F. STEINMANN.

FLYING MACHINE.

APPLICATION FILED JULY 1, 1912.

1,141,431.

Patented June 1, 1915.

4 SHEETS—SHEET 1.

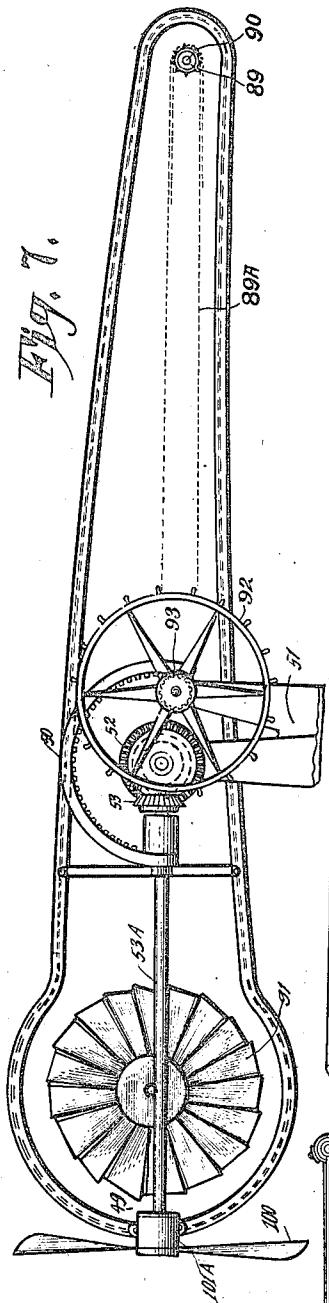

Fig. 1.

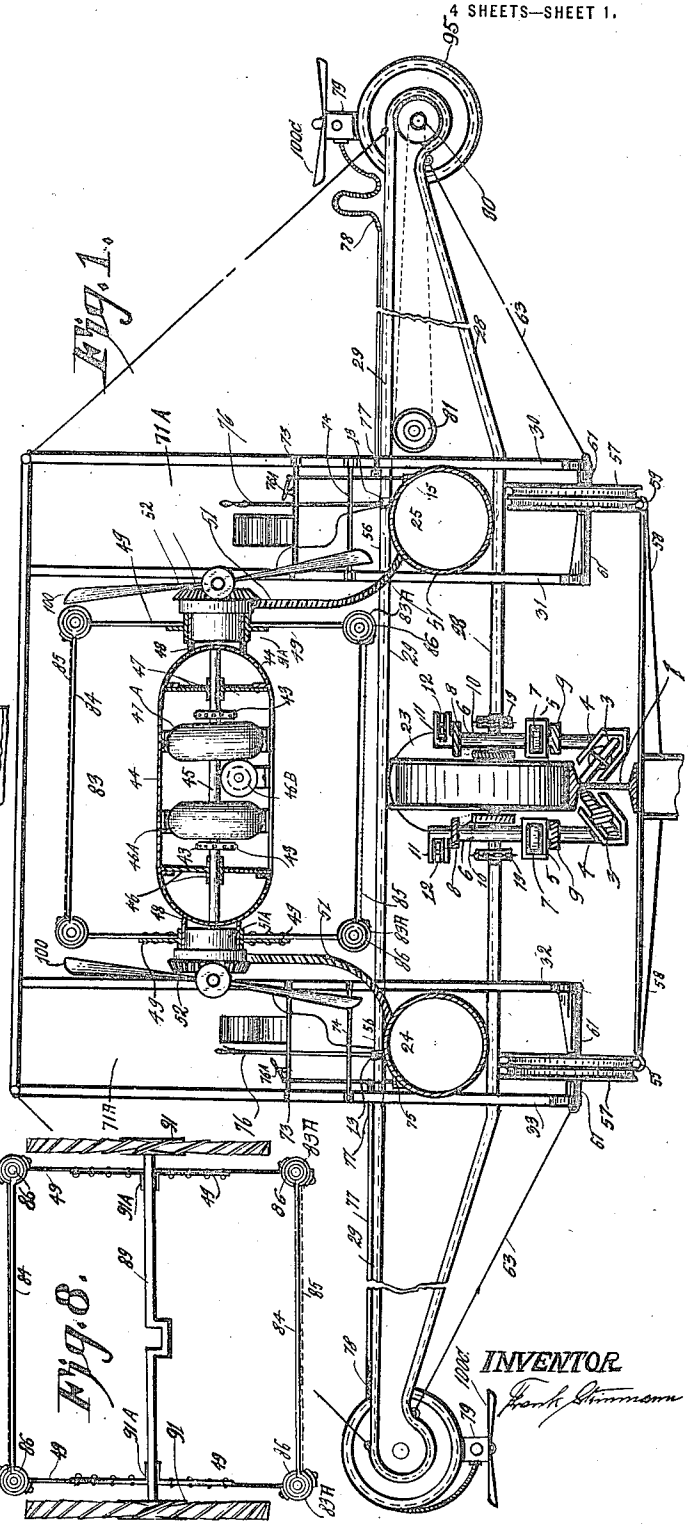

Fig. 1.

Fig. 8.

WITNESSES:

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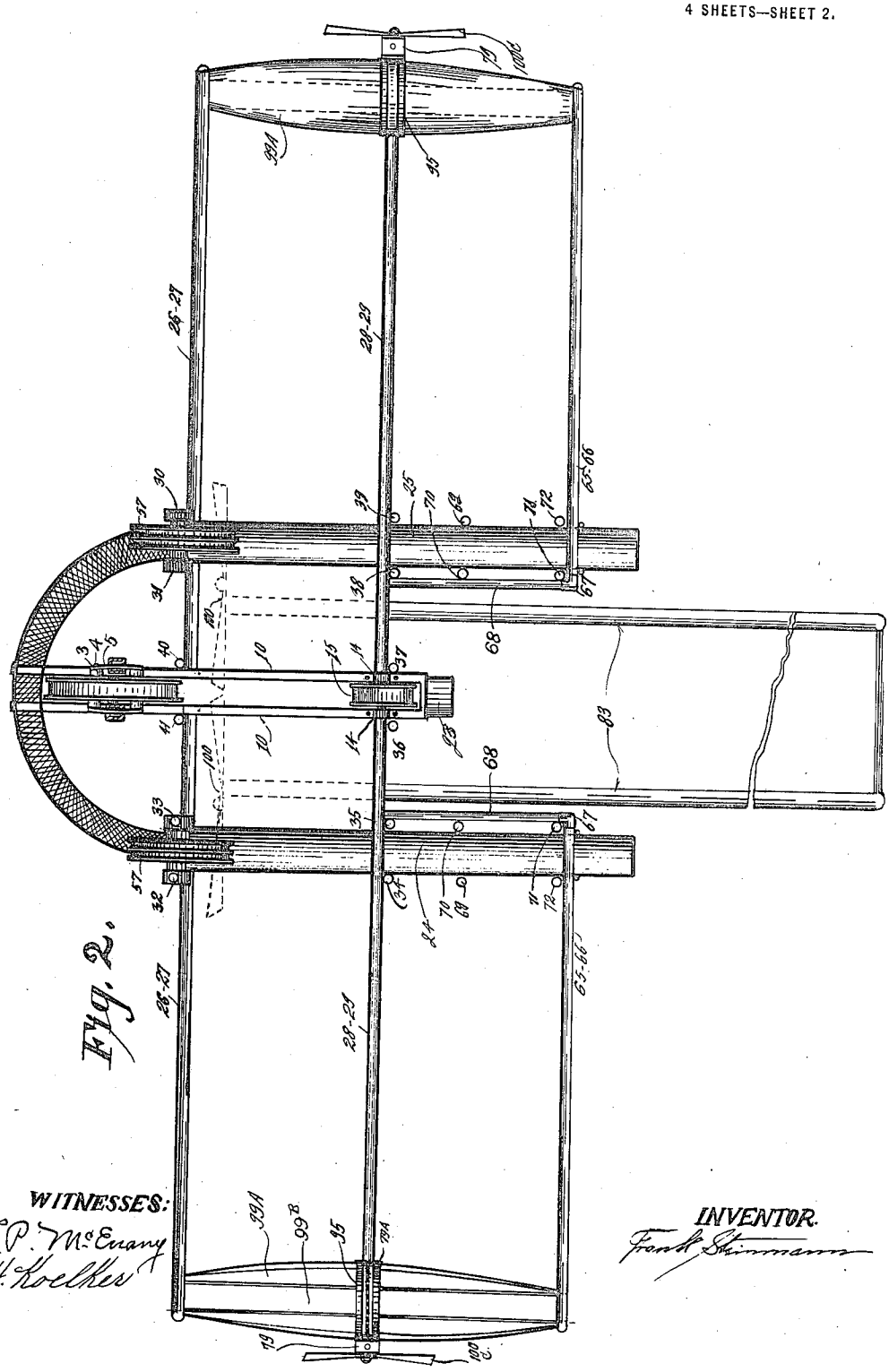

Fig. 2.

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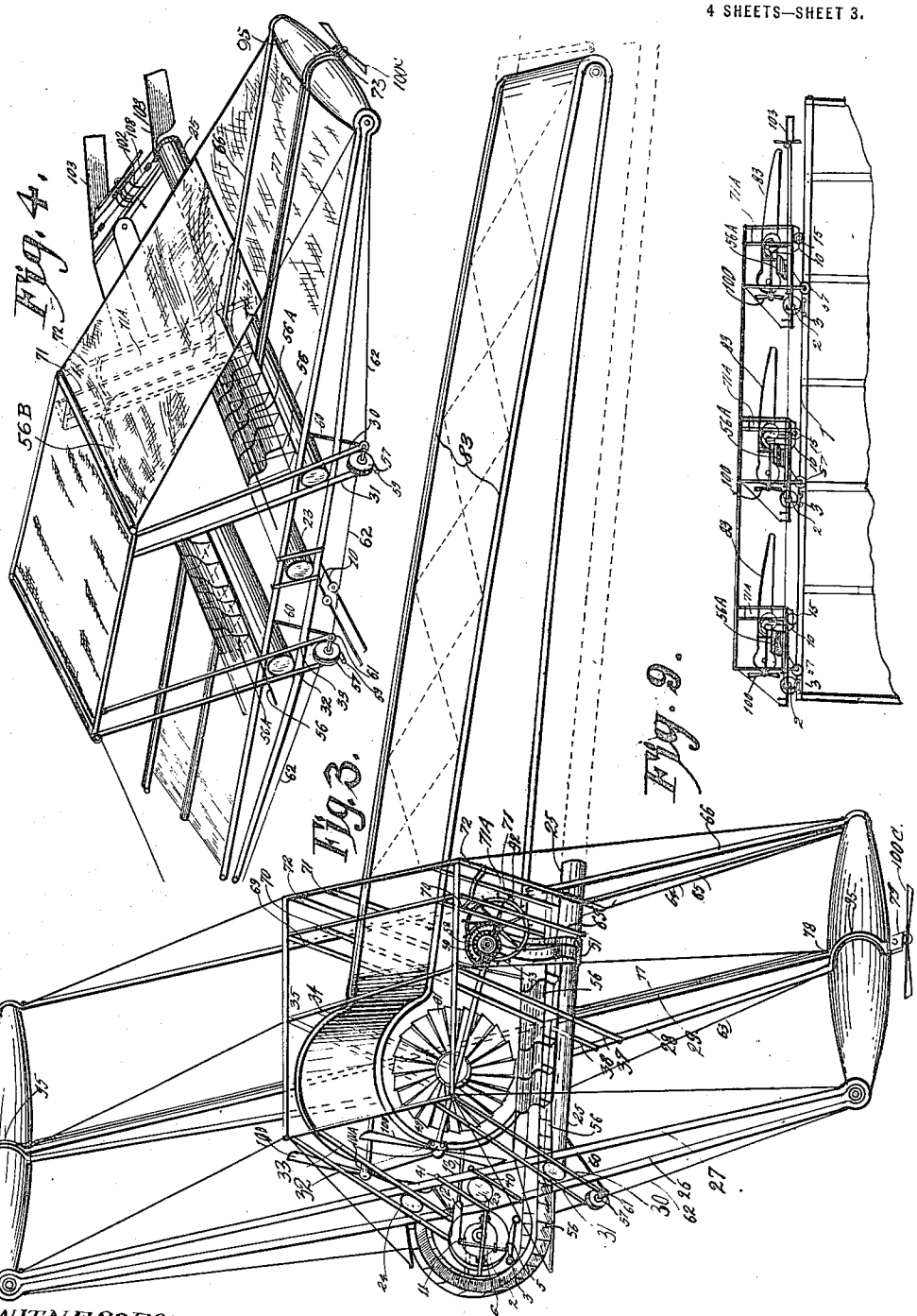

Fig. 4.

Fig. 3.

Fig. 9.

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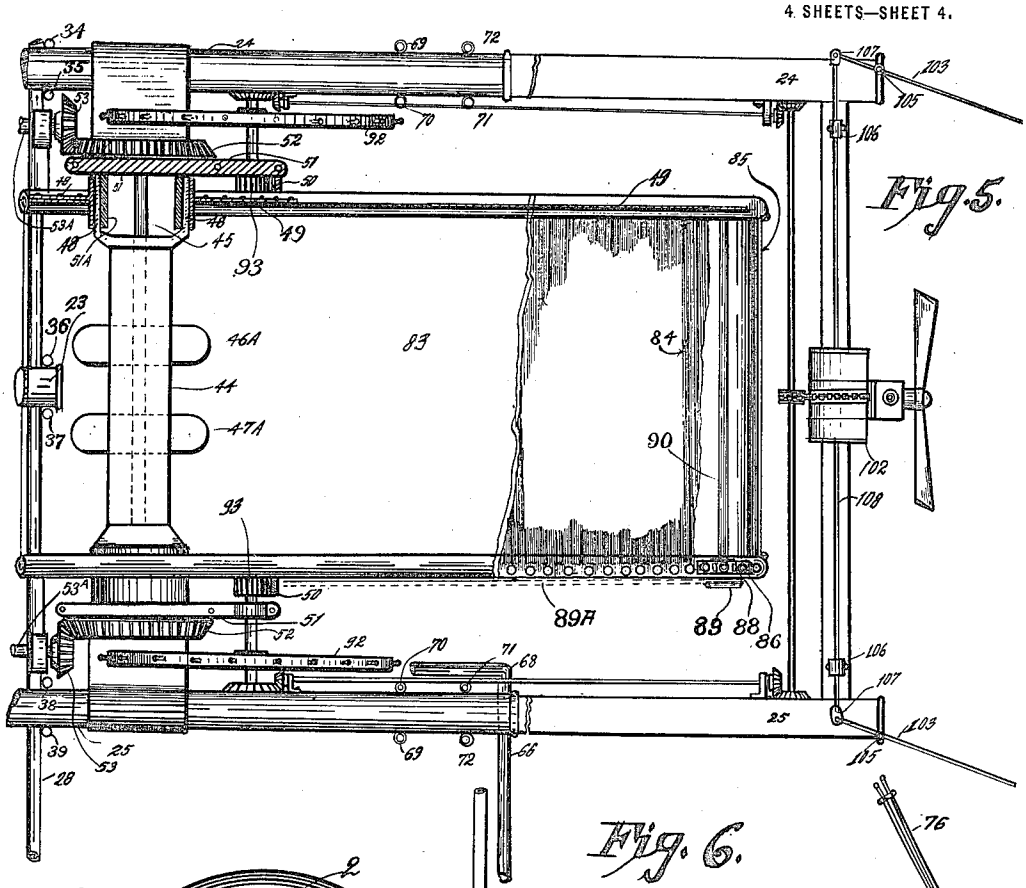

Fig. 5.

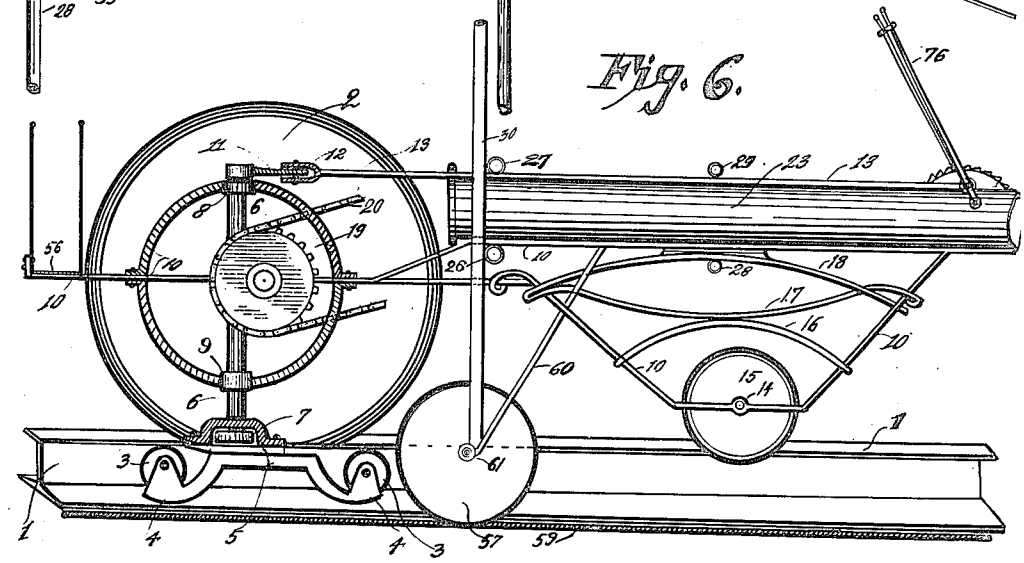

Fig. 6.

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UNITED STATES PATENT OFFICE.

FRANK STEINMANN, OF ST. LOUIS, MISSOURI.

FLYING-MACHINE.

1,141,431. Specification of Letters Patent. Patented June 1, 1915.

Application filed July 1, 1912. Serial No. 707,124.

To all whom it may concern:

Be it known that I, FRANK STEINMANN, a citizen of the United States, residing in the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Flying-Machines; and I do 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.

The object of my invention is to provide an improved form of a flying machine of the aeroplane type which is also especially adapted for use on an elevated monorail track for heavy passenger traffic or for amusement purposes. Its main features reside in the compressed air stabilizing system and the wheeled structure which serves to guide it along the track and also in the arrangement of parts, all as will be specifically pointed out in the following description and as shown in the several views of the drawings.

In the drawings Figure 1 is a front elevation of the flying machine, at rest on its launching rail. Fig. 2 is a ground plan, viewed from beneath the machine. Fig. 3 is a perspective view of the machine, the rear lower portion being shown in dotted lines. Fig. 4 is a perspective view of a portion of the machine showing more particularly the arrangement of the passenger seats and the overhead adjustable roofing. Fig. 5 is a detail view, in plan, with parts broken away, showing the power plant, the stabilizing plane and adjustments, and the rudders and rear stabilizing propeller. Fig. 6 is a longitudinal section showing in detail the wheels and safety brake. Fig. 7 is a side elevation of the stabilizing plane carrying the main propellers. Fig. 8 is a transverse section through the circular front end of the stabilizing plane, showing the wind wheels, and the slotted framing. Fig. 9 is a view showing three of the machines coupled together and mounted to run on an elevated monorail track. This form may be used for passenger traffic or for amusement purposes. Only the rear machine in this case carries rudders, the rear extensions of the lateral air tanks, being removed from the other two machines.

My flying machine consists in general of the following main parts: A number of elongated air tanks serve to support a frame structure on which are located the pilot's seat and the various controlling elements for the machine as well as seats for the passengers. Beneath this frame is located a wheeled truck provided with a safety brake, while extending laterally are a pair of main sustaining planes each carrying a tiltable stabilizing propeller actuated by compressed air from the air tanks. Above the frame is an adjustable elevation or stabilizing plane carrying the main propellers, a pair of wind wheels and the power plant, which consists of gasolene motors and an air compressor of any suitable type.

In the drawings 1 represents an elevated rail which is used to support the machine before launching and after landing. This rail is engaged by a suitable drive wheel 2 journaled in a frame at the base of the machine. A safety braking appliance is provided for holding the wheel in engagement with the rail. This consists of rollers 3 mounted in frames 4 which are connected by a yoke 5. One pair of rollers with connecting framing is used on each side of the rail. Cam rods 6 are inserted in central hubs on the yokes 5 and said cam rods are provided with cams 7 which engage with the yokes and serve to move the yokes and consequently the rollers into contact with the rail when the cam rods 7 are turned. Said cam rods are journaled in bearings 8 and 9 located on the supporting frame 10 of the drive wheel. A crank 11 rigidly attached to the upper end of each cam rod serves to turn the same when desired. A rod 13 engages each crank 11 by means of its forked end 12, and the other end of each rod 13 is connected to an adjusting lever 75 located in one of the pilot's cabins. It will be understood that two levers 76 are used and that each controls one side of the brake. By properly manipulating said levers the rollers may be caused to grip the rail, thus affording an emergency stop device. On moving the levers 76 in the opposite direction the rollers are moved away from the rail and the machine is then free to ascend. The frame 10 at its rear end carries a bearing 14 in which is journaled the rear wheel 15 which serves to support the main portion of the weight of the machine. Cushion springs 16—17 are provided to take up vibrations

and shocks. Power is transmitted to the drive wheel 2 by means of sprocket wheels 19 rigidly connected with it, and chains 20 driven from sprocket wheel 43 on the crank shaft 45 of the main power plant.

Metal tanks 23, 24, 25, used for storing compressed air are held between horizontal sections of tubing 26, 27, 28, 29, extending transversely of the machine and braced by vertical tubes 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40 and 41.

A housing 44 forms the support of the main power plant. Extending transversely of said housing and journaled in bearings 46 and 47 is the crank shaft 45 driven by suitable motors 46^A 47^A from which the air compressor 46^B for charging the tanks 23, 24, or 25 may be driven. Sleeves 48 extend laterally from housing 44 and are journaled on trunnions provided on upright standards 51 mounted on tanks 24, 25, as shown at 51^A.

Extending from the housing 44 are the side walls 49 of the elevator or stabilizing plane to be more fully described hereinafter. These walls carry toothed sectors 50 rigidly connected therewith for adjusting the elevator plane, as will be described. The crank shaft 45 carries bevel gears 52 meshing with bevel gears 53 on longitudinal shafts 53^A which carry the driving propellers 100 and are journaled in bearings 101^A mounted on the side walls 49.

Carried on the air tanks 24, 25 and suitably connected thereto is a narrow platform 56 of horseshoe shape, the loop of which extends in front of the machine and which is used to provide space for the passengers and to permit the various parts of the machine to be readily inspected. Seats 56^A for the convenience of the passengers may be located on this platform and shelter, consisting of a roof and sides of celluloid and canvas, attached to the vertical tubing and the longitudinal horizontal braces and adapted to be rolled up like an awning, is provided, as shown at 56^B.

To keep the machine in an upright position on its rail when it is not in motion balancing or landing wheels 57 are provided one on each side of the machine. These balancing wheels are grooved and adapted to rest on cables 59 supported on each side of the rail on brackets 58 extending transversely of the rail. Lateral cables are provided at each landing place. Wheels 57 are journaled in bearing 61 provided on the vertical tubes 30, 31, 32 and 33. Braces 60 are provided to furnish additional rigidity to the structure. Stays 62 connect the vertical tube 31 with the tube 33 and the tubes 30 and 32 with the outer extremities of the main supporting planes 99^A. Similar stays 63 and 64 are used for strengthening other portions of the machine. Additional transversely extending horizontal tubes 65 and 66 are carried by the air tanks 23, 24 and 25. Joined to tube 66 by elbows 67 are longitudinally extending tubes 68. Vertical tubes 69, 70, 71 and 72 form the main supports of the pilot's cabins 71^A, one of which is located on each side of the machine and the floor of which is supported from said tubes by suitable fastening means 73. A step 74 permits easy access from the floor of each cabin to the platform 56.

Air valves 75, located one on each air tank 24 and 25, are each provided with a foot pedal 76^A and placed within easy reach of the operators. The valves 75 serve to control the supply of air passing through the pipes 77, provided with flexible rubber end sections 78, to the pivotally mounted compressed air motors 79, which operate the attached stabilizing propellers 100^C. Each air motor 79 is mounted on a circular bearing 95 which has an extending flange 79^A. By this arrangement the propeller is held firmly in place while at the same time it may be adjusted around the circular bearing to provide a lifting effect in the desired direction and to thereby overcome the disturbing influence of dangerous air currents. This adjustment is effected by means of a chain or flexible cable (not shown in the drawing) running in a circular slot around a drum 99^A mounted on a float 99^B at the extreme end of the main plane and connected to the bearing 95 encircling said float and brought within easy reach of the operator. It will be understood that another propeller and its appurtenant parts are located at the extremity of the main plane and connected to the float on the opposite side of the machine. The advantages of this construction are evident. Whereas other craft, when the motor stops, become helpless and collapse and fall, in my invention it is merely necessary for the operator to open the valves 75 and thus bring the propellers 100^C into action so that a safe landing may be made.

The stabilizing plane 83 consists of a framework of slotted tubes with an adjustable canvas covering. Fastened to each of the side walls 49 is an endless tube 83^A forming a closed figure whose sides run longitudinally of the machine and whose ends are rounded, the front end being in the form of a circular arc of comparatively great radius. The two lateral frames thus formed define a solid body rectangular in cross-section, of which the parts 49 form the sides while a portion of the remaining surface is formed by an adjustable sheet of canvas 84. The lateral edges of this canvas are bent over, and sewed therein at spaced intervals are a series of balls 86 of any suitable material. The tubes of the frame 83^A are slotted lengthwise on their inner sides so that the canvas 84 may pass therethrough. The interior of the tubes forms a runway for the

balls 86 and thus serves as a guide for the canvas 84 stretched between the two sections of tubing. To properly protect the canvas 84 and to strengthen the structure wire netting 85 may be stretched between the side walls 49 to form a protection for the canvas 84. At the rear end of the stabilizing plane a shaft 90 passes transversely through it and carries two sprocket wheels 88 the teeth of which fit into the spaces between the balls 86. It will be evident that by imparting rotation to the sprocket wheels 88 by suitable means, such as sprocket 89 and chain 89A, the canvas 84 will be shifted. To allow the sprocket wheels 88 to properly engage with the balls a portion of the walls of the tubes is cut away at the rear end. Passing through the forward enlarged circular end of the plane 83 is a transverse shaft 89 journaled in suitable bearings 91A in the side walls 49, which carries two wind wheels 91 and from which air compressor 46B is driven. When the machine is descending, its motion relative to the air will cause the operation of the wind wheels which in turn drive the air compressor 46B, from which the compressed air is delivered to any one of the air tanks, to be stored therein for future use.

For adjusting the position of the stabilizing plane a hand wheel 92 is placed within convenient reach of the operator. A pinion 93 rigidly connected with the hand wheel 92, engages the toothed sector 50 previously described and serves to transmit the motion of the hand wheel to the stabilizing plane.

The adjustable canvas construction described for the stabilizing plane may also be used for the main sustaining planes, the framework of which is for this purpose constructed of slotted steel tubing reinforced by wire netting. For adjusting these surfaces the sprocket wheels 80 and 81 engage with the balls carried by the canvas, the wheel 81 being furnished with suitable means whereby it may be manipulated by the operator.

Located on each of the floats 24 and 25 is a pivot 105 serving to support a rudder 103. A compressed air cylinder 102 serves for the adjustment of the rudders, by means of the piston rod 108 passing through slotted guides 106 and carrying at its ends forks 107 having pivoted engagement with the rudders. A propeller is adjustably mounted on the cylinder 102 and serves to assist in the propulsion and the stabilizing. By suitable transmission devices controlled by the hand wheels 92 this propeller is tilted simultaneously with the stabilizing plane.

The operation of the machine will be apparent from the description of the parts given. By adjusting and tilting the stabilizing plane 83 to a suitable angle, the wind wheels are more exposed to the air currents, thereby furnishing power for producing compressed air, for propulsion or for any other purpose.

I do not limit myself to the exact details described and shown, but consider as the equivalent of my invention all such forms as fall within the scope of the appended claims.

I claim:

1. In a flying machine, in combination with main sustaining planes, a compressed air actuated tiltable stabilizing propeller located at the extreme outer end of each sustaining plane, and operatively connected to a plurality of air tanks extending longitudinally of the machine and forming, in conjunction with the sustaining planes a base for the machine and also a means for keeping it afloat when alighting on water, means for propelling the machine along a launching rail consisting of a frame attached to the lower part of the base and provided with bearings in which are journaled a drive wheel and a rear landing wheel respectively, a roller grip safety attachment on said frame for guiding the machine along the launching rail and adapted to be disengaged therefrom when an ascending flight is to be made, and lateral cables to balance the machine when it is not in motion.

2. In a flying machine, in combination with sustaining planes, a compressed air actuated tiltable stabilizing propeller located on the end of each sustaining plane, means under the control of the operator for driving the same and setting the same at different angles, a plurality of compressed air tanks running longitudinally of the machine and forming, in conjunction with the sustaining planes, a base for the machine and also a means for keeping it afloat when alighting on water, a frame provided with bearings attached to the underside of the base, a driving wheel journaled in said bearings and adapted to engage with the launching rail, a chain and sprocket drive for rotating the driving wheel, lateral balancing wheels, and a roller safety grip for guiding the machine along the rail and capable of being disengaged therefrom when an ascending flight is to be made.

3. In a flying machine, in combination with sustaining planes a compressed air actuated tiltable stabilizing propeller mounted on the end of each sustaining plane, a pivoted stabilizing plane in the form of a casing consisting of a canvas covered truss frame of slotted pipes extending longitudinally of the machine, means for setting the stabilizing plane to any angle at the will of the operator, comprising a hand wheel, air tanks adapted to act as floats, a wheel frame extending longitudinally of the machine, and a drive wheel and a rear wheel mounted thereon and adapted to engage with a rail, driving means for the drive

wheel, and a launching roller grip operated by rods and cams under the control of the operator.

4. In a flying machine, in combination with a sustaining plane, an elevation plane mounted on trunnions supported by suitable standards secured to compressed air tanks constituting a floating body to sustain the machine on water, connecting means extending between said trunnions and forming a housing for a power plant comprising an air compressor and suitable motors, said elevation plane comprising a truss frame of endless slotted pipes extending longitudinally of the machine and parallel to the direction of flight, said truss frame being formed with a large circular front end and tapering to a small circular rear end; means for covering said truss frame, consisting of canvas, balls of suitable material sewed into said canvas at suitable intervals along its sides and adapted to be inserted into the slotted pipes, a shaft passing transversely through the circular front end of the truss frame and suitably supported therein, wind wheels mounted on the ends of said shaft, means for elevating said elevation plane and said wind wheels, main propellers mounted on said elevation plane and driven by suitable gearing actuated from the power plant, and suitable means to drive the air compressor from the wind wheel shaft.

5. In a flying machine an elevation plane and a hand wheel tilting device for the same, said plane consisting of a pair of parallel slotted pipes, each in the form of a longitudinally extending closed curve, a flexible covering extending between said pipes and passing through the slots in the same, spaced balls sewed into the edges of said covering and located in the interior of said pipes, and serving to guide the covering along the runways formed by said pipes, and means for shifting said covering into any position along the pair of slotted pipes.

6. In a flying machine a frame work of parallel slotted pipes, a surface of flexible material extending between said pipes and having its lateral portions extending through the slots into the interior of said pipes, a plurality of spaced balls located in the interior of the pipes, and sewed into the lateral portions of the flexible surface and means engaging with said balls adapted to move the flexible surface along the framework.

7. In a flying machine, a main plane support comprising a truss frame of slotted pipes extending laterally of the machine and embracing longitudinally extending air tanks forming a floating base for the machine, said frame carrying a circular bearing at its outer end supported by a frame in the form of a spindle-shaped float, a stabilizing propeller mounted for adjustment in said circular bearing, a flexible plane extending between the slotted pipes of said frame and having its side portions passing through the slots in the pipes into the interior of the pipes, means in the pipes to retain the side portions of the planes within the pipes, means for adjusting the flexible plane by sliding it along the slotted pipes, and means for adjusting said stabilizing propeller.

8. In a flying machine, a floating base comprising longitudinally extending air tanks, twin rudders located one on each air tank an air cylinder carried between said air tanks, said air cylinder being provided with a piston, connections between the piston and the rudders, a valve located in the operator's cabin whereby the supply of air to the cylinders and consequently the operation of the rudders, may be controlled and a tilting stabilizing propeller mounted on the air cylinder.

FRANK STEINMANN.

In presence of—
CHAS H. KORTE,
WM. PETRY.