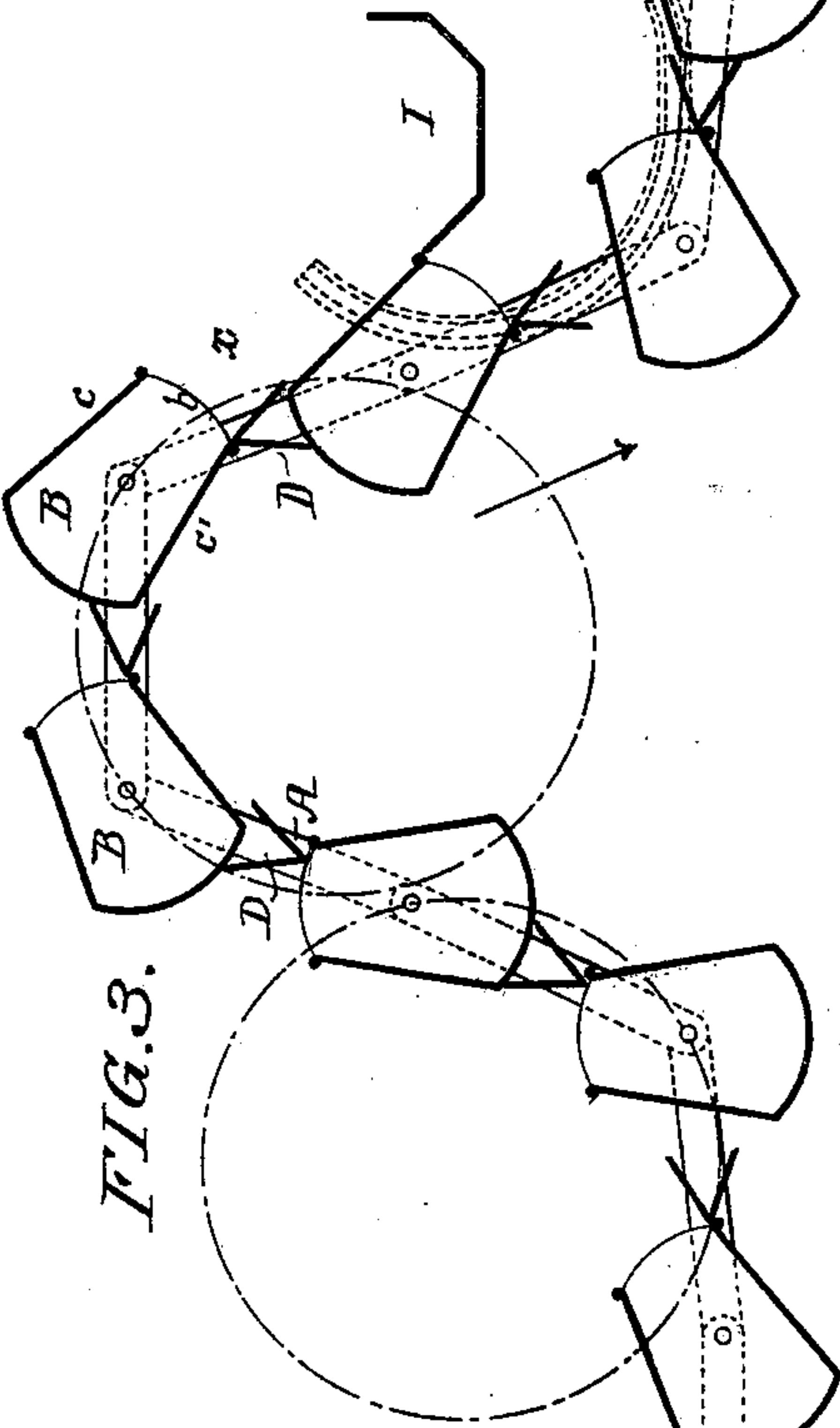
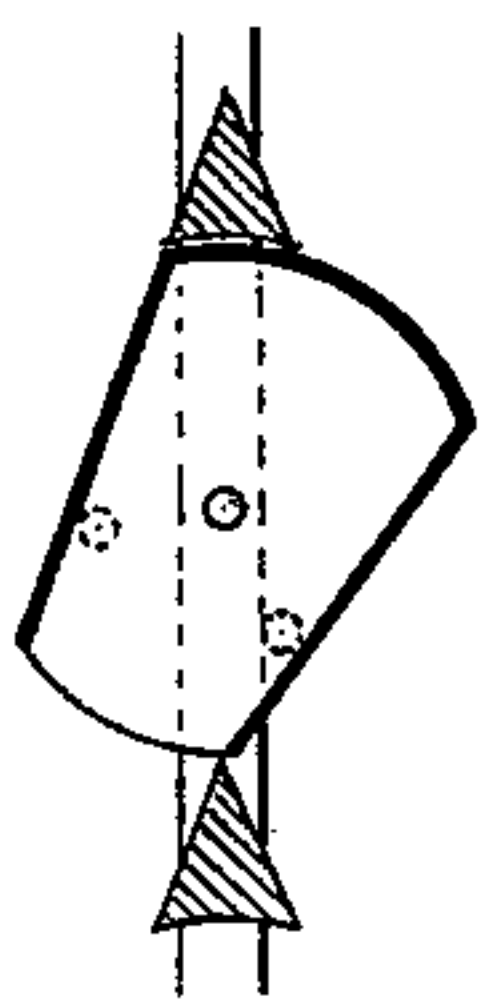


FIG. 9.



Witnesses:
Hamilton D. Turner
Will. A. Bram

Inventor:
Henry Howson
by his Attorneys
Howson & Howson

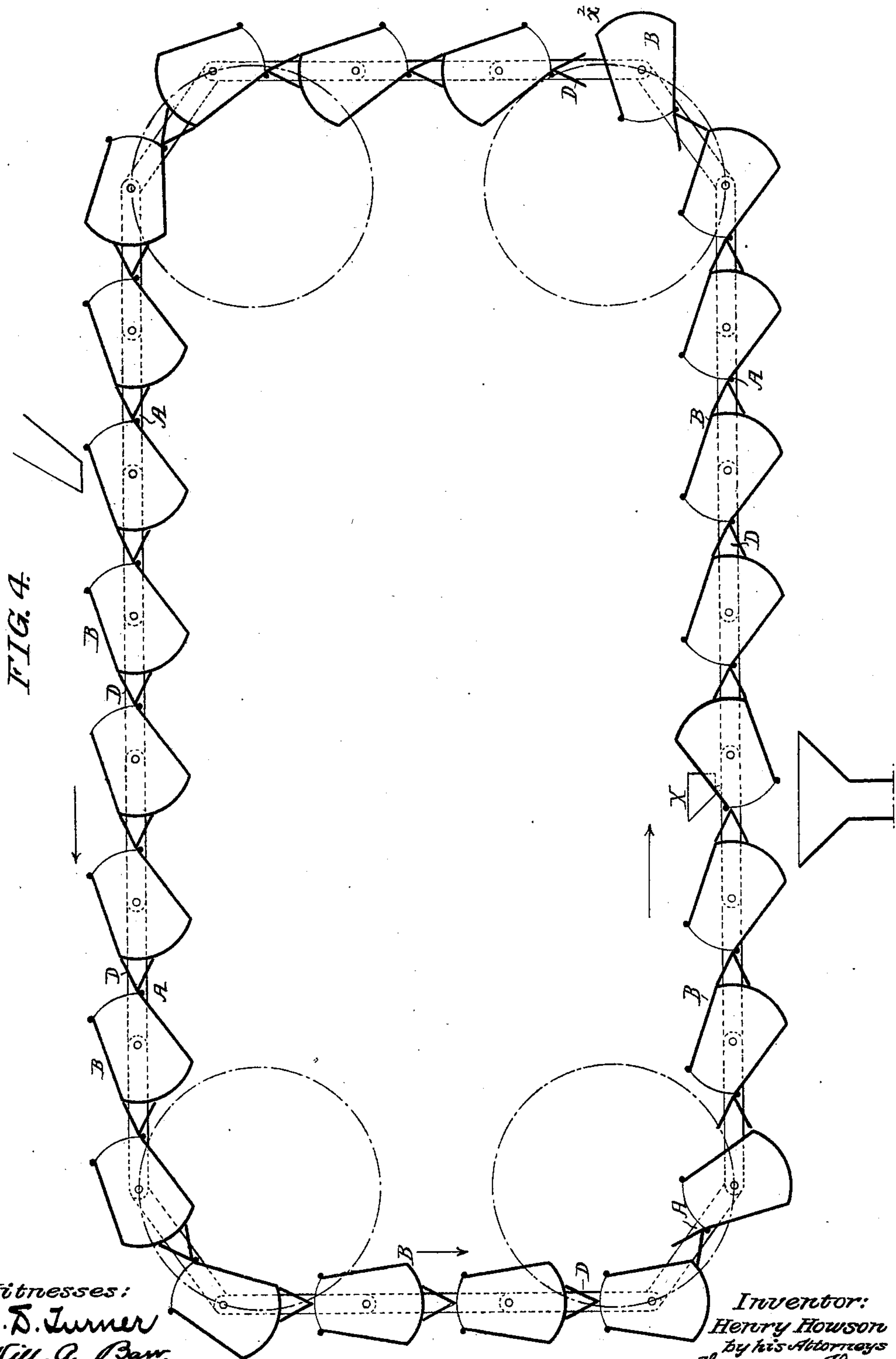
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FIG. 5.

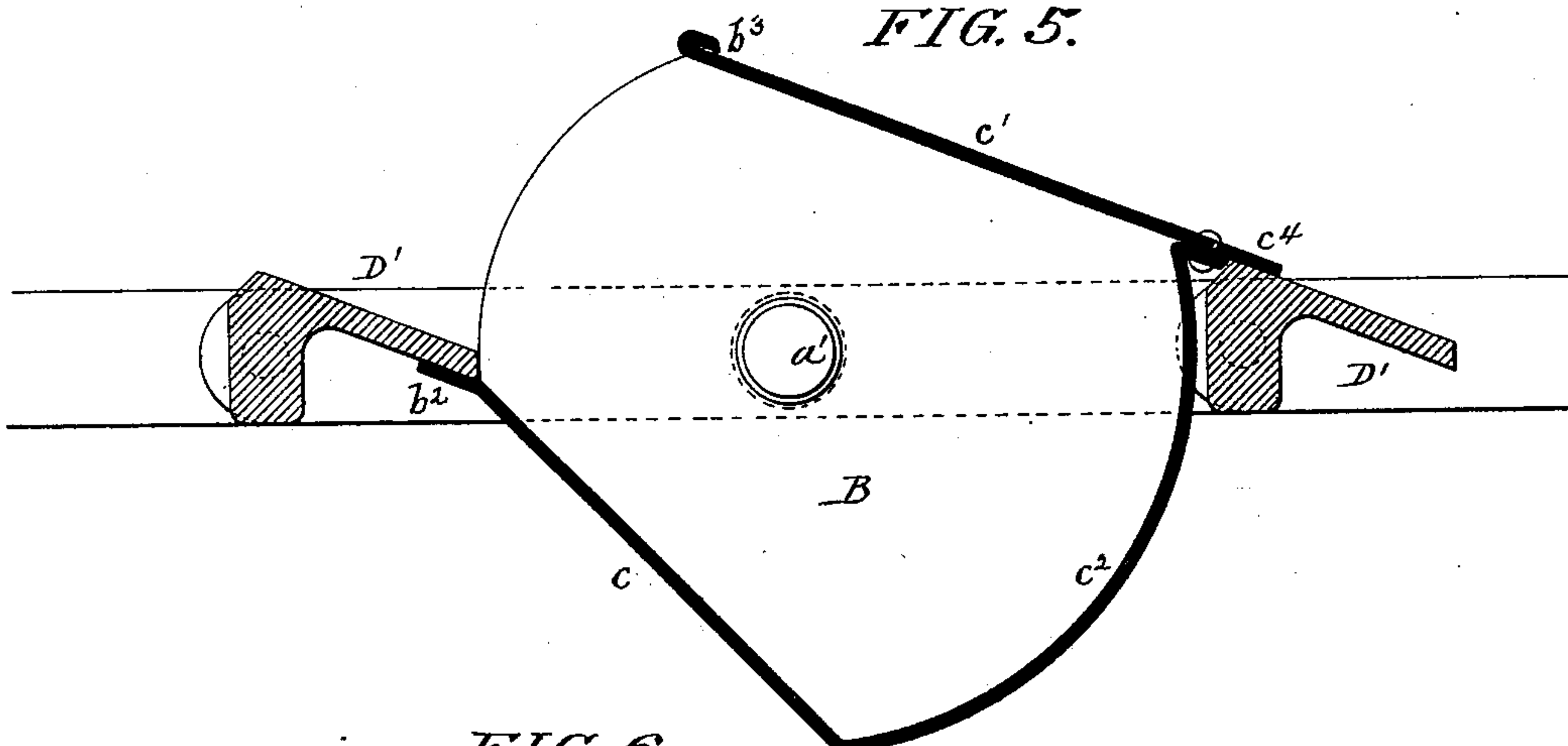


FIG. 6.

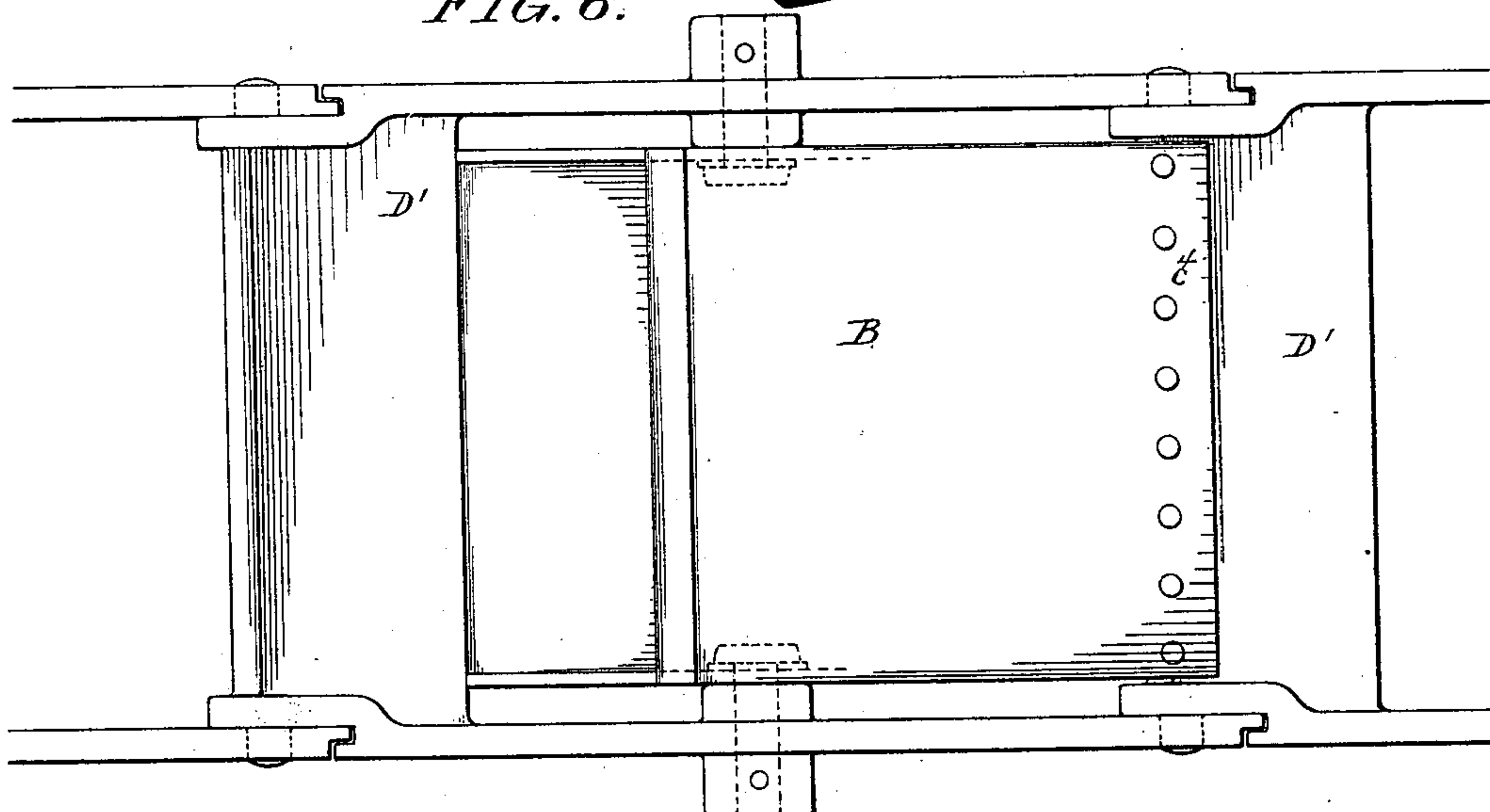


FIG. 7.

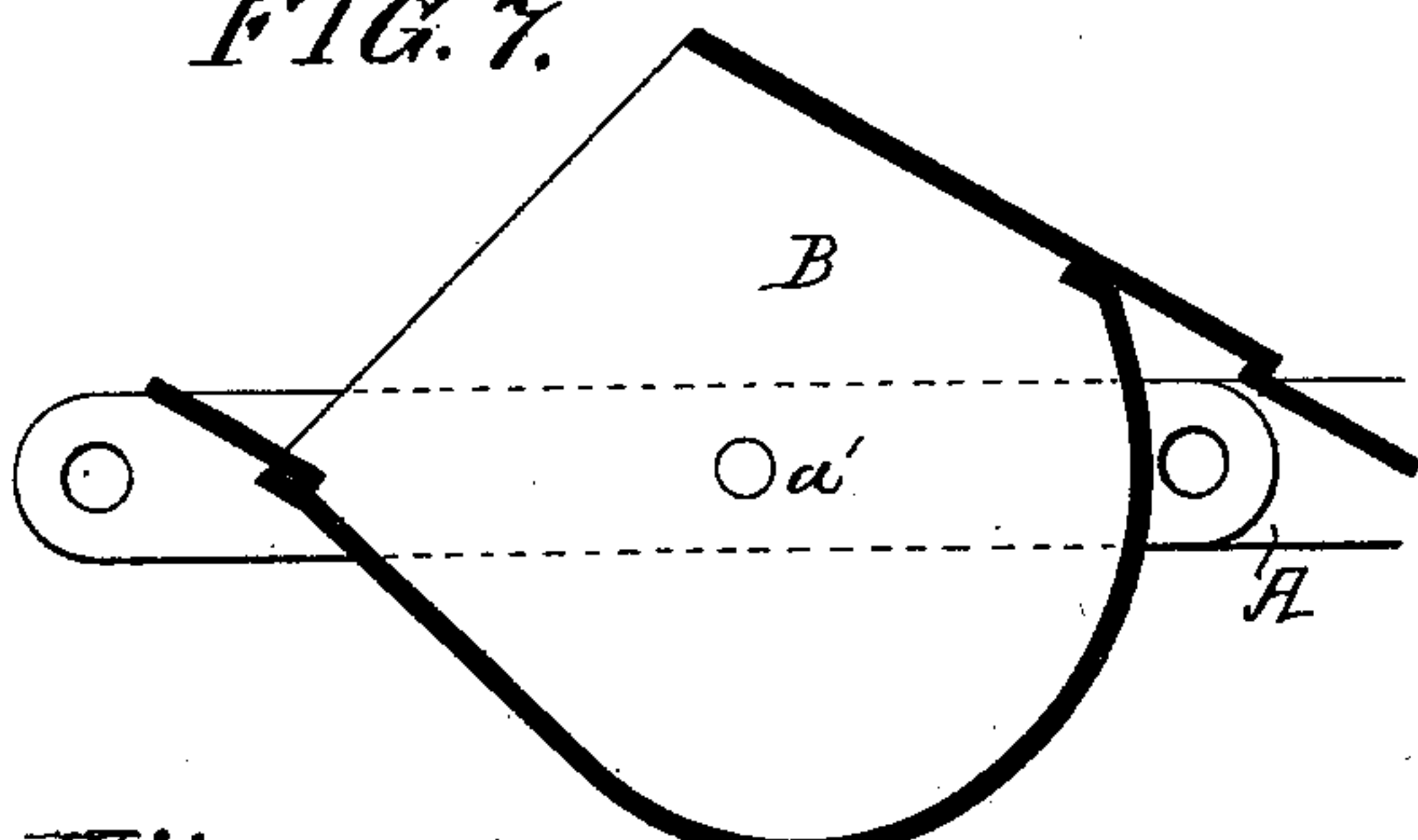
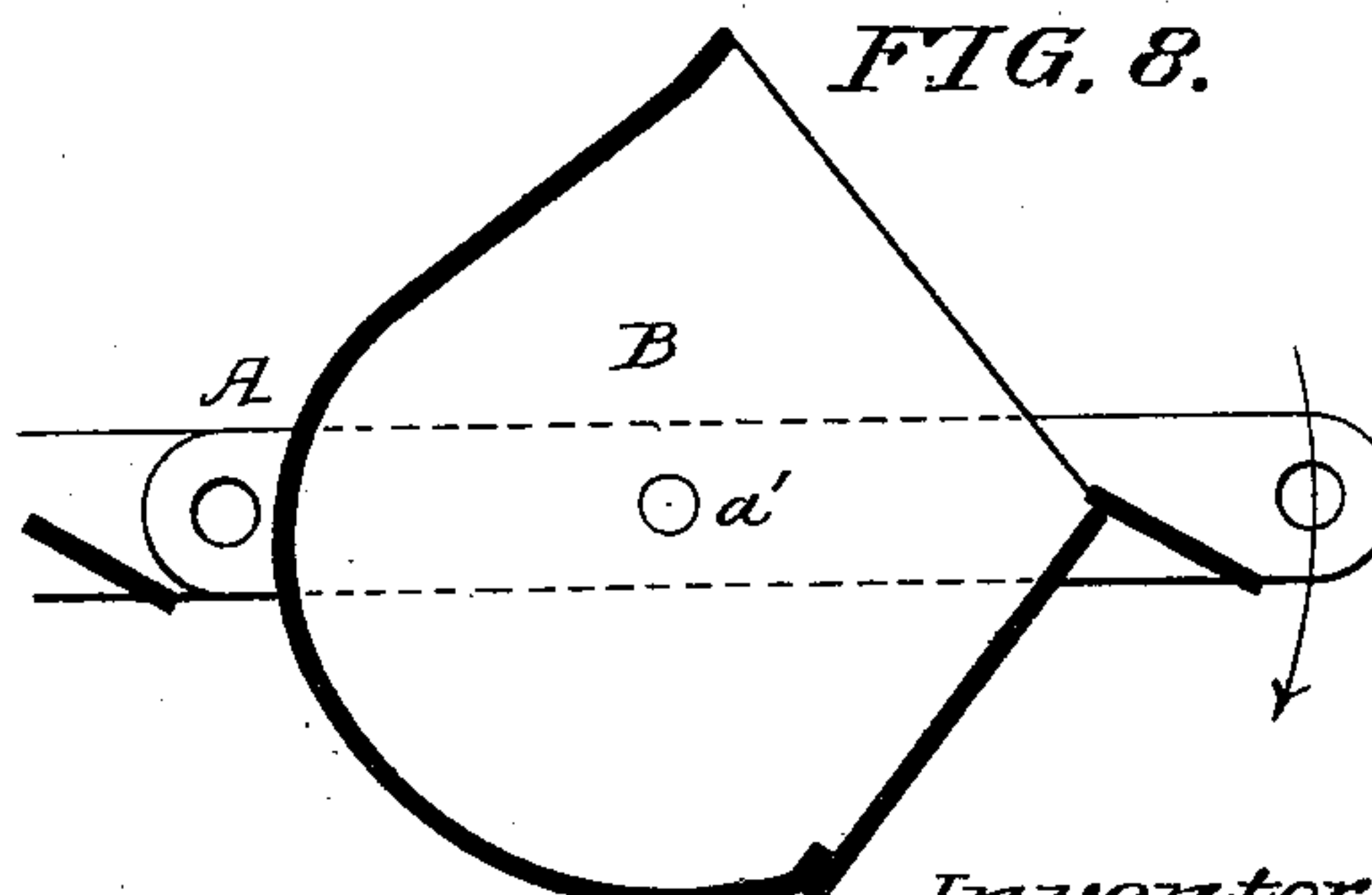


FIG. 8.



Witnesses:
Hamilton D. Turner
Will. A. Barr.

Inventor:
Henry Howson
by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

HENRY HOWSON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE
LINK-BELT ENGINEERING COMPANY, OF SAME PLACE.

CONVEYER.

SPECIFICATION forming part of Letters Patent No. 592,709, dated October 26, 1897.

Application filed June 30, 1896. Serial No. 597,619. (No model.)

To all whom it may concern:

Be it known that I, HENRY HOWSON, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Conveyers, of which the following is a specification.

The object of my invention is to so construct an endless-chain conveyer of the pivoted-bucket type that the bucket will have a
10 preponderance of weight at one side of the pivotal axis, so that the mouth of the bucket will be presented at one end, a further object being to provide stops to limit the rotative movement of the buckets on the chain,
15 whereby the buckets can carry material on either the upper or lower run of the conveyer, as well as on the ascending or descending run, and when in this position the buckets will be prevented by said stops from accidentally
20 discharging the material.

My improved conveyer can be driven forward to carry the material from the lower to the upper run or can be reversed when it is necessary to carry material from an upper
25 to a lower run.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of sufficient of a pivoted-bucket conveyer to illustrate my invention. Fig. 2 is a plan view of Fig. 1. Fig. 3 is a diagram view, in sectional elevation, of a conveying apparatus employing my improved buckets, showing mechanism for discharging the buckets on the upper run. Fig. 4 is a diagram view in elevation
35 of the buckets in section, illustrating the loading of the buckets in the upper run and the discharging of the buckets in the lower run by tripping. Fig. 5 is a modification in which a wrought conveyer-link is used, to
40 which the bucket is hung. Fig. 6 is a plan view of Fig. 5, and Figs. 7, 8, 9, and 10 are views of further modifications of my invention.

Heretofore it has been the general practice
45 to make endless-chain conveyers having pivoted buckets in such a manner that the bucket is entirely open at the top, the bucket being maintained in this position by the preponderance of weight at the bottom, the trunnions of the bucket being near the mouth, so
50 that the tendency of the bucket is always to

remain in one position irrespective of the position of the chain. Consequently buckets which are utilized to carry material from a lower to an upper run have to be tripped by
55 special mechanism, and they are always liable to be dumped by striking an obstruction, this being especially the case in the elevating run. Furthermore, buckets of this type cannot be continuously charged without
60 the intervention of some special mechanism for feeding the buckets separately; otherwise they will be overcharged and overbalanced and will dump the load by the preponderance of weight being on one side. 65

I overcome the objections to the ordinary pivoted-bucket conveyer by constructing the device in the manner which I will now proceed to describe.

Referring in the first instance to Figs. 1 and 2, A is the conveyer-chain, of any ordinary type, the chain in the present instance being composed of links connected together by pins *a*, which extend from one set of links to the other, as clearly shown in Fig. 2, and I utilize
75 the pins *a* as the pivots of the buckets B, which can be of any form desired, although I prefer to shape them in the manner shown in Fig. 1, in which the mouth portion *b* is narrower than the base portion *b'*, so as to give the proper
80 incline for the free flow of material. The bucket shown is made of sheet metal forming the side sections *c c'* and bottom sections *c²*, which are secured to end sections *c³* by rivets or other means of fastening. 85

D are stop-plates extending from one set of links to the other, as clearly shown in Fig. 2, and beveled on the upper side *d* and on the lower side *d'*. The stop-plates preferably terminate in a point *d²* on the center lines of the
90 pivots and are so arranged in respect to the buckets that the lip *b²* strikes on the under side of the stop-plate when the bucket is in the position shown in Fig. 1, and when in the reverse position the lip *b³* strikes against the
95 opposite side of the stop-plate. The plate is so formed that when the bucket is in the position shown in Fig. 1 the upper surface *d* of the stop-plate will be on about the incline of the side *c'* of the bucket. Hence it will be
100 seen that if a conveyer is passing under a chute through which material is continuously fed

part of the material will fall directly into the bucket or on the upper surface of the stop-plate and be directed into the body of the bucket, owing to the incline, and some of the material will fall on the side c' of the bucket and will be directed over the surface d of the stop-plate into the succeeding bucket, so that an ordinary continuously-feeding hopper or chute can be used to load the conveyer-buckets. It will be noticed that the preponderance of weight of the bucket is on one side—that is to say, the pivots for the buckets are arranged nearer to the mouth than to the bottom—so that the tendency of the bucket will be to bear against its stop-plate.

Referring to Fig. 3, which shows a diagram of an endless-chain-conveyer system with my improved buckets, it will be seen that the buckets are charged on the lower run from a chute i , the load of each bucket depending upon the rate of flow of material from the chute and the rate of travel of the buckets under the chute. As the buckets receive material they are prevented by the stop-plates from tipping farther than the position indicated, although the tendency of the load in the bucket is to raise the mouth of the same, a tendency, however, which is limited by the stop-plates, but when the conveyer turns to take the elevating run the buckets assume the vertical position, and are held in this position by the preponderance of material, the latter having shifted from the side c to the bottom c^2 . In the event of the buckets being struck while on the elevating run they will not tip to such an extent as to discharge any portion of their contents, as the stop-plates will limit the movement of the buckets in either direction, as will readily be seen by the drawings. When the chain turns to traverse the upper horizontal run, the stops are drawn over to the inner sides of the buckets, tipping the latter to a certain extent, but not sufficient to discharge any portion of the contents of the buckets. In fact, the incline of the buckets in this position is the same as when on the lower run, but in the opposite direction. The material has again shifted and is now carried mainly by the side plate c' of the bucket, which cannot discharge accidentally owing to the preponderance of weight tending to keep the mouth of the bucket uppermost. If, however, it is intended to discharge the bucket on the upper run, a trip can be provided to act positively upon the bucket and trip it, as shown, for instance, on the lower run in Fig. 4, and the contents will be discharged. I have shown a device, Fig. 3, which may be used to tip the buckets so that they can discharge on the upper run, this device comprising wheels around which the conveyer-chain passes, the stops when the buckets reach the point x drawing down the mouths of the buckets to such an extent that the material will flow from the buckets into a suitable trough I , the buckets assum-

ing their normal position when they again reach the horizontal run. The buckets can, if desired, be discharged at the point x' , where they are tipped as the chain passes from the upper to the descending run. The buckets will assume their normal position for the lower run as the chain passes from the descending run to said lower run, so that no mechanism is required to reset the buckets. When it is desired to carry material from an upper to a lower horizontal run, all that is necessary is to simply reverse the driving mechanism, so as to reverse the direction of travel of the conveyer-chain.

Fig. 4 is a diagram showing the charging of the buckets on an upper horizontal run and the conveying of the material by the buckets along this run, thence down a descending run and along the lower horizontal run to the point of discharge, which in this figure is illustrated simply by a trip X . The buckets, however, can be discharged at the point x^2 as they turn from the lower horizontal run to the elevating run, or the lower run of the chain may be deflected in the same manner as the upper run is deflected, Fig. 3. It will be understood that any device may be used to automatically tip the buckets to discharge without departing from my invention.

In Figs. 1 and 2 the pivots a of the links of the chain are the pivots of the buckets, but in Fig. 5 I have shown a bucket pivoted midway between the pivots of the chain, and in this case the chain is simply made up of open single links pivoted together in any suitable manner, and the bucket is shaped to fit into the open space of the link. One edge of each link forms a stop-plate D' , which also acts as a chute, and the lip b^2 of the bucket is enlarged in this instance, so as to have a full bearing on the under side of the plate. The plate c' of the bucket has an extension c^4 , which projects from the rear of the bucket over the plate D' , forming a lap-joint to prevent the material from passing between the plate and the bucket, and this extension also acts as an additional stop for the bucket. In some instances the lip b^2 may be dispensed with and the extension c^4 only used, although I prefer to rely on the lip to hold the bucket in position.

The bucket shown in Fig. 5 can be used in the reverse position, similar to that shown in Fig. 1, but when so used the plate D' will be provided with two inclined surfaces similar to that of the plate D , Fig. 1.

Figs. 7 and 8 illustrate another form of bucket in which the ordinary links are used, similar to those shown in Fig. 1, and the buckets are pivoted on independent pivots a' between the pivots of the links. The bucket here shown is intended to be charged with material only when in the position shown in Fig. 7, and to carry material along an ascending run and thence along another horizontal run, in which the bucket assumes the position

shown in Fig. 8, so that on moving one end of the link in the direction of the arrow shown in said Fig. 8 the stop-plate will draw the bucket down to a discharge-point, and when the chain is turned to assume its original position in the lower run the buckets will automatically shift and will swing to the position shown in Fig. 7.

In Fig. 9 I have shown stop-pins on the buckets striking against the links of the chain, so that the chute-plate for directing the material into the bucket is not used as a stop, and in Fig. 10 I have shown a recessed hub on the trucks of the bucket and a stop-pin on the chain, so as to permit the bucket to have a certain amount of movement independent of the chain.

It will be understood that the details of the invention may be modified considerably without departing from the main features of my invention.

By my invention I am enabled to convey material from a lower horizontal run to an upper horizontal run and to discharge the material at any point along the horizontal run and at the same time keep the buckets rigid during their travel along these runs and prevent the accidental discharge of the buckets on the ascending run, and, furthermore, by simply reversing the direction of travel of the chain I can charge the buckets with material on the upper horizontal run and carry material down to and along a lower horizontal run and discharge the material at any point on this run.

The buckets can be charged continuously from an ordinary hopper or chute, and the load for each bucket can be regulated simply by the flow of material and the travel of the chain.

I claim as my invention—

1. The combination of a carrier, a bucket pivoted thereto and having its mouth at one end, said bucket adapted to swing so that its mouth will be presented on either side of the carrier, a stop whereby the swing of the bucket is limited so that its mouth is always on the upper side of the carrier in the longitudinal runs of the same.

2. The combination of a carrier adapted to travel longitudinally, a bucket pivoted thereto, said bucket having a mouth on one side of the pivot at one end and having a preponderance of weight on the other side of the pivot so that the mouth end of the bucket will be normally uppermost, with a stop to limit the movement of the bucket on its pivot so that it can be dumped at any point throughout the run, substantially as described.

3. The combination of an endless carrier, a series of buckets pivoted thereto, each bucket having its mouth at one end and adapted to swing so that its mouth will be presented on either side of the carrier, and stops whereby the swing of each bucket is so limited that its mouth will be on the upper side of the

carrier in either the lower or upper run thereof, substantially as described.

4. The combination of an endless carrier, buckets pivoted thereto, and each having its mouth at one end, and stops on the carrier whereby the lateral swing of the bucket is limited when the buckets are on the upright runs of the carrier so as to prevent the dumping of any of the contents of the buckets while traversing said upright run, substantially as described.

5. The combination in a conveyer, of a chain, a pivoted bucket, and a stop to limit the rotation of the bucket, said stop also acting as a chute for the material, substantially as described.

6. The combination in a conveyer, of the chain, pivoted buckets, a stop-plate on each section of the chain and a bucket pivoted to each chain-section, the bucket in advance of the stop-plate forming therewith a chute, substantially as described.

7. The combination in a conveyer, of the chain, pivoted buckets, a stop-plate on each section of the chain and a bucket pivoted to each chain-section, the bucket in advance of the stop-plate overlapping the latter and forming therewith a chute, substantially as set forth.

8. The combination in a conveyer, of a chain, buckets pivoted thereto, each bucket having its mouth at one end, and stops located in respect to the buckets whereby the loaded portion of the bucket will automatically swing below the pivotal axis when the bucket is on either longitudinal run or one of the vertical runs, but will permit the dumping of the bucket on the other vertical run, substantially as described.

9. The combination of a carrier, a chute thereon, a bucket pivoted to the carrier and having its mouth on one side of the pivot and its preponderance of weight on the other side of the pivot, and a stop to limit the movement of the bucket on its pivot so that its mouth can be presented on either side of the chute, substantially as described.

10. The combination in a conveyer, of a chain, with buckets pivoted thereto and plates serving as chutes forming a continuation of one side of the bucket on one run, and of the other side of the bucket on the other run, substantially as described.

11. The combination, in a conveyer, of a carrier, buckets having uniformly-converging sides pivoted thereto, each bucket being wider at the bottom than at the mouth, substantially as described.

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

HENRY HOWSON.

Witnesses:

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