

(No Model.)

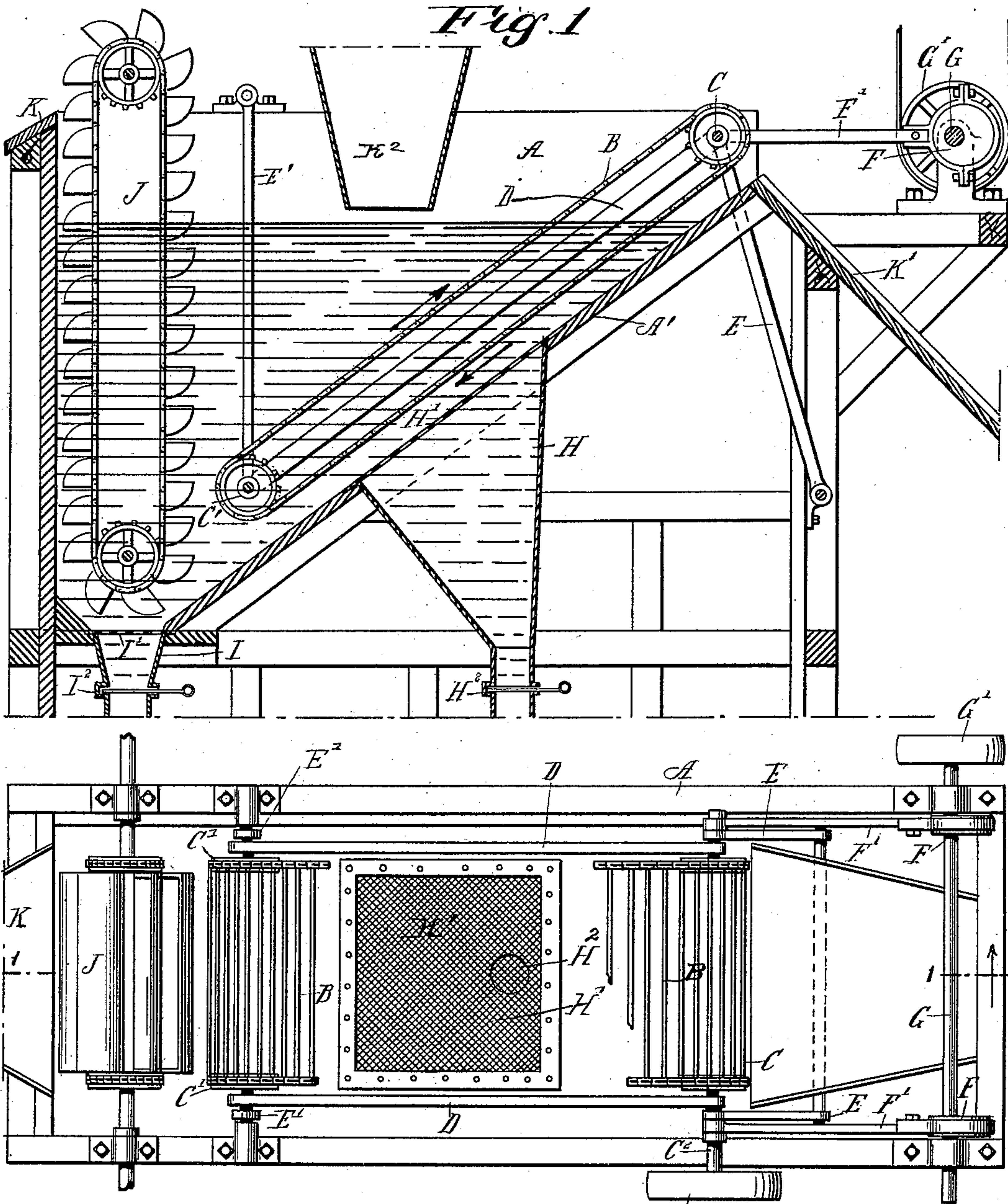
3 Sheets—Sheet 1.

F. PARDEE.

APPARATUS FOR SEPARATING HEAVY FROM LIGHT MATERIALS.

No. 538,596.

Patented Apr. 30, 1895.



WITNESSES:

John Bergstrom
Thos. G. H. H. H.

Fig. 2

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(No Model.)

3 Sheets—Sheet 2.

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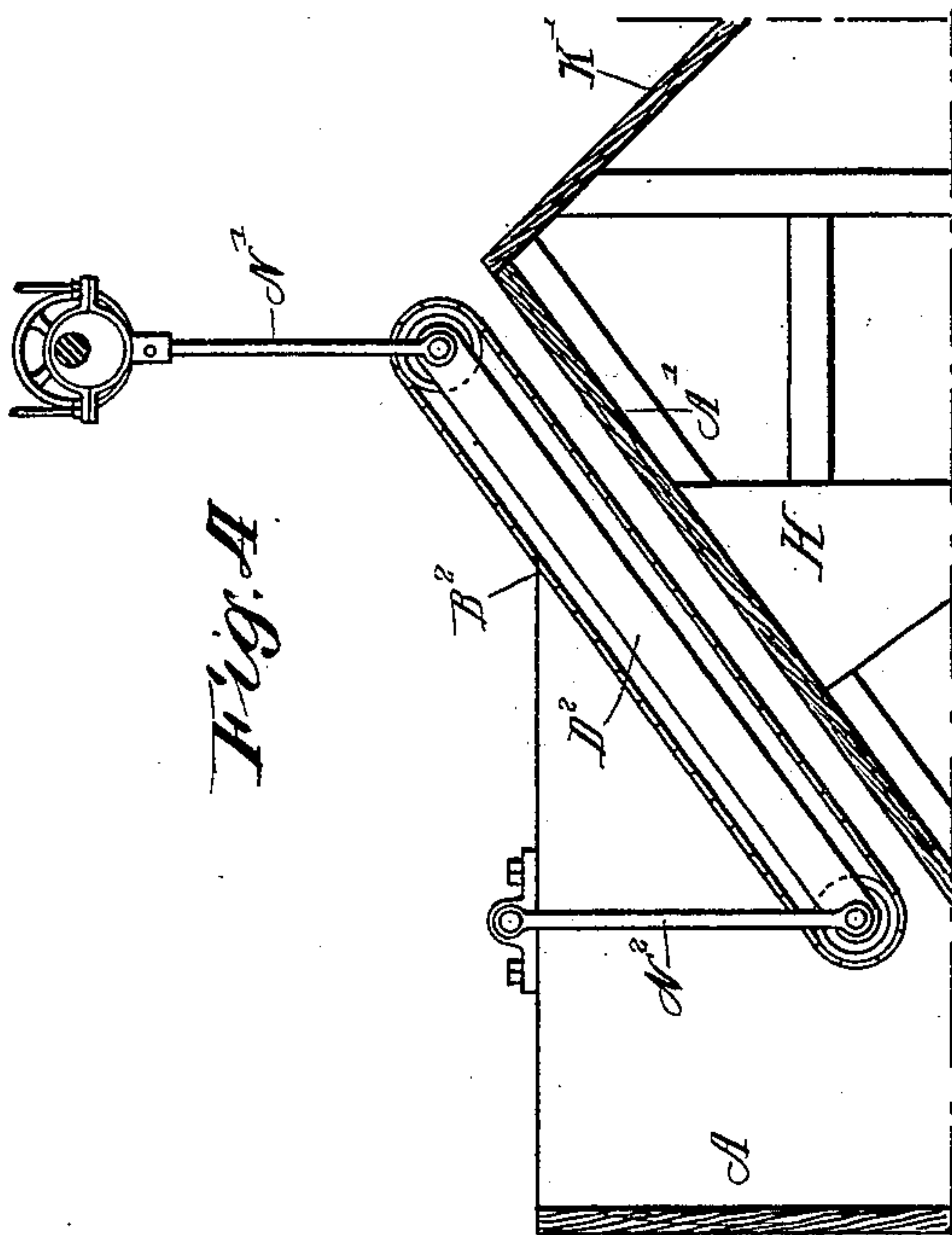


Fig. 1

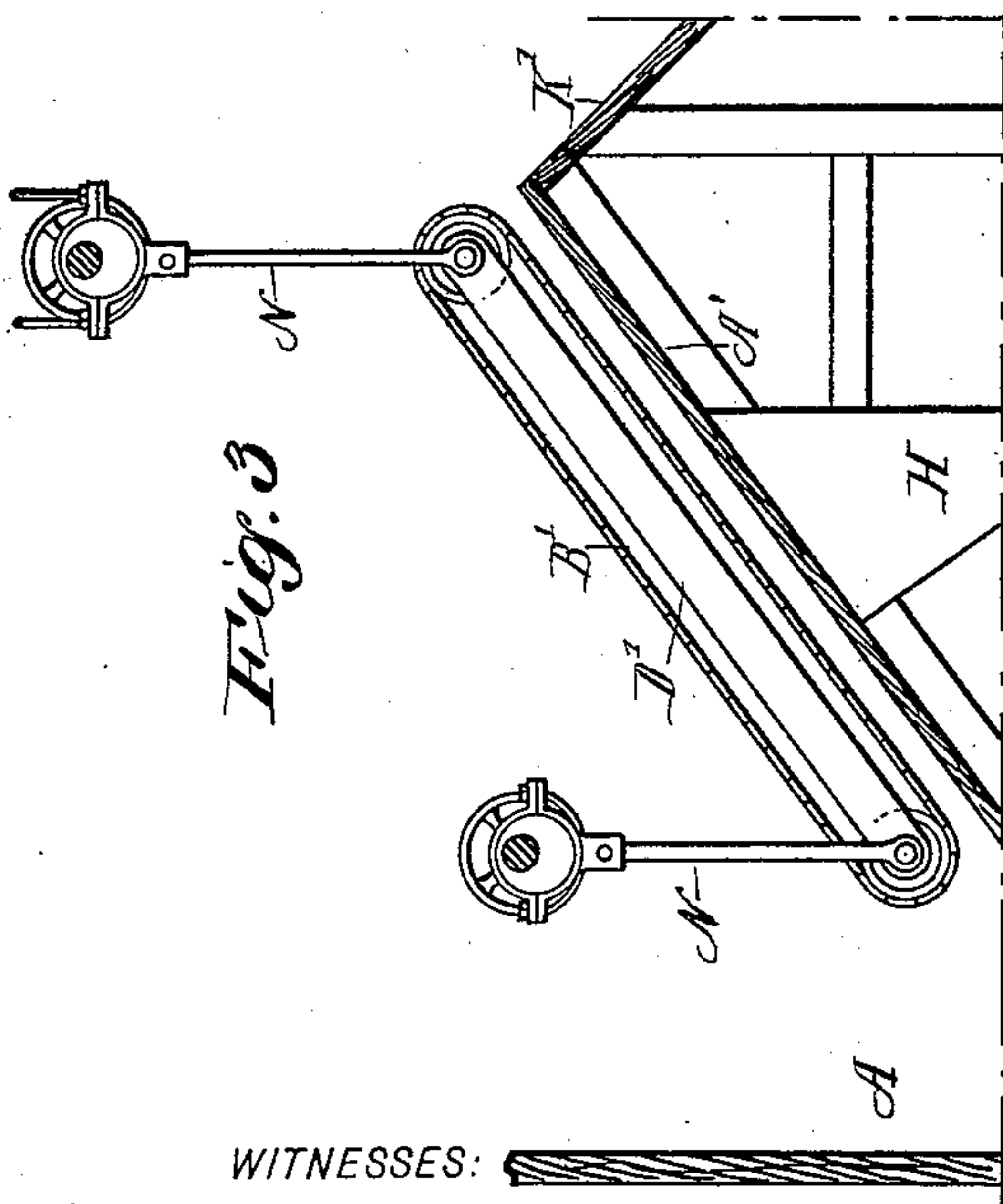


Fig. 2

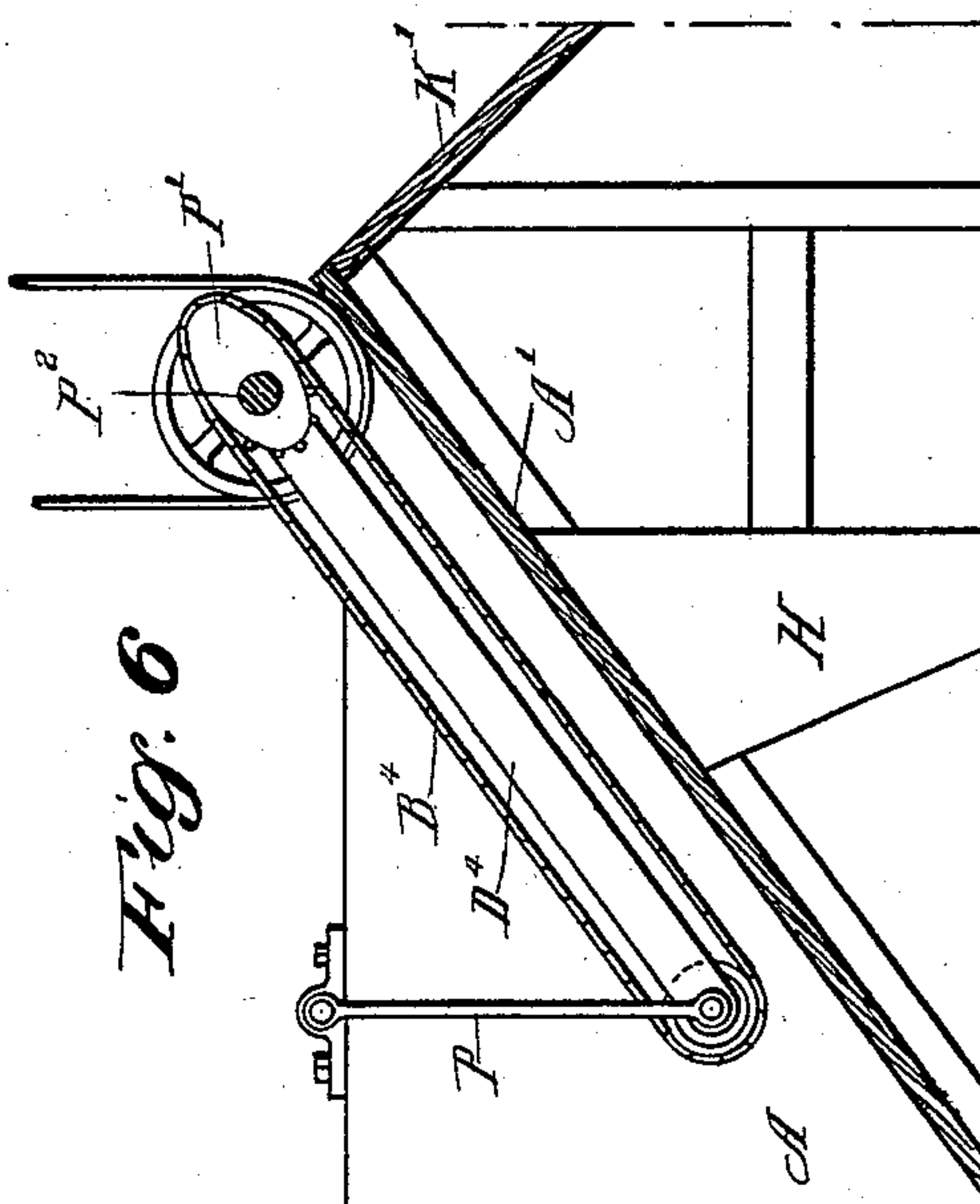


Fig. 3

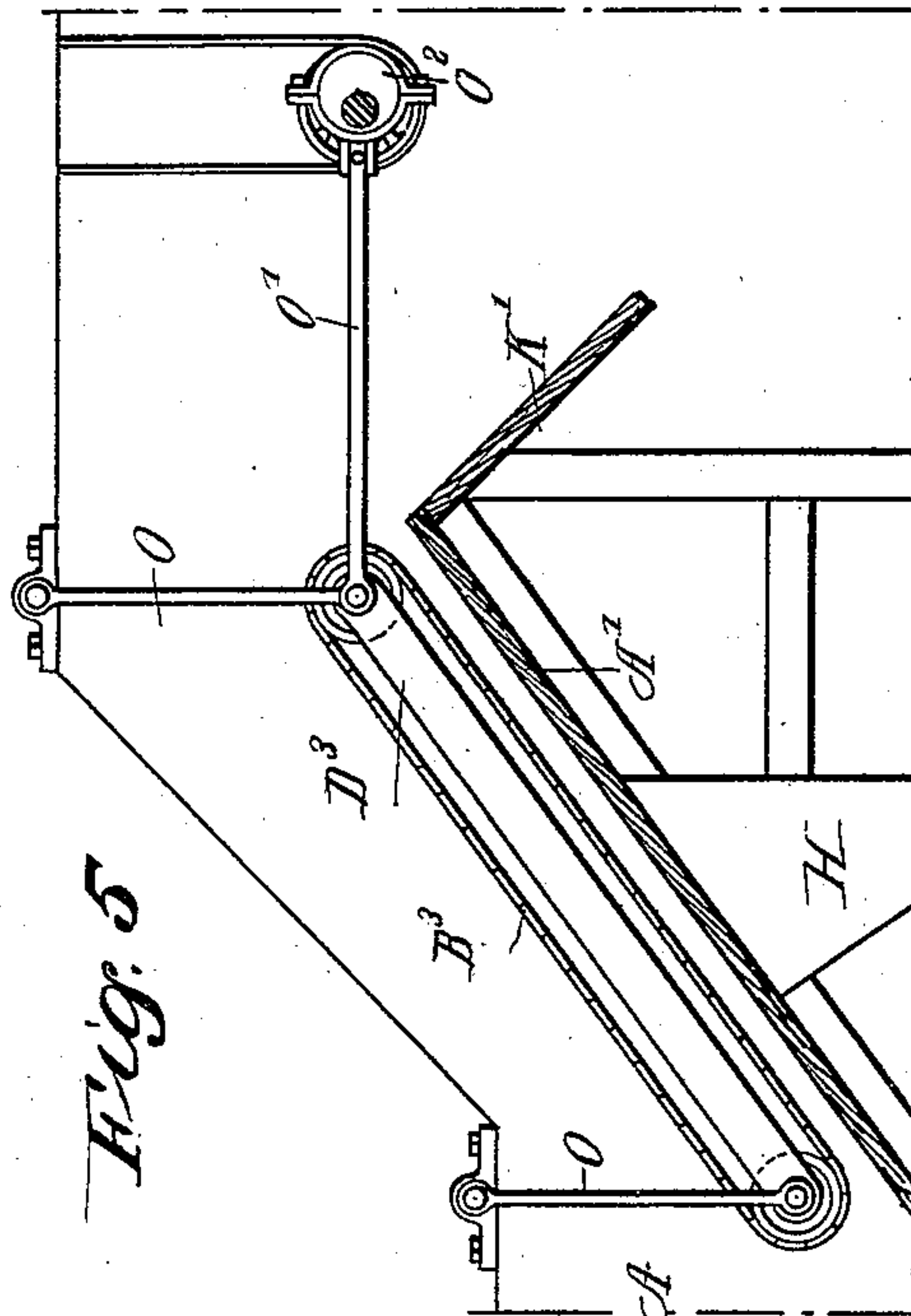


Fig. 4

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(No Model.)

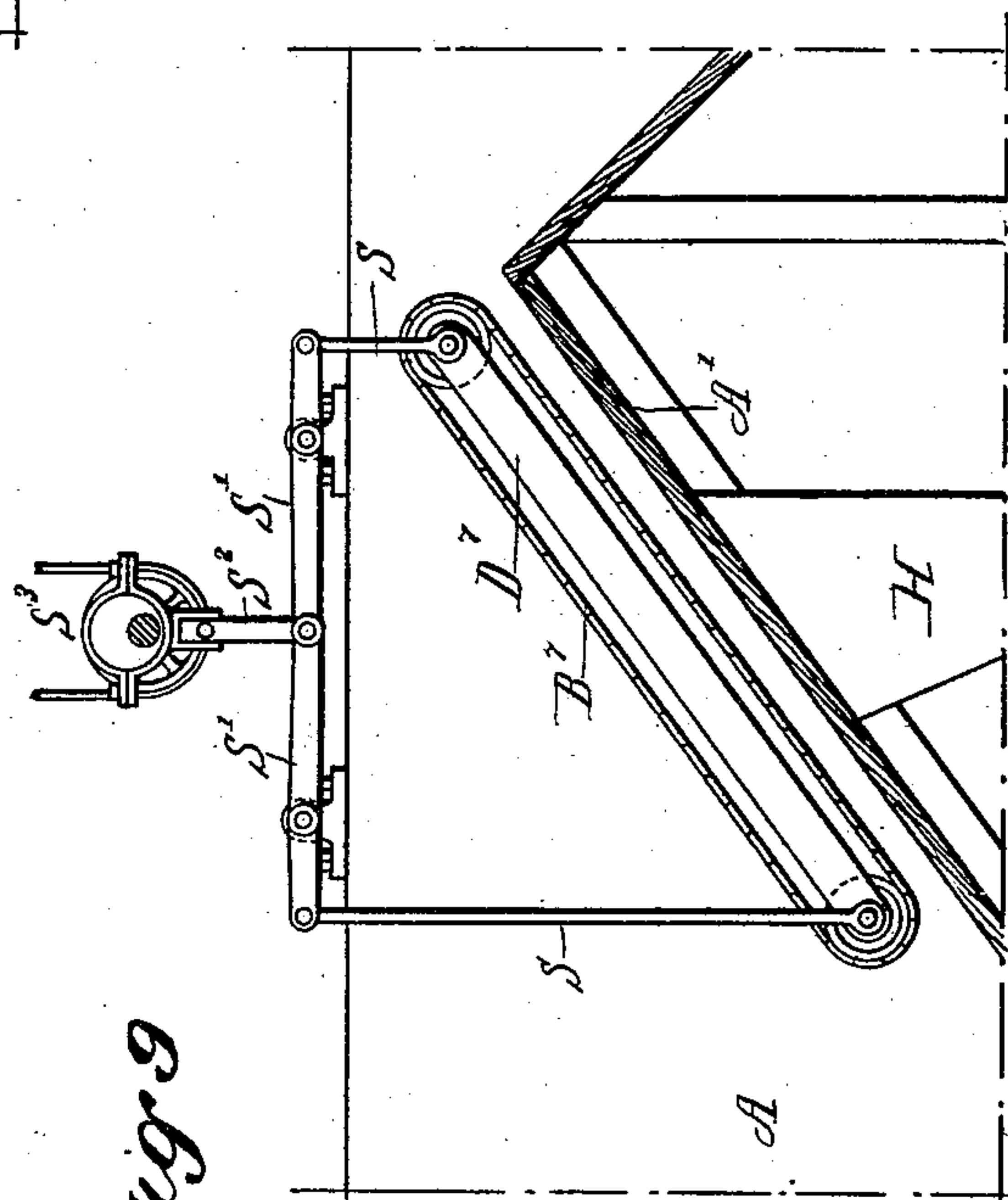
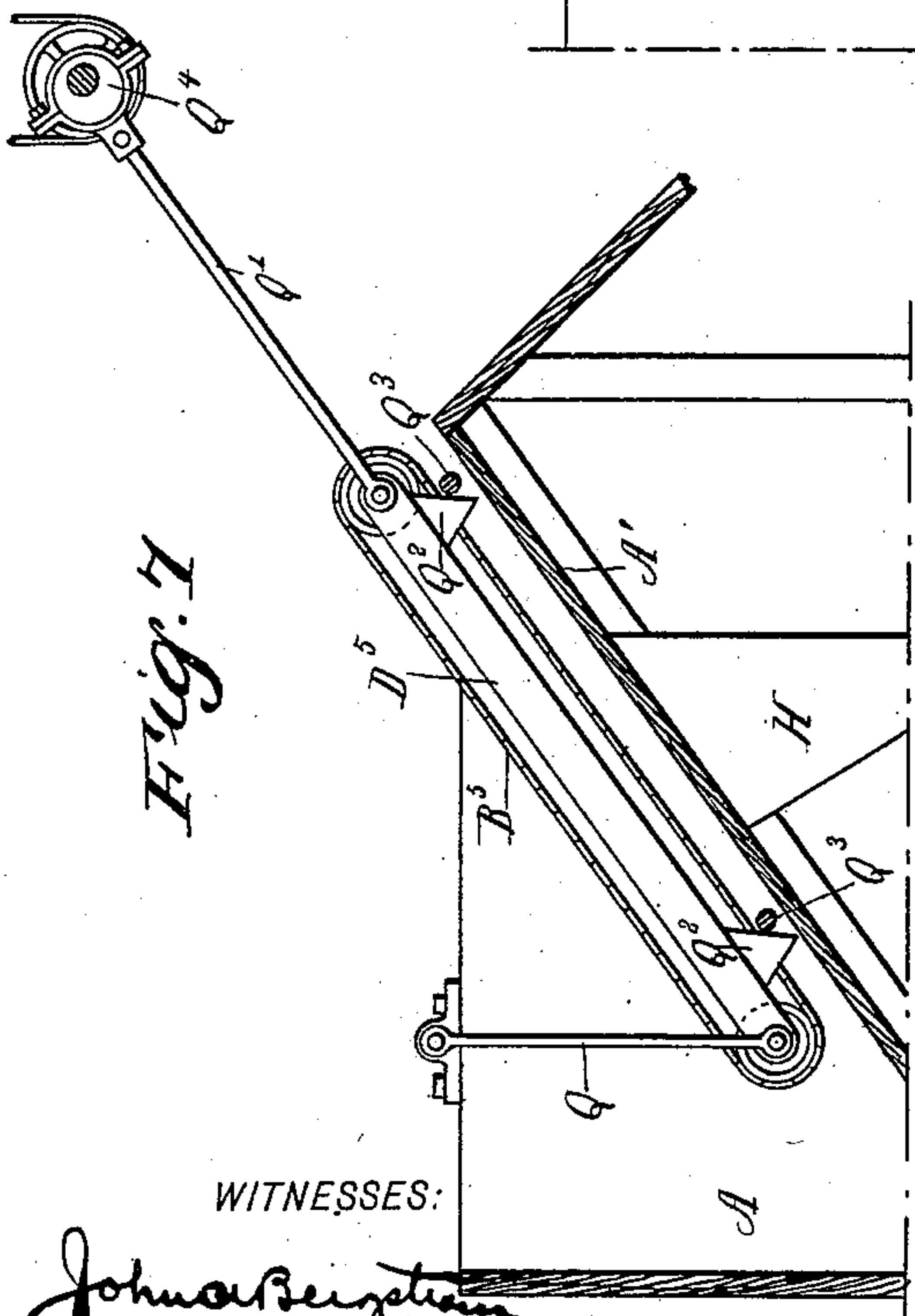
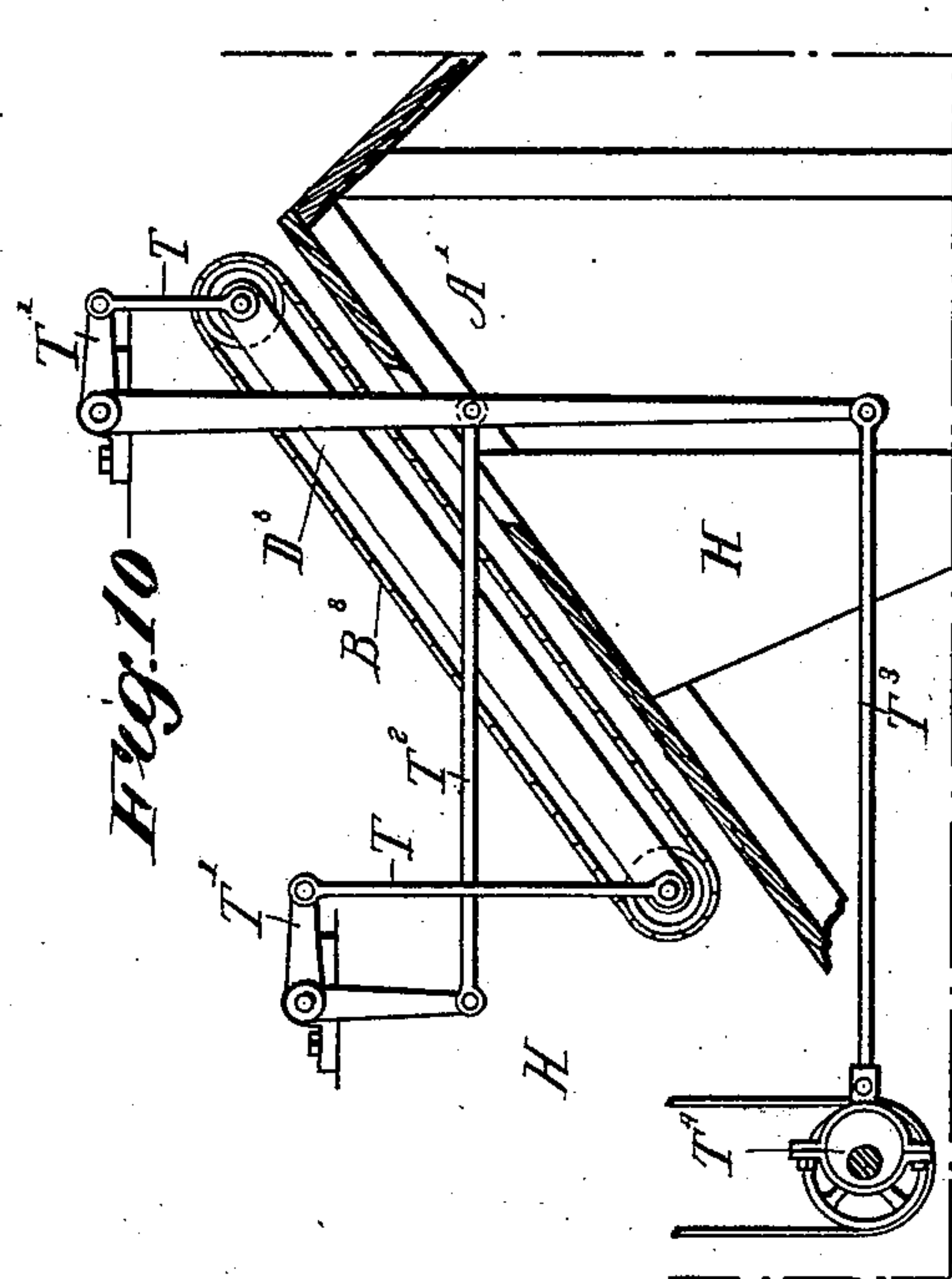
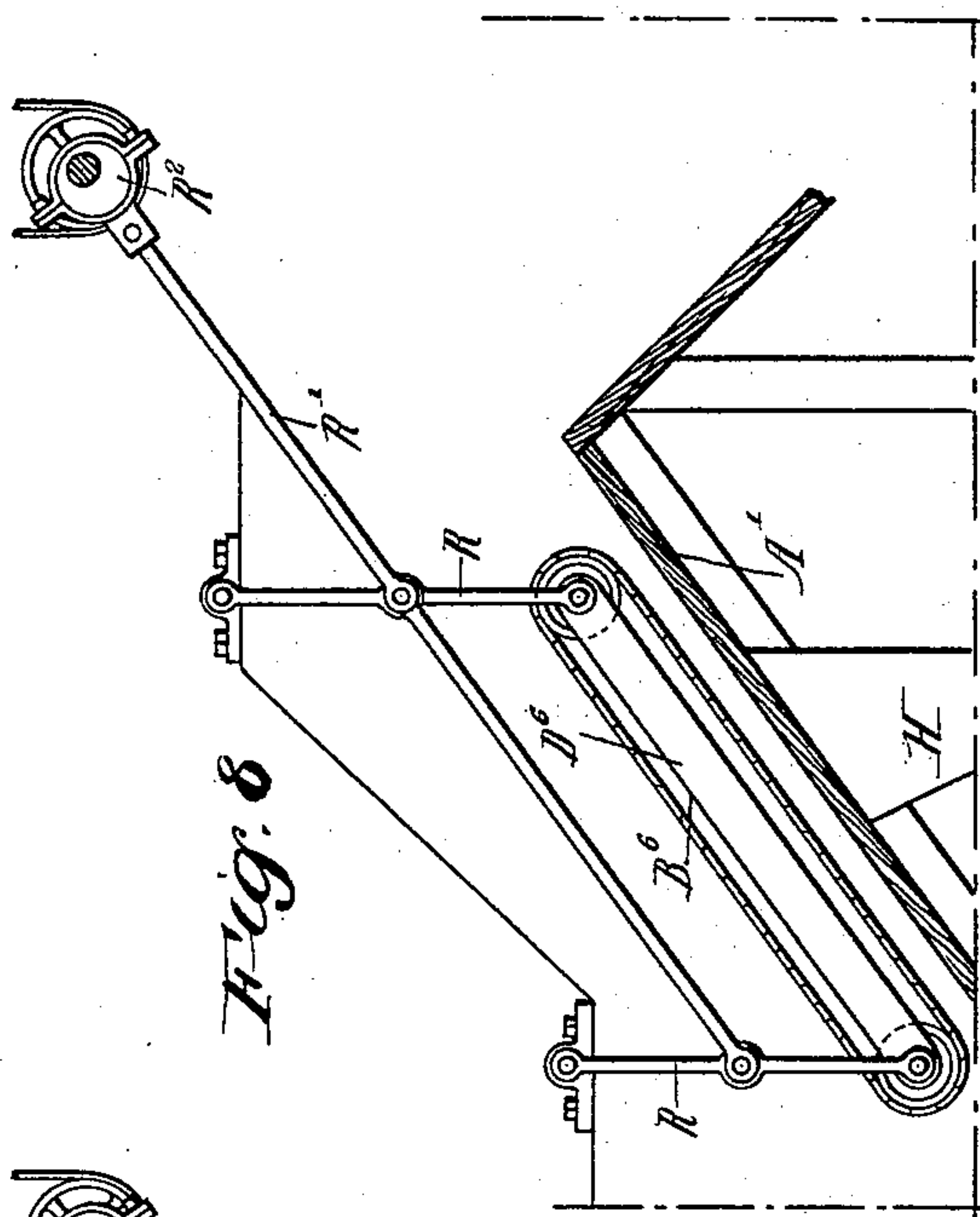
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WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANK PARDEE, OF HAZLETON, PENNSYLVANIA.

APPARATUS FOR SEPARATING HEAVY FROM LIGHT MATERIALS.

SPECIFICATION forming part of Letters Patent No. 538,596, dated April 30, 1895.

Application filed July 24, 1894. Serial No. 518,429. (No model.)

To all whom it may concern:

Be it known that I, FRANK PARDEE, of Hazleton, in the county of Luzerne and State of Pennsylvania, have invented a new and
5 Improved Apparatus for Separating Heavy from Light Materials, of which the following is a full, clear, and exact description.

The invention relates to improvements in the separation of coal from slate, and ores and
10 other materials from impurities, and its object is to provide a new and improved apparatus for conveniently and quickly separating heavy from light material in a very simple and economical manner.

15 The invention is embodied in the construction and combination of parts hereinafter set forth.

Reference is to be had to the accompanying drawings, forming a part of this specification,
20 in which similar letters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional side elevation of the improvement on the line 1 1 of Fig. 2. Fig. 2 is a plan view of the same with parts broken
25 out, and Figs. 3 to 10 are sectional side elevations showing modified forms of the mechanism for imparting motion to the belt-frame.

The improved apparatus for separating heavy from light material is provided with a
30 tank A, containing water or other suitable liquid and provided with an inclined bottom A', as plainly shown in the drawings. Into this tank A extends an inclined carrier belt, adapted to pass over sprocket wheels C and
35 C', journaled in a frame D, having a motion to and from the said inclined bottom A', the said frame with the belt extending approximately parallel to the inclined bottom A'. The parallelism of the bottom is, however,
40 not essential, but it economizes space and liquid.

As illustrated in Fig. 1, the belt frame D is hung at its upper and lower ends on links E and E', pivoted on the tank A, to permit of
45 imparting a swinging motion to the said belt frame and the belt carried thereon. The belt frame is connected at its upper end by eccentric rods F', with eccentrics F, held on a transversely-extending main driving shaft G
50 carrying at one end a pulley G', connected by a belt or other means with suitable machinery to impart a rotary motion to the said shaft

G, to cause the eccentrics F to impart a swinging motion to the belt frame D.

The uppermost sprocket wheels C are se- 55
cured on a transversely-extending shaft C², carrying a pulley C³, connected by a belt with suitable machinery so as to impart a rotary motion to the shaft C², to cause a traveling of the belt B at the time the belt frame D re- 60
ceives a swinging motion toward or from the inclined bottom A'.

In the inclined bottom A', directly under the lower run of the belt B, is arranged a dirt collecting box H, provided at its upper end 65
with a screen H' opening into the tank A, so that any dirt passing off from the material into the liquid, can pass through the screen H' into the collecting box H. The lower contracted end of the latter is provided with a 70
valve H², which when opened from time to time, permits of readily discharging any dirt that may have accumulated in the box H. A similar box I is arranged at the lower end of the inclined bottom A' in the tank A, and 75
is likewise provided with a screen I' and a valve I².

In the tank A is arranged an elevator J, extending vertically and having its lower end close to the lower end of the inclined bottom 80
A', so that the lighter material separated on the belt B, is taken up by the elevator J in the lower end of the tank A, and carried upward out of the tank A, to be finally discharged over a chute K to one side of the 85
tank. The heavy material remaining on the belt B is discharged at the upper end thereof into a delivery chute K' connected with the upper end of the bottom A', as illustrated in the drawings. The material to be treated is 90
passed down a chute K² extending into the tank A, so as to deliver the material upon the upper run of the belt B at a point immersed in the water or other liquid contained in the tank. 95

It will be seen that when the shafts G and C² are set in motion as above described, a reciprocating motion is given to the belt frame D, and a traveling motion to the belt B, so that both work simultaneously. The upper 100
side of the belt, or conveyer, on frame D, travels upward. The material delivered upon the upper run of the belt B is jerked by the reciprocating or shaking motion to separate the

lighter from the heavy material, the latter remaining on ribs or other projections formed on the belt B. The heavier material is discharged at the upper end of the belt onto the delivery chute K', to carry it to one side of the tank, while the lighter material travels downward and is taken hold of in the lower end of the tank by the buckets of the elevator J, which latter raises the lighter material out of the tank and discharges it over the chute K to one side of the machine. Any dirt separated or loosened by the separation of the heavier from the lighter materials, passes into the dirt collecting boxes I and H' and is removed therefrom from time to time by opening the valves H² and I². Thus, suppose coal is being treated, the pieces of the same being lighter than the stones and slate mingled with them, are successively lifted by the peculiar movement of the conveyer frame, D, from one rung, or cross-bar, of the conveyer belt to another, and consequently pass downward to the elevator, B, while the said stones and slate, being held down by their superior gravity, remain fixed on the said belt, and are hence carried up by it and discharged into the chute K. Meanwhile, the dirt mingled with the coal, &c., passes down between the cross-bars of the conveyer, and, falling upon the inclined bottom of the tank, slides downward onto the screen, H, while the coarser portion passes on into the box I.

It will be seen that the material is carried through the water and is simultaneously subjected in the water to a shaking motion, a traveling motion, and to a floating action, so as to separate the lighter material from the heavier one, and both being carried out of the tank separately to different delivery chutes. At the same time the dirt arising by the separation is separately disposed of.

In the modified forms shown in Figs. 3 to 10, different means are employed for imparting a motion to the belt frame and its belts, but otherwise the construction of the tank, the dirt boxes and elevator remains the same. As shown in Fig. 3, the belt frame D' carrying the belt B', is hung on eccentric rods N, extending vertically, so that when the eccentrics are set in motion an up and down movement is given to the belt frame relative to the inclined bottom A'.

As shown in Fig. 4, the belt frame D² carrying the belt B², has its lower end hung on a vertically disposed link N², fulcrumed on the tank A, while the upper end of the said belt frame D² is engaged with a vertically disposed eccentric rod N', which causes an up and down movement of the frame and its belt when the eccentric is actuated.

As illustrated in Fig. 5, the belt frame D³, carrying the belt B³ is hung on two links O, disposed vertically, and the said frame is also connected with a horizontally disposed eccentric rod O', so that when the eccentric O² is actuated, a swinging motion is imparted to

the belt frame relative to the bottom A' of the tank A.

As shown in Fig. 6, the belt frame D⁴ carrying the belt B⁴ is hung at its lower end on a vertically disposed link P, while the upper end of the said frame and belt is engaged by an elliptical or eccentric sprocket wheel P', so as to impart a swinging motion to the belt frame at the time the shaft P² for the said sprocket wheel is rotated. The eccentric sprocket wheel P' is attached to the shaft P², and as the shaft P² revolves, the eccentric raises the carrying belt, at the same time forcing the link P forward and on making a revolution, imparts a swinging motion to the conveyer belt B⁴, and the sprockets at the same time move the belt B⁴ up in the direction of the discharge; the shaft P² running in a journal.

In the modified form shown in Fig. 7, the belt frame D⁵ carrying the belt B⁵, has its lower end hung on a vertically disposed link Q, while the upper end is pivotally connected with an eccentric rod Q' extending in alignment with the frame. On the latter are secured the downwardly projecting wedges Q² engaging fixed pins Q³ held in the tank, so that the frame D⁵, when actuated by the eccentric Q⁴ of the eccentric rod Q', causes an up and down swinging movement of the belt, owing to the inclines or wedges Q² traveling on the fixed pins Q³.

As shown in Fig. 8, the belt frame D⁶ carrying the belt B⁶, is hung on the links R, pivotally connected with each other by the eccentric rod R', so that when the eccentric R² actuates the eccentric rod R', the latter gives a swinging motion to the links and an up and down motion to the frame and belt.

As illustrated in Fig. 9, the belt frame D⁷, carrying the belt B⁷ is hung on vertically disposed links S, pivotally connected at their upper ends with levers S', having their inner ends connected with the eccentric rod S² of the eccentric S³. Thus, when the latter is rotated, a swinging motion is given to the lever S', so that an up and down movement is imparted to the belt frame D⁷.

As shown in Fig. 10, the belt frame D⁸, carrying the belt B⁸ is hung on vertically disposed links T, pivoted on bell crank levers T', pivotally connected with each other by a link T², one of the bell crank levers being also connected with the eccentric rod T³ of the eccentric T⁴. Now when the latter is set in motion, a swinging motion is given to the lever T', so that the links T are raised and lowered, and a like movement is given to the belt frame D⁸.

In the modified forms described, the material is discharged on the belts, at the upper ends, and when the belts are set in motion as described and a swinging motion is given to the belt frame, then the separation of the materials takes place in the manner previously described in reference to Figs. 1 and 2.

Having thus described my invention, I

claim as new and desire to secure by Letters Patent—

1. In an apparatus for separating heavy from light material, the combination with the
5 tank, having an inclined bottom and a dirt-receptacle arranged in said bottom, and a chute arranged at the upper end of the latter, of a frame arranged substantially parallel to the bottom, links which support the frame,
10 and adapt it to swing, a belt, pulleys, and shaft arranged on said frame, and means for imparting a to-and-fro movement to the frame, and travel to its belt, whereby the heavier material is carried upward and delivered into

the chute and the lighter caused to travel 15 downward, as specified.

2. An apparatus for separating heavy from light material, comprising a tank having an inclined bottom, a traveling belt extending into the said tank, a movable frame carrying 20 the said traveling belt, and a dirt collecting box in the bottom of the said tank, substantially as shown and described.

FRANK PARDEE.

Witnesses:

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GUS T. FISCHER.