

986,195.

H. MITCHELL.
FLYING MACHINE.
APPLICATION FILED APR. 7, 1910.

Patented Mar. 7, 1911.
3 SHEETS—SHEET 1.

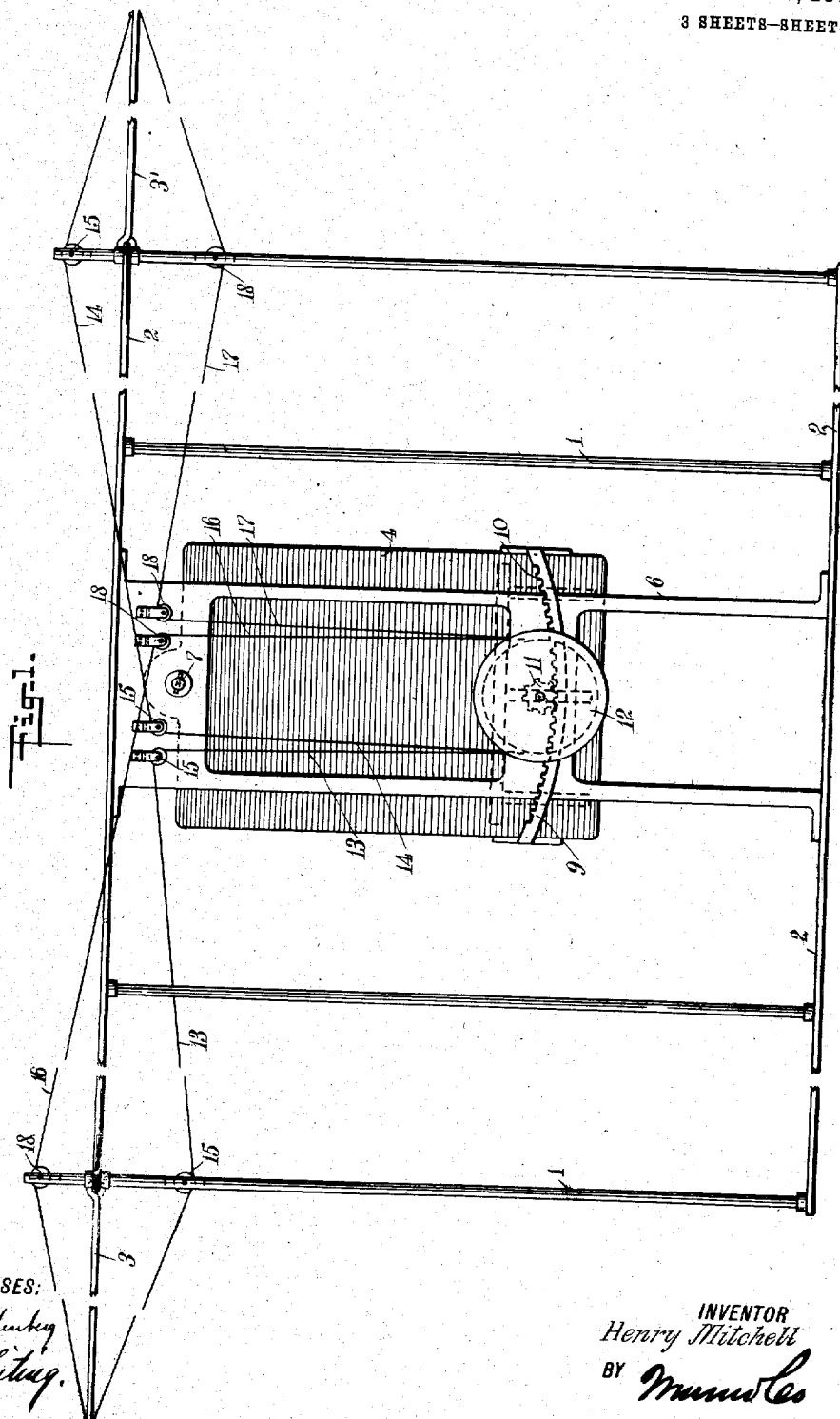


Fig. 1.

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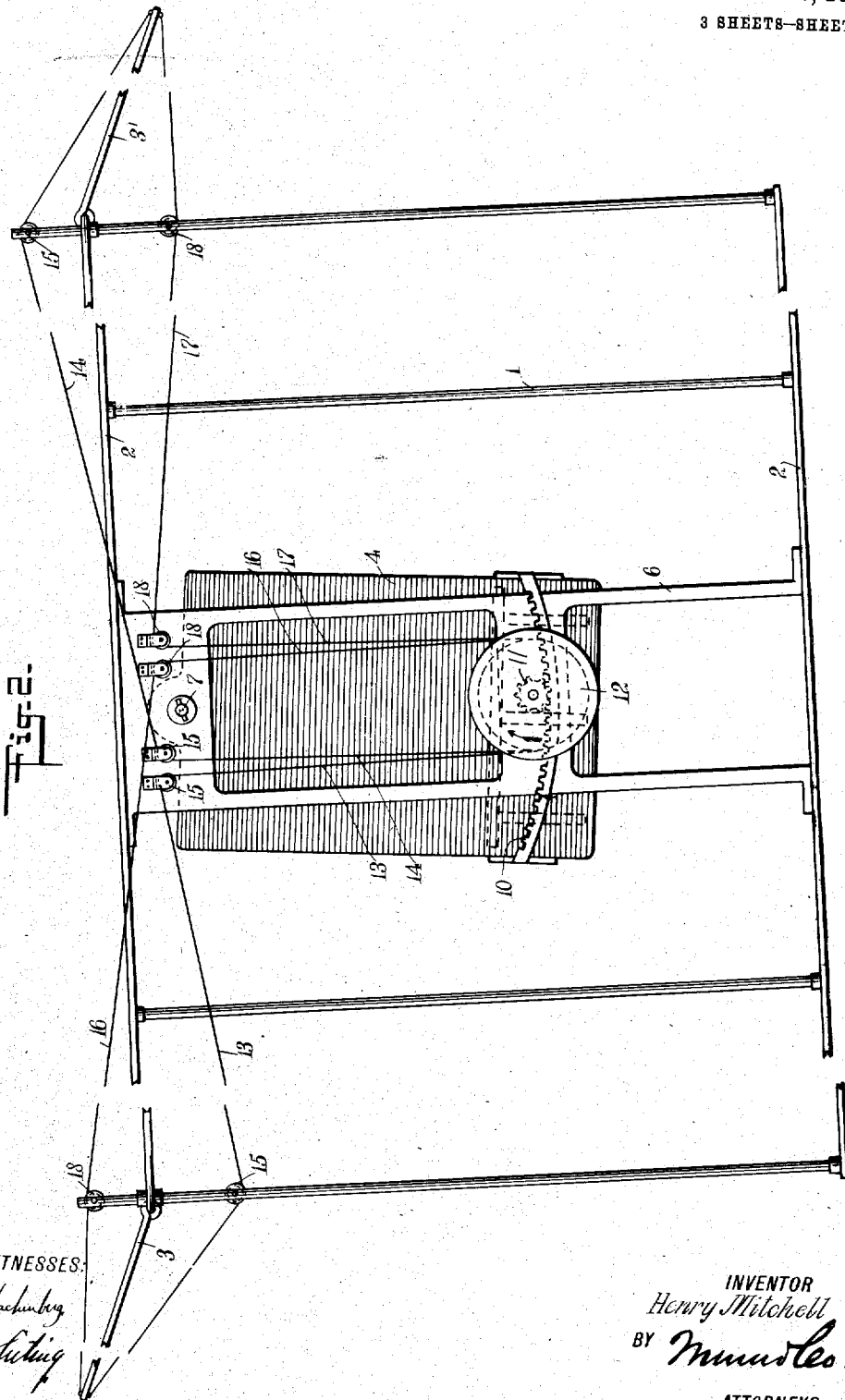


Fig. 2.

WITNESSES:

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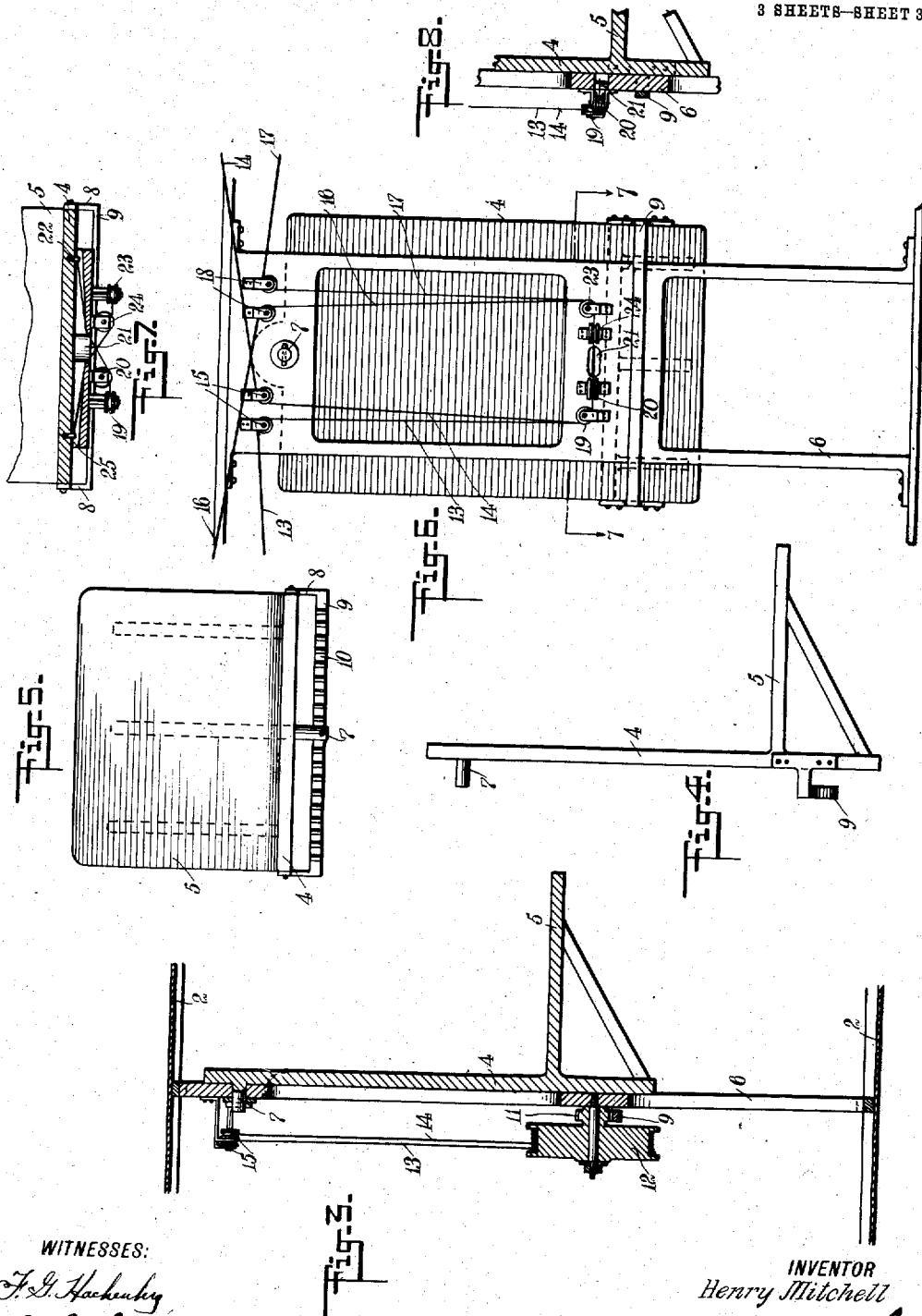
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UNITED STATES PATENT OFFICE.

HENRY MITCHELL, OF ST. PAUL, MINNESOTA.

FLYING-MACHINE.

986,195.

Specification of Letters Patent.

Patented Mar. 7, 1911.

Application filed April 7, 1910. Serial No. 553,917.

To all whom it may concern:

Be it known that I, HENRY MITCHELL, a citizen of the United States, and a resident of St. Paul, in the county of Ramsey and State of Minnesota, have invented a new and Improved Flying-Machine, of which the following is a full, clear, and exact description.

This invention relates to an improvement in flying machines, and particularly to means for automatically maintaining the equilibrium of the machine, without the necessity of any physical or mental effort on the part of the operator.

An object of this invention is to provide a device which will be simple in construction, inexpensive to manufacture, light in weight, and positive and quick in its operation.

A further object of this invention is to provide an automatic equilibrium control, for manipulating planes or portions of planes operated by a pendulum member.

These and further objects, together with the construction and combination of parts, will be more fully described hereinafter and particularly set forth in the claims.

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

Figure 1 is a front view in elevation, showing the flying machine in a normal, horizontal position; Fig. 2 is a view similar to Fig. 1, showing the flying machine tilted to one side, with the equilibrium planes warped or swung to regain the normal, horizontal position; Fig. 3 is a vertical section through one form of the controlling mechanism; Fig. 4 is a detail view of the pendulum seat, which may be applied to either form of the device; Fig. 5 is a top plan view of the pendulum seat as applied to the form illustrated in Figs. 1, 2 and 3; Fig. 6 is a detail view in elevation, showing another form of the controlling mechanism; Fig. 7 is a horizontal section on the line 7—7 of Fig. 6; and Fig. 8 is a vertical section disclosing details of the form shown in Figs. 6 and 7.

Referring more particularly to the separate parts of the device, 1 illustrates a suitable frame, on which are provided one or more supporting planes 2 of any suitable light structure adapted to support the flying machine in air. The sides of any or all of these supporting planes 2 may be extended to form equilibrium-controlling planes 3 and 3', or these planes may be formed separately and pivoted in any well known manner to the frame 1. For the purpose of manipulating the planes 3 and 3' in an automatic manner without the necessity of the operator exerting any mental or physical effort to control the same, there is provided a pendulum member 4, which, while it may be actuated solely by its own weight, preferably is provided with a seat 5, so as to support the operator and utilize his weight to obtain the controlling force necessary to manipulate the planes 3 and 3'. The member 4 is pivotally connected in any well known manner to an intermediate frame 6, which may form part of the frame 1, and is preferably rigidly connected to the flying machine, as by means of a pin 7.

Extending from each side of the pendulum member 4, beyond the frame 6, there are provided arms 8, which are connected in front of the frame 6 by means of a bar 9, the latter engaging the front of the frame 6 closely, so as to prevent any unnecessary vibratory movement of the pendulum member 4, due to the pitching and tossing of the flying machine in the direction of its flight, and to very slight side tilting.

For the purpose of correcting the larger tiltings of the flying machine to one side or the other by manipulating the planes 3 and 3', the relative movement of the pendulum member 4 with respect to the flying machine as a whole, or the frame which represents a part of the flying machine, there are provided connections between the pendulum member 4 and the planes 3 and 3'. These connections may be of any suitable form, and two forms are here illustrated. In the form illustrated in Figs. 1 to 5, the bar 9 is arcuate in shape, and formed with rack teeth 10 on its upper surface, which are en-

gaged by a pinion 11 rotatably supported by the frame 6 in any well known manner. The pinion 11 is operatively connected in any well known manner, as by being secured thereto, to a suitable pulley or drum 12, which is also rotatably supported on the frame 6 in any well known manner. Extending from one side of the drum 12, there is provided a pair of flexible connections 13 and 14, which extend over suitable guide pulleys, indicated at 15, to the lower and upper sides of the planes 3 and 3' respectively. From the opposite of the drum 12, there also extends a pair of flexible connections 16 and 17, which also extend over suitable guide pulleys, indicated at 18, to the upper and lower sides of the planes 3 and 3', respectively. It will thus be seen that when the flying machine, as a whole, tilts to one side or the other, the pendulum member or seat 4 will tend to maintain a normal vertical position, so that there will be a movement of the pendulum member and the flying machine which will shift the rack 10 so as to rotate the pinion or gear 11 and the drum 12, thereby tilting up the plane 3 or 3' on the side of the flying machine which is lowered, tending to raise this side to its normal position on a level with the opposite side, and depress the equilibrium plane 3 or 3' on the side which has been abnormally raised, so as to bring it down to a level with the opposite side.

In the form illustrated in Figs. 6 to 8, the parts are the same as those in the form just described, and are indicated by the same characters, with the exception that the means for operating the flexible connections 13, 14, 16 and 17, from the pendulum member 4, is somewhat different. In this case, the bar 9 is not provided with the rack formed with the teeth 10, but engages the frame 6 as a clamp, for the same purpose as in the other form. The flexible connections 13 and 14 in this case extend over suitable guide pulleys 19 and 20, through an opening 21 in the frame 6, where they are connected to the farther side of the pendulum member 4 at 22, as is more clearly illustrated in Fig. 7. The flexible connections 16 and 17 also extend over suitable guide pulleys 23 and 24 through the opening 21, where they are also connected to the opposite side of the pendulum member 4 at 25. It will again be seen in this case that the relative swinging movement of the frame of the flying machine and the pendulum member 4, due to the abnormal tilting of the flying machine to one side or the other, will manipulate the planes 3 and 3' to raise the equilibrium plane on the depressed side, and also the equilibrium plane on the raised side, so as to counteract

the effect of the tilting and bring the flying machine to a normal horizontal position.

The operation of the machine will be readily understood from the above description.

While I have shown two embodiments of my invention, I do not wish to be limited to the specific details thereof, but desire to be protected in various changes, modifications and alterations which I may make within the scope of the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. In a flying machine, the combination with a frame, of a pendulum member pivotally connected to said frame so as to swing relative to said frame, equilibrium planes pivotally connected to each side of said frame, a drum rotatably mounted on said frame, flexible connections leading from the top of one of said equilibrium planes and the bottom of another of said equilibrium planes, on one side of said drum, flexible connections leading from the bottom of said first-mentioned equilibrium plane and the top of said second-mentioned equilibrium plane, on the other side of said drum, a gear operatively connected to said drum, and a rack-bar operatively connected to said pendulum member and engaging said gear.

2. The combination with a frame, of an auxiliary upright frame on said first-mentioned frame, a pendulum member pivotally connected to said auxiliary frame and adapted to swing on one side thereof, an arcuate rack bar secured to said pendulum member in spaced relation therefrom and adapted to swing on the other side of said auxiliary frame so as to guide and control the motion of said pendulum member, a gear operatively engaging said rack, one or more equilibrium planes, on said frame, an operating member for said equilibrium planes operatively connected to said gear, and operative connections between said last-mentioned member and said equilibrium planes.

3. The combination with a frame, of an equilibrium plane pivotally connected to each side of said frame, an auxiliary frame on said first-mentioned frame, a drum rotatably mounted on said auxiliary frame, flexible connections between the top sides of said equilibrium plane and the opposite sides of said drum, flexible connections between the bottom sides of said equilibrium plane and the opposite sides of said drum, a pendulum member pivotally connected to said auxiliary frame and adapted to swing on one side thereof, an arcuate rack secured to said pendulum member at its ends and spaced apart from said pendulum member intermediate its ends, so as to form a slot

through which said auxiliary frame extends, whereby said pendulum member is limited to a swinging motion in one plane, and a gear operatively connected to said drum and engaging said rack; whereby the motion of said pendulum member is transmitted to said equilibrium plane.

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

HENRY MITCHELL.

Witnesses:

ANDREW G. JOHNSON,
ANDREW J. NEWGREN.