

H. THADEN.
AIRSHIP.

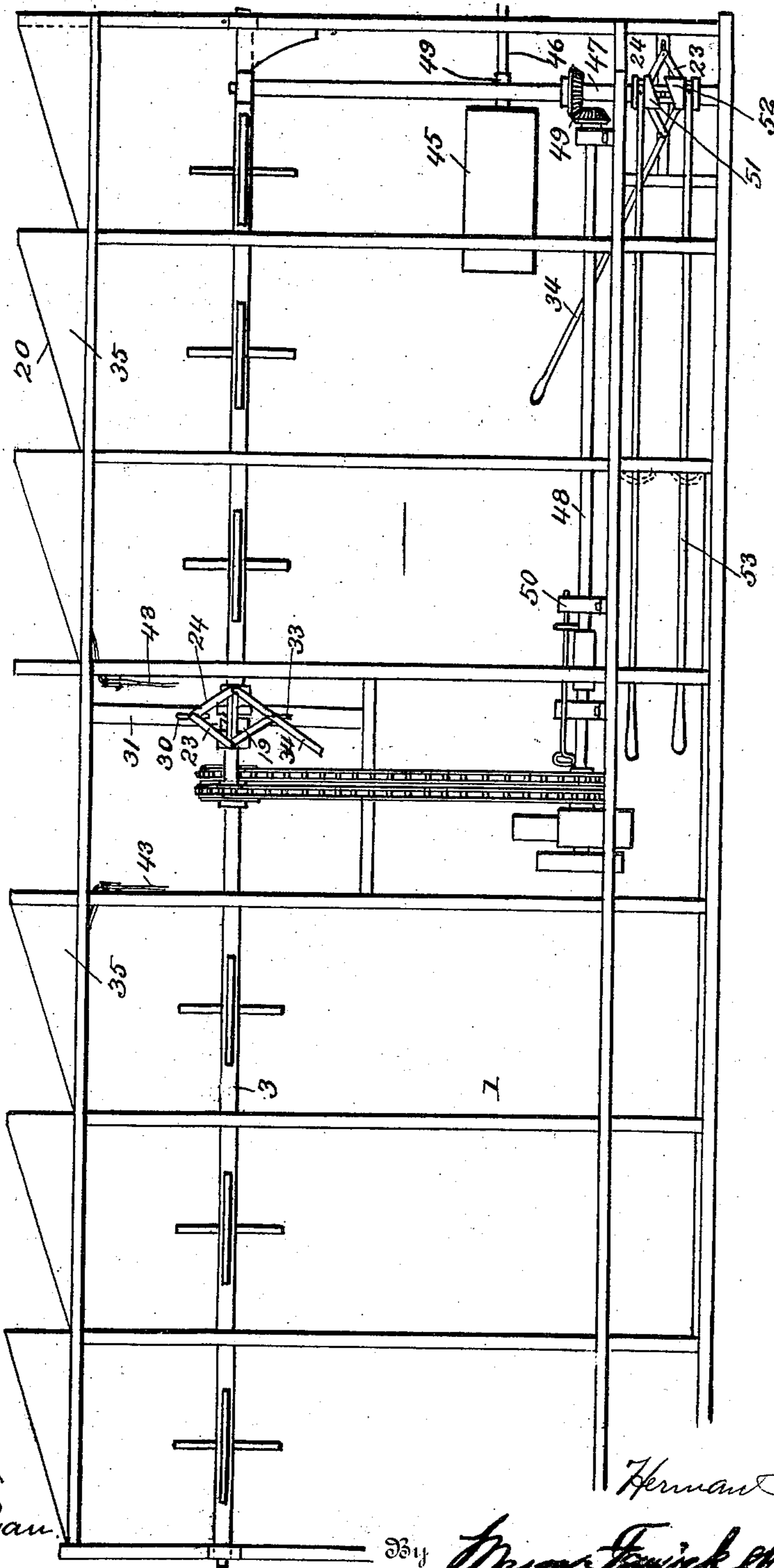
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976,709.

Patented Nov. 22, 1910.

6 SHEETS—SHEET 1.

Fig. 1.



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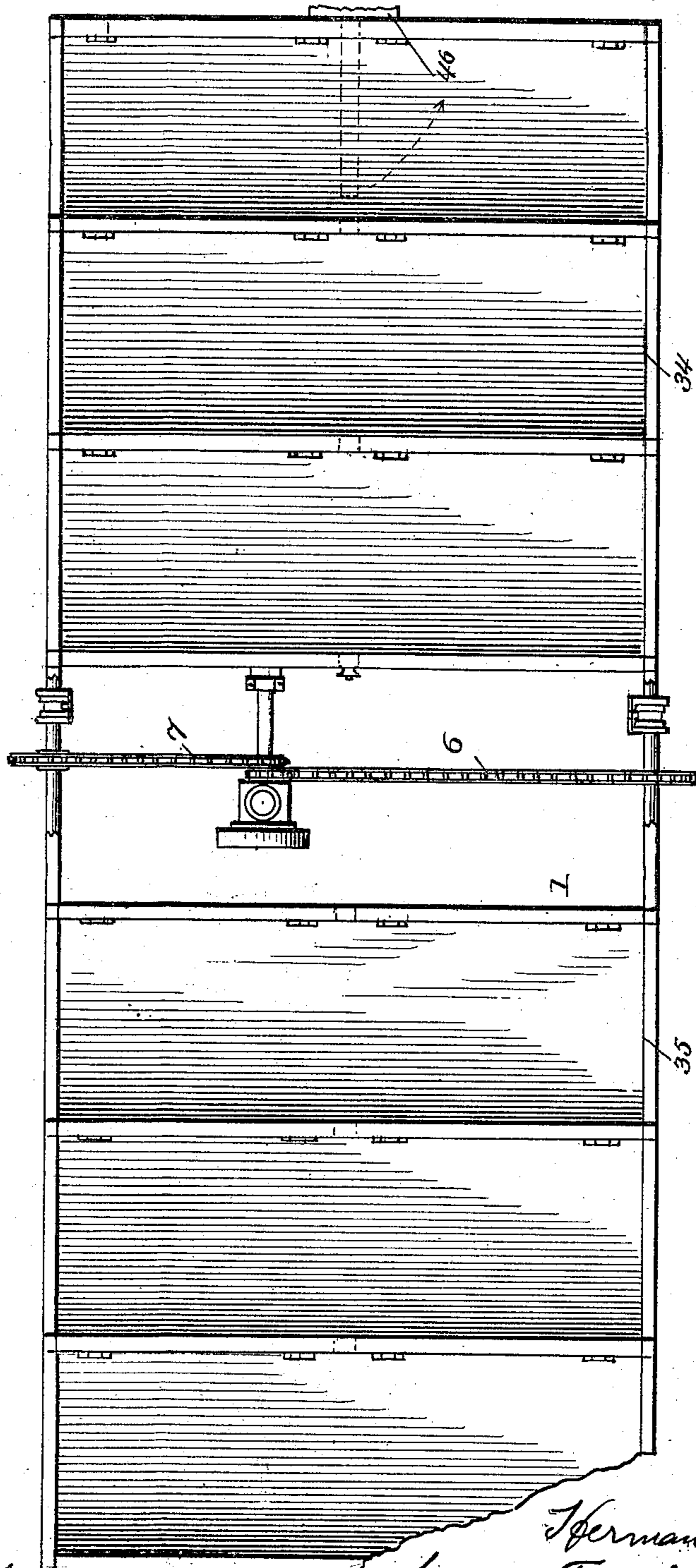
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5 SHEETS—SHEET 2.

Fig. 2.



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5 SHEETS—SHEET 3.

Fig. 3.

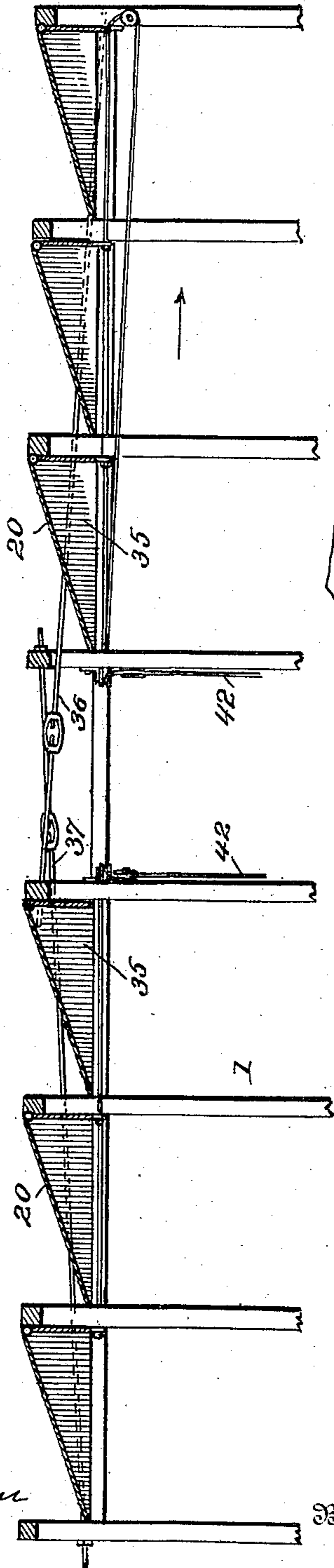
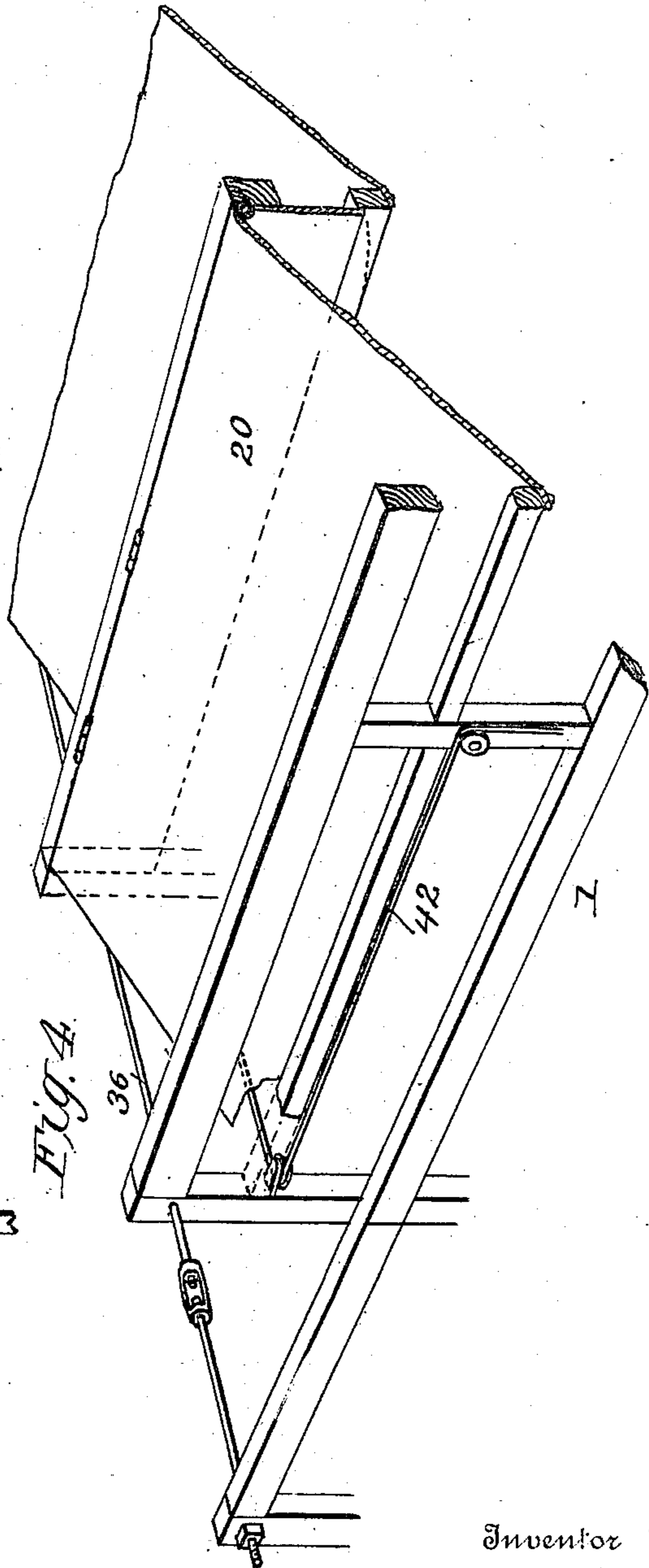


Fig. 4.



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Fig. 5

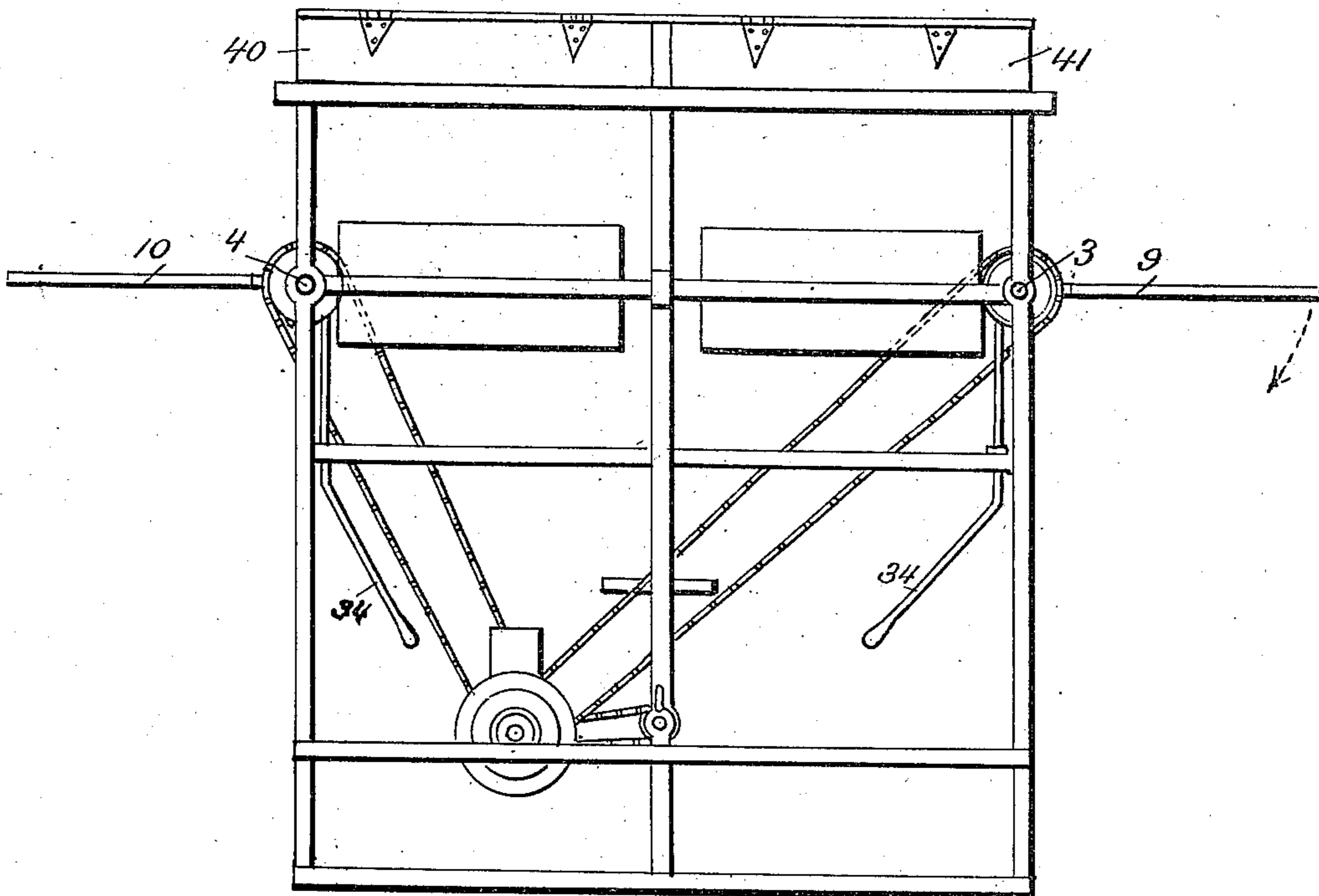
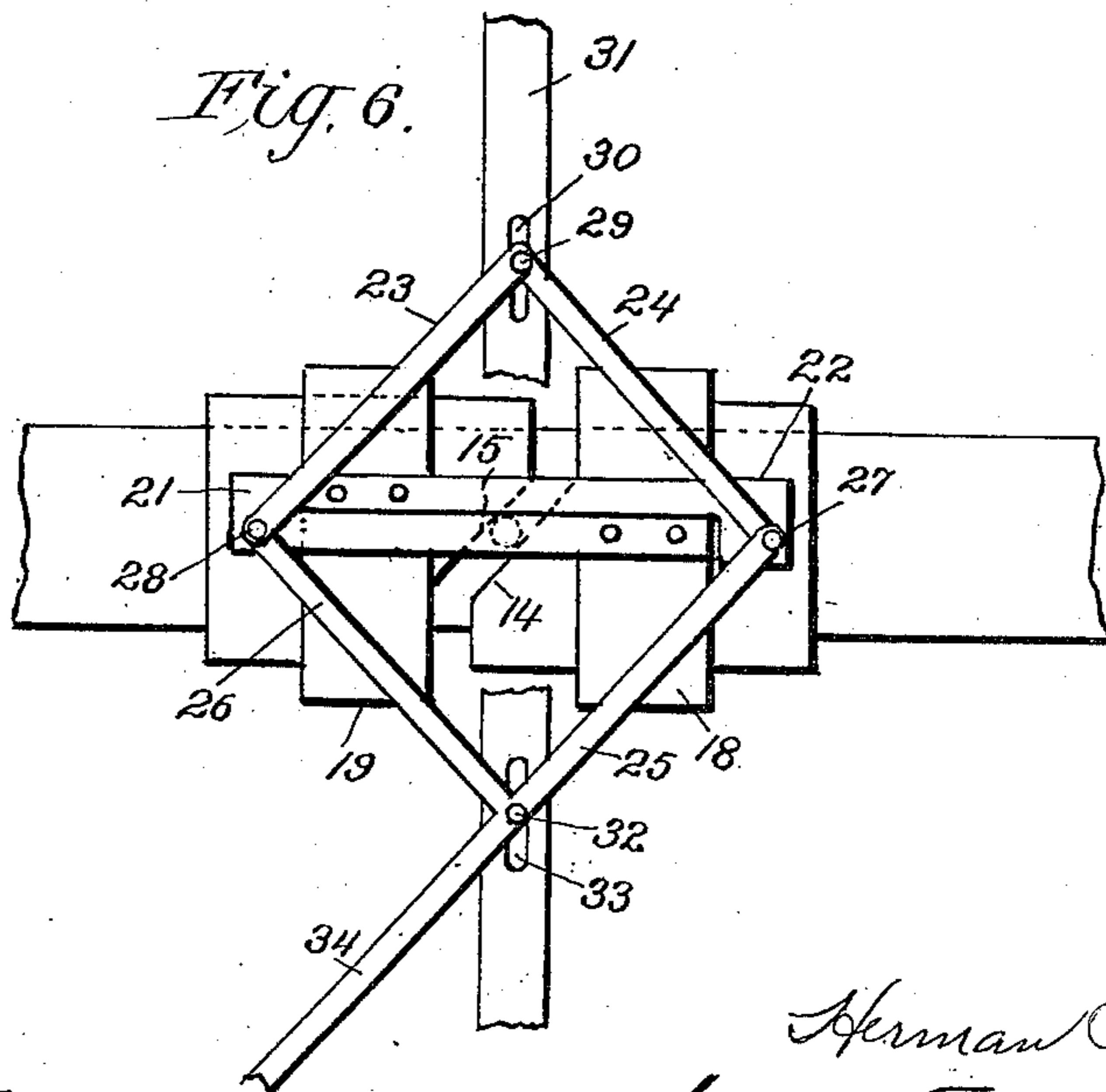


Fig. 6.



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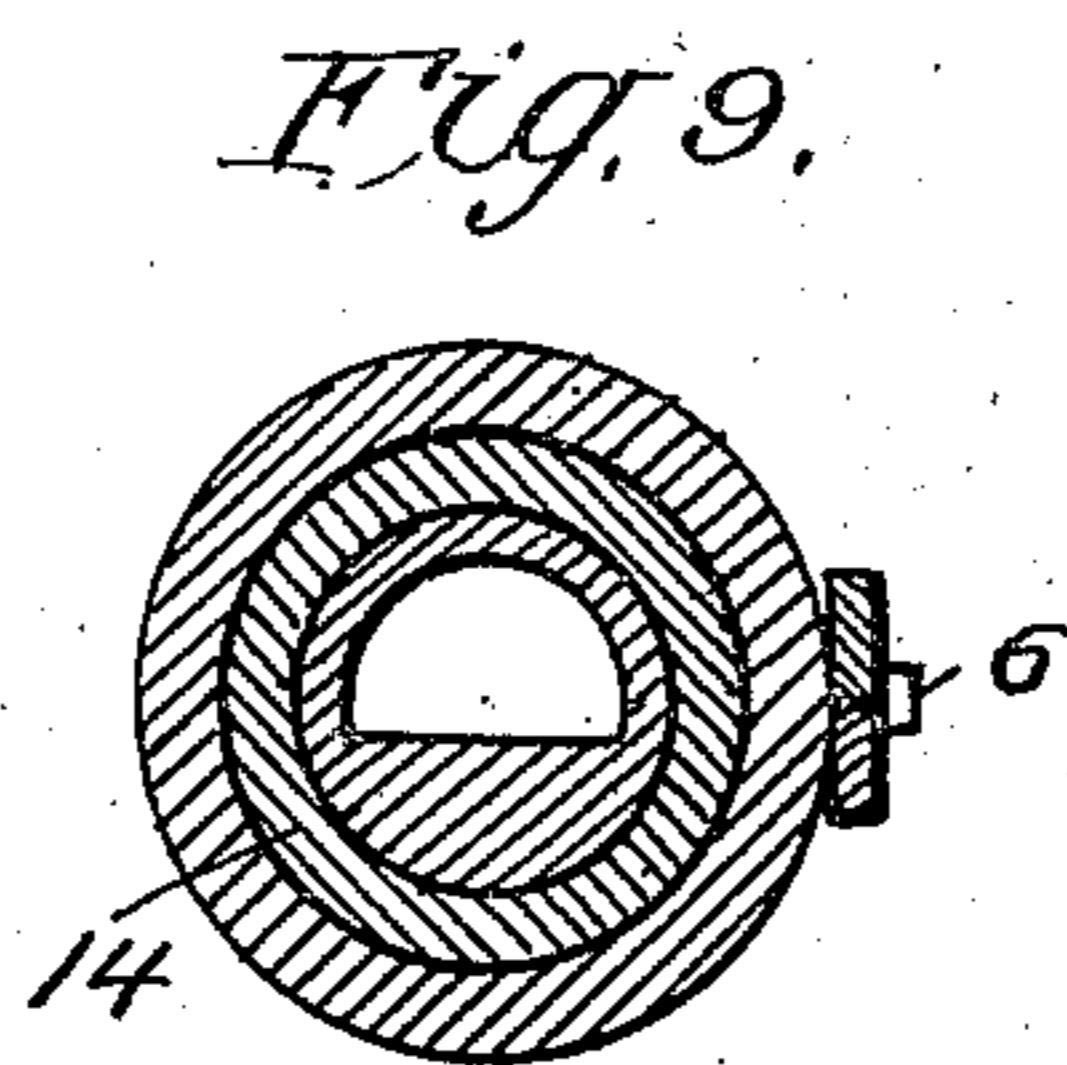
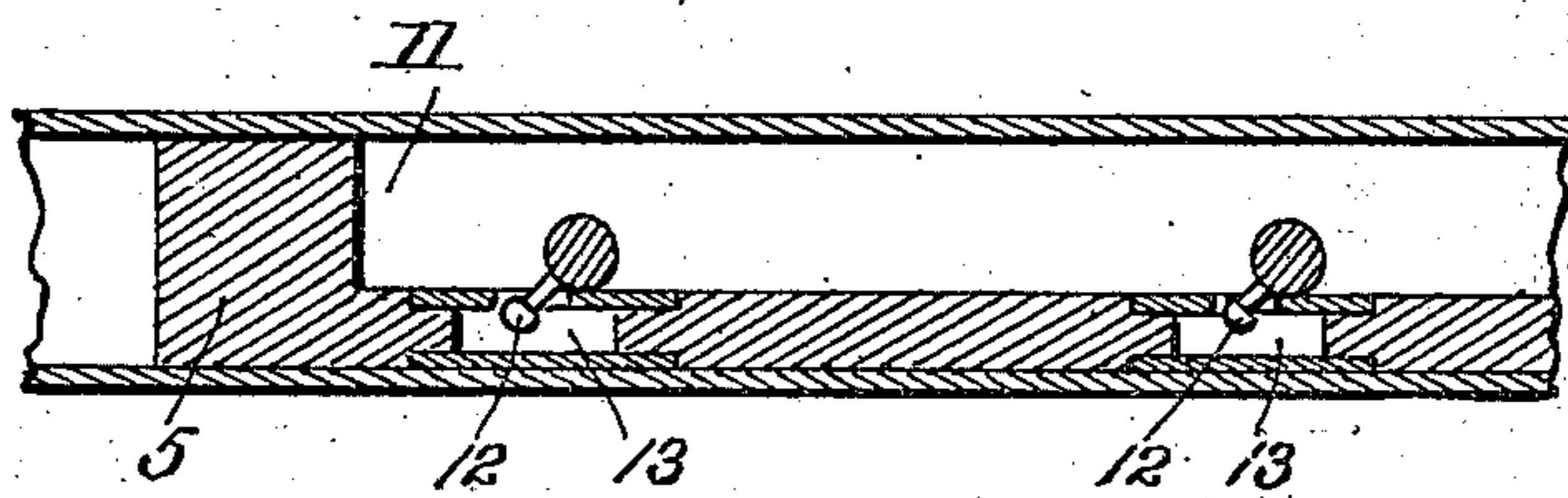
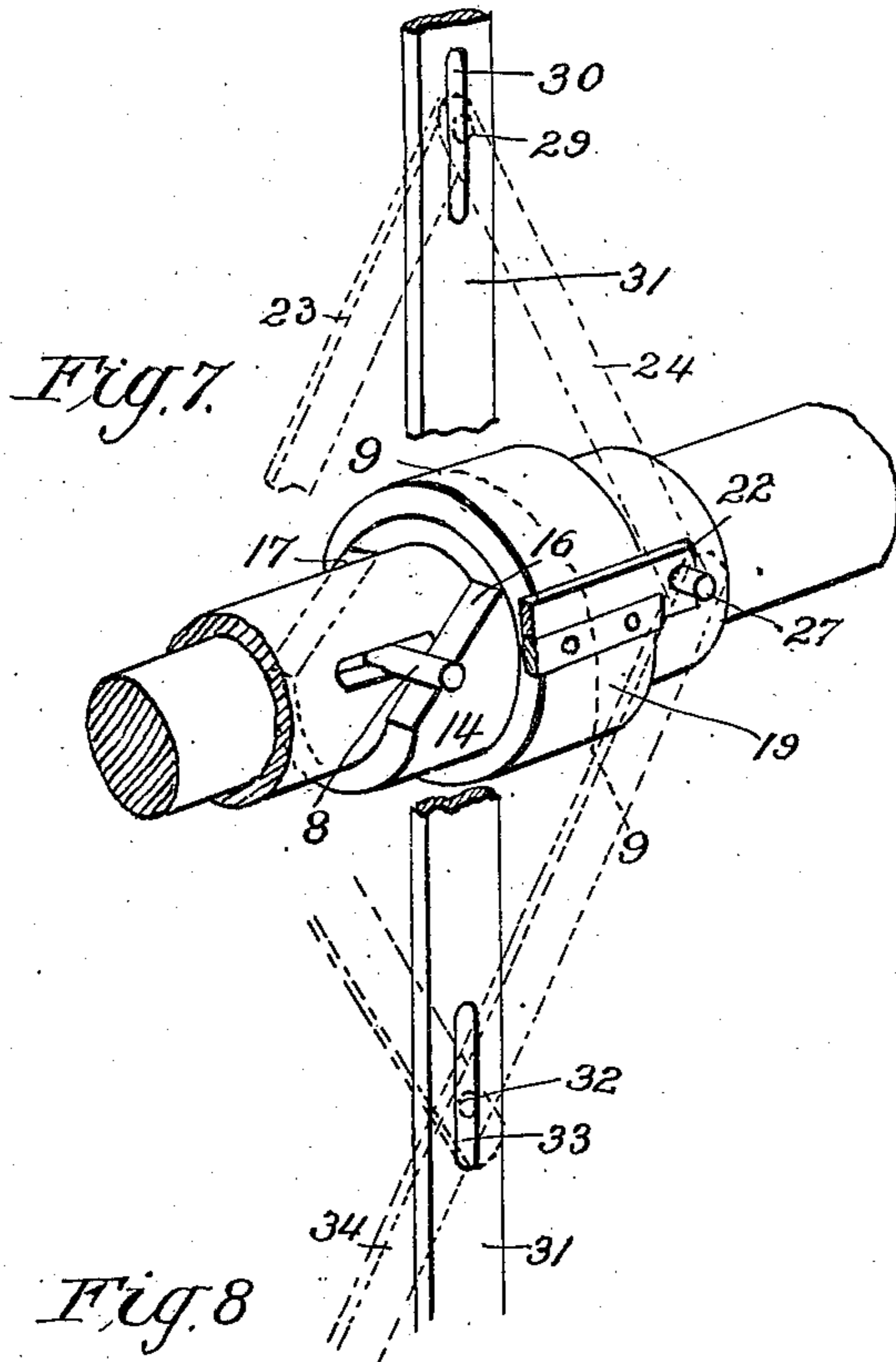
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UNITED STATES PATENT OFFICE.

HERMAN THADEN, OF ATLANTA, GEORGIA.

AIRSHIP.

976,709.

Specification of Letters Patent.

Patented Nov. 22, 1910.

Application filed November 20, 1909. Serial No. 529,085.

To all whom it may concern:

Be it known that I, HERMAN THADEN, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Airships; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in air ships, and particularly to air ships having lifting means and sustaining planes co-operating with propelling means, and is an improvement of my co-pending application, Number 465,598, filed December 2, 1908.

The object in view is the arrangement in an air ship, of a plurality of planes and lifting and propelling means in connection therewith.

Another object in view is the provision of sustaining planes formed with means for controlling the sustaining power thereof.

A further object of the invention is the provision of planes and movable shutters for determining whether or not air will be permitted to engage the respective planes, whereby the sustaining action of the planes are varied and the course of the ship is determined.

A still further object of the invention is the arrangement in an air ship, of a plurality of lifting and propelling means associated with a controlling lever mechanism for varying the action of the blades.

With these and other objects in view the invention comprises certain novel constructions, combinations, and arrangement of parts as will be hereinafter more fully described and claimed.

In the accompanying drawings: Figure 1 is a side elevation of an air ship embodying the invention. Fig. 2 is a top plan view of the structure shown in Fig. 1. Fig. 3 is a fragmentary longitudinal sectional view, approximately on line 3—3 of Fig. 2. Fig. 4 is a detail fragmentary perspective view of one of the planes and surrounding parts. Fig. 5 is a front view of the air ship shown in Fig. 1. Fig. 6 is a side elevation of lever controlling means. Fig. 7 is a fragmentary sectional perspective view of the lever controlling means shown in Fig. 6. Fig. 8 is a longitudinal sectional view through the shaft carrying and operating propellers.

Fig. 9 is a sectional view through Fig. 7, approximately on line 9—9.

Referring to the accompanying drawings by numerals, 1 indicates a framework consisting of uprights, cross bars, longitudinal bars, and bracing means for holding the various moving parts correctly in position, and for forming a body for the ship.

Mounted in the framework 1 in any desired manner is an engine 2 of any desired kind, which provides power for the lifting and propelling parts.

Mounted upon framework 1 near the top are rotatable hollow shafts 3 and 4 each of which carry a reciprocating and revolving shaft 5. Chains 6 and 7 convey power from engine 2 to shafts 3 and 4, from which the power is conveyed to each of the shafts 5 by pins 8. Mounted upon the shafts 3 and 4 are propellers 9 and 10 which have their supporting shafts passed through shafts 3 and 4, and also through a cut-out portion 11 (Fig. 8) in each of the shafts 5.

The rotation of the shafts 5 and the shafts 3 and 4 rotate the respective propellers, and the reciprocation of the shafts 5 is designed to turn the propellers so that the blades on their downward stroke will strike flatwise against the air, and will strike edgewise against the air on their upward stroke. This is accomplished by pins 12 projecting from each of the shafts of the propellers into a receiving socket 13 formed in each of the shafts 5.

The respective shafts 5 are moved back and forth in proper timed relationship to the shafts 3 and 4 so as to cause the blades of the propellers to operate as just set forth.

This movement of shafts 5 is caused by cams 14 and 15, (Figs. 6 and 7), which act on pins 8, and cause a proper reciprocatory movement of shafts 5 for causing the blades of the propellers on their downward stroke to strike the air flatwise or only partially flatwise according to the position of the cams.

Each of the cams 14 and 15 are provided with cam surfaces 16 and 17 so as to positively move the pins 8 back and forth as desired.

When lifting the air ship the engine 2 is started, and the propellers and lifting members 9 and 10 are operated, the cams 14 and 15 are brought as close together as they are permitted by pins 8, so as to cause the propellers 9 and 10 to act only as lifting members. After the ship has been raised to the proper elevation, and it is desired to move the same forward the cams

14 and 15 are moved apart gradually and as the cams are moved apart gradually the rings 18 and 19 are gradually moved together, so that the pins 8 will be properly guided in their movement, and the propellers will be set so as to urge the ship forward, and somewhat lift the same at the same time. If the cams 14 and 15 are moved apart to their extreme movement rings 18 and 19 will be brought almost together, that is until the same engage pins 8, whereupon the propellers 9 and 10 will be held in a position to act only as propellers for urging the ship forward, and the reciprocating shafts 5 will be held against reciprocation. As will be evident the moving part of the cams 14 and 15 will cause a loose motion between the same and pins 8, so that in actual operation it is desirable to move the cams and sliding rings 18 and 19 as quickly as will be permitted by the progress of the ship through the air. In order to permit a comparatively quick changing of the operation of the propellers 9 and 10 a plurality of planes 20 are provided for maintaining the ship in the air during the forward movement of the same. Cam 15 is connected to ring 18 by a bar 21 and ring 19 is connected to cam 14 by a bar 22, so that the cams and rings can operate in proper unison. A plurality of links 23, 24, 25 and 26 are connected together, and also connected to pins 27 and 28 which pass through the respective bars 21 and 22, and into cams 14 and 15. The links 23, and 24 are pivotally connected by a pin 29 which slides in a slot 30 formed in an upright 31. Links 25 and 26 are connected by a pin 32 operating in a slot 33 in upright 31, so that all of the links are operated properly for pulling apart or pulling together the cams 14 and 15. In order to properly operate the respective links, link 25 is formed with a handle 34 which extends downward into proximity to the operator. A cam mechanism, as shown in Figs. 6 and 7, is positioned on each of the shafts 3 and 4, so as to operate the same independently. Arranged at the top of the framework 1 are a plurality of planes 20 set at an angle, as more clearly shown in Fig. 3, and arranged with side members 35-35 for inclosing the air beneath the planes. In order to prevent the air pressing against the planes 20 from injuring the framework suitable braces 36 and 37 are provided which extend from the central part of the ship in opposite directions at an incline so as to tie strongly together all of the parts of the framework. Each of the planes 20 is secured to a cross bar 38 at its upper end and to a cross bar 39 at its lower end so as to be inclined from the horizontal. In moving the ship the same is moved in the direction of the arrow, so that the air will press against the vertically positioned curtains 40 and 41 pivotally secured

to cross bars 38. The planes 20 are made preferably from cloth of some good quality, and also the curtains 40 and 41 are made from cloth of some good quality. The curtains 40 and 41 are also in addition provided with a framework hinged in position on cross bar 38, and designed to be operated by cables 42-42 and 43-43. Each of the curtains 40 on the front part of the ship is operated by a single cord 42 and each of the curtains 41 is operated by a single cord 43, so that either of the curtains may be closed or opened as desired. Ordinarily the controlling cords 42-42 and 43-43 are permitted to remain loose so that the pressure of the air against the curtain will move the same back against the planes 20, and hold the same in that position until positively closed by pulling upon the cords. Either side of the ship may have the curtains closed for depriving that part of the ship of the sustaining power of its planes, and consequently vary the direction of travel of the ship. By this means the ship if desired may be steered by manipulating the various curtains 40 and 41, though a regular steering apparatus is provided as hereinafter described. By this arrangement it will be observed that a large number of planes are provided without enlarging the framework unduly, and also the air pressure of the planes is under constant control by the operator.

In order to positively properly guide the ship a rudder 44 is provided. The rudder 44 is provided with blades 45 and 46 having their supporting axles passing through a rotating shaft 47 which in turn has positioned therein a sliding bar or shaft similar to the shafts 5, and designed to operate in the same manner for varying the position of blades 45 and 46. The shaft 47 may be rotated whenever desired by the prime mover or engine 2, a shaft 48 and gearing 49 connecting the prime mover with the shaft. Any desired kind of clutch 50 is provided for throwing in and out shaft 48, so as to either cause the rotation of blades 45 and 46 or stop the rotation thereof. A pair of cams 51 and 52 similar to cams 14 and 15 are provided upon shaft 47, and act in a similar manner to cams 14 and 15, and will therefore need no further description. Connected with cams 51 and 52 are a plurality of links similar to the links 23, 24, 25 and 26, having a handle 53 similar to handle 34. In operation guiding rudder 44 is rotated always in the same direction, but by the movement of cams 51 and 52 the blades 45 and 46 may be caused to engage the air flatwise on either side of shaft 47 as desired, and consequently force the machine in any desired direction. For instance, if the guiding rudder 44 was being rotated as indicated by the arrow in Fig. 2 and the blades set to operate

in the direction shown in Fig. 2, the machine would turn to the left as the blades would act against the air on the inside of the machine, and consequently force the rear of the machine to the right. If it is desired to move the machine to the right cams 51 and 52 will be moved for causing blades 45 and 46 to be turned so that the same will engage the air flatwise as they are making their stroke on the outside or rear of the machine. This would force the rear of the machine to the left, and consequently point or turn the machine to the right. In arranging the steering apparatus the same may be either placed in the rear of the ship or the forward part of the ship, and if the propellers are only turned partially and held in that position the rotary movement of the shaft causes a lifting of the forward portion of the ship, and thus assists in holding the ship elevated at an angle for permitting the planes 20 to act better against the air. This action also may be utilized for elevating and depressing the rear part of the ship if desired, though preferably no lifting strain is brought upon the propellers except when positioned in front.

In operation when it is desired to lift the machine from the earth and force the same through the air cams 14 and 15 on each side of the machine are set so as to cause the blades of the propellers 9 and 10 to engage the air flatwise upon their downward stroke, and then the prime mover or engine 2 is started, which has power conveyed therefrom to shafts 3 and 4 for rotating all of the propellers 9 and 10 at the same time. This will give a direct lift to the machine, and also a slight forward movement. During the lifting of the machine it will be seen that the planes 20 move almost bodily against the air, but as the movement of the machine directly upward is comparatively slow, the planes 20 will be of no material disadvantage. The planes also will not affect the action of the blades of the propellers and lifting members 9 and 10, as upon the upward stroke the same engage the air edgewise and therefore will not be acting against confined air beneath the planes. After the machine has been raised a short distance the lifting action may be continued if desired for a greater distance, or what is preferable, the respective cams 14 and 15 on both sides of the machine can be moved slightly apart for giving a considerable forward movement as well as an upward movement. Upon giving the ship a forward movement the planes 20 will act by pressing against the air as is usual with planes, and will eventually entirely support the ship during its passage through the air, or par-

tially support the same as desired and according to the speed of the ship. If when sufficient speed has been attained it is desired cams 14 and 15 on both sides of the ship may be moved entirely apart, and rings 18 and 19 brought together for engaging pins 8 for holding the blades of the propellers 9 and 10 rigidly in position for acting as propellers only for forcing forward the machine.

What I claim is:

1. In an air ship, a framework, means for lifting and propelling the framework, a plurality of fixed planes, and a plurality of pivotally mounted curtains in front of each of said planes for controlling the air attempting to engage the planes.
2. In an air ship, a framework, means for lifting and propelling the framework, a plane mounted at the upper part of the framework, an independent side wing arranged at each side of said plane for forming a partial housing whereby a substantially parachute effect is provided when the ship is being lowered, and a plurality of pivotally mounted curtains arranged in front of said planes, and independent means for controlling each of said curtains.
3. In an air ship, a framework, propelling means arranged on said framework, a plurality of planes arranged at the top of said framework and extending transversely thereof, said planes being positioned at an angle to the general direction of the ship but in line with each other, a pair of horizontally pivotally mounted curtains positioned in the front of each of said frames, rigidly positioned side curtains extending downward from the ends of said planes for inclosing the air engaging said planes, and means for controlling the position of said curtains for varying the air pressure against said planes.
4. In an air ship, a framework, means for lifting and propelling the framework, a plane mounted at the upper part of the framework, and a plurality of pivotally mounted curtains independently controlled for varying the action of the air pressing on said plane.
5. In an air ship, a framework, means for raising and propelling the ship, a plurality of planes arranged at an angle to the general direction of the air ship, a pair of curtains arranged in front of each of said planes, and means for regulating the position of a plurality of said curtains at one time.

In testimony whereof I affix my signature in presence of two witnesses.

HERMAN THADEN.

Witnesses:

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WILLIE R. ALLEN.