

(No Model.)

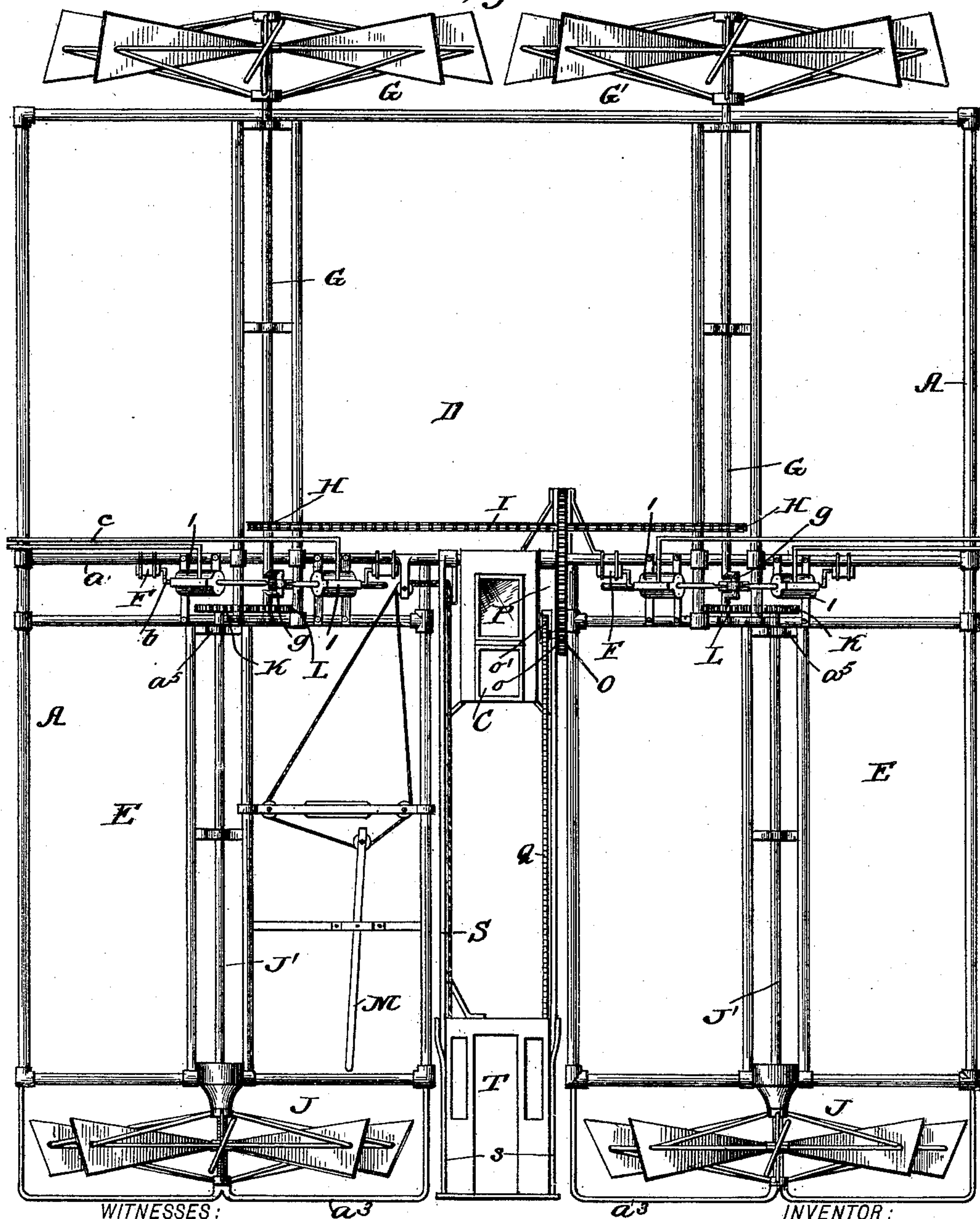
3 Sheets—Sheet 1.

S. CAIRNCROSS.
AERIAL MACHINE.

No. 464,851.

Patented Dec. 8, 1891.

Fig. 1.



WITNESSES:

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INVENTOR:

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Stewart Cairncross.

BY

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3 Sheets—Sheet 2.

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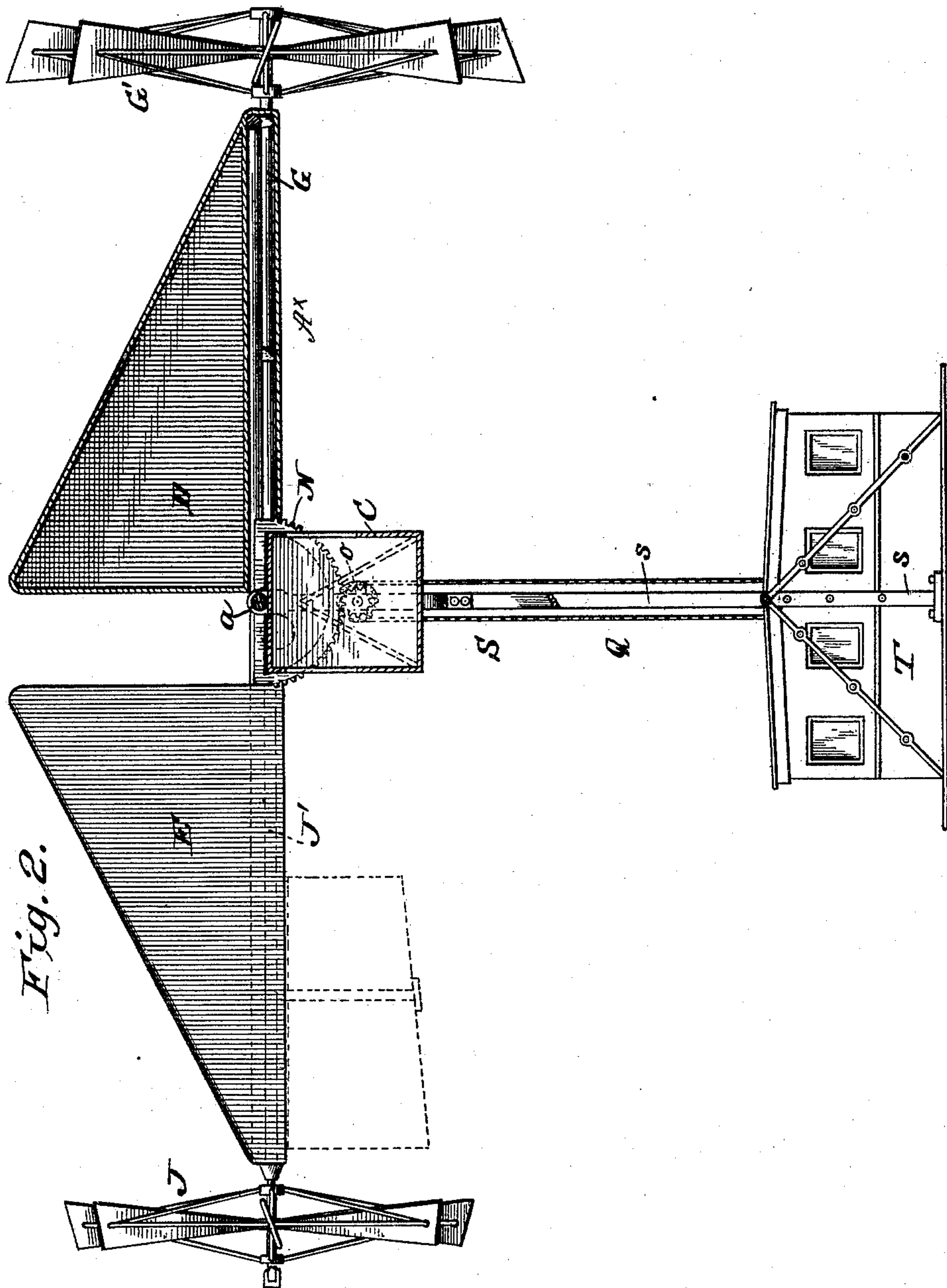


Fig. 2.

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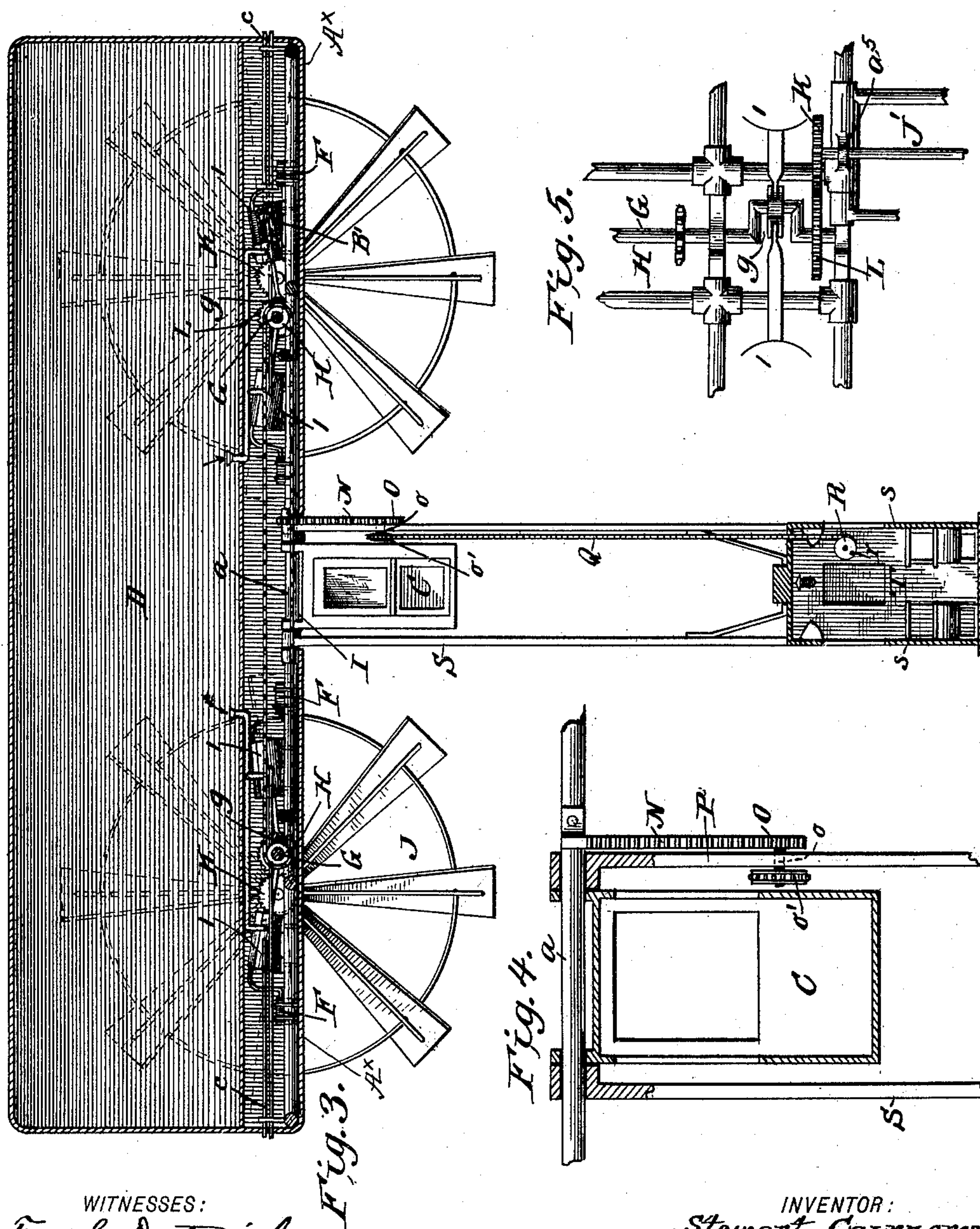
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UNITED STATES PATENT OFFICE.

STEWART CAIRNCROSS, OF GRAFTON, NORTH DAKOTA.

AERIAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 464,851, dated December 8, 1891.

Application filed March 31, 1891. Serial No. 387,190. (No model.)

To all whom it may concern:

Be it known that I, STEWART CAIRNCROSS, residing at Grafton, in the county of Walsh and State of North Dakota, have invented certain new and useful Improvements in Aerial Machines, of which the following is a specification.

My invention relates to that class of air-ships wherein suitable mechanism is connected to the gas bag or balloon proper, which mechanism serves to raise the machine, propel, and steer the same when in the air; and it more particularly refers to improvements on the machine, for which a patent was granted me July 24, 1890, Serial No. 432,860.

My invention has for its object to construct an air-ship of this character which will be light in weight, but of great strength, and which can be quickly manipulated by the operator, so as to ascend or descend and to travel in any direction.

My invention consists in certain details of mechanism arranged and constructed whereby to render the operation of the ship simple and positive, all of which will hereinafter be fully described in the annexed specification, and particularly pointed out in the claim, reference being had to the accompanying drawings, in which—

Figure 1 is a front view of my improved air-ship, the balloon proper and the propellers being disposed in a vertical position and resting upon the ground. Fig. 2 is a sectional side view of the same, the parts being disposed in a traveling position. Fig. 3 is a transverse section of the same on the line 3 3, Fig. 1, looking in the direction of the arrow; and Figs. 4 and 5 are detail views, which will hereinafter be referred to.

In the accompanying drawings, A indicates the main frame, which, as well as the supporting-frame, is preferably constructed of aluminum to give it the required degree of lightness and strength. The entire underface of such frame, except at a point where the depending cage is attached, is covered by a smooth covering A^x, such as glazed canvas, for a purpose hereinafter specified.

In my other patent above referred to the shaft-operating mechanism is suspended from the main frame and is arranged under the covered bottom. This construction I deem

objectionable, as the said mechanism is not sufficiently protected from the weather, and also acts as an impediment to the flight of the machine. In this case I have arranged for supporting the driving mechanism on top of the main frame above the glazed covering and under the gas-holders, which arrangement provides for ample protection to said mechanism, and will render the operation more positive for the purposes stated.

In the other case referred to I employ hand and foot power to operate the machine. In this case I employ gas-engines *l l l l*, supported on the main-frame bars and arranged at an angle to each other, as shown, said engines being connected with and operated by gas from the gasometers or bags D E E held on the main frame, the gasometer D occupying all the front part of the frame, while the gasometers or reservoirs E E are disconnected from each other and from the reservoir D and are arranged over the divided rear portion of the frame, as shown.

S indicates the depending frame or cage, which is suspended from and journaled on the main transverse bar *a* in a manner most clearly understood by reference to Fig. 4 of the drawings, and in the upper part of which is located and supported the engineer's car C, while to the lower ends of the bars *s s* is attached the passenger-car T, as shown.

F indicates cylinders held on the frame *a*, adapted to hold liquid ammonia, which chambers communicate by the pipes *b b* with annular spaces B' about the cylinders *l*, the ammonia passing around the said cylinders B (serving to absorb the heat of the working cylinders) and then off into the exhaust-pipes *c c*.

By referring to Figs. 4 and 5 of the drawings it will be seen that the main propeller-shafts G are each formed with a crank *g*, each connected with a pair of cylinders *l*, the piston-rods being arranged to operate in a manner clearly understood by referring to the drawings. The shafts G are each provided with a sprocket-wheel H, which are connected with each other by means of an endless sprocket-chain belt I, so that there will be at all times perpetually a working stroke of one of the cylinders. As before stated, the rear part of the main frame is divided into two sections. Such sections I provide each with a

propeller J, operating in the frame portions a^3 , the shafts J' of which extend forward and project beyond bearings a^4 , formed on the cross-bars a^5 , the ends of such shafts being
 5 provided with cog-gears K K, arranged to mesh with cog-gears L on the inner ends of the shafts G and from which they receive motion.

While I have not so shown it in the drawings, it is obvious that either of the gears L or K may be formed with sliding clutch mechanism arranged to be operated from the engineer's car, whereby the rear propellers may be readily thrown into or out of operative
 15 connection with the main propeller-shaft G. It will also be observed that the propellers J J are of a less diameter than the forward propellers G', such propellers J serving to add increased power and speed to the machine
 20 when in operation. They also serve to materially aid in steering the machine, as either or both of them may be thrown out of operation, as before stated.

M indicates the steering-vane, which is arranged and operated in a manner similar to that shown and described in my patent before referred to.

N indicates a semicircular rack or toothed wheel arranged to project from and supported
 30 by the central transverse bar A, which meshes with a gear O, journaled on the swinging frame or support-arm P, the shaft o of which carries a sprocket-wheel o', which is connected by means of an endless chain Q with a sprocket-pulley R, located in the passenger-car, (see Fig 3,) said pulley being provided with a suitable operating-handle r, as shown. By this construction it will be observed the
 40 car, can at all times have full control of the moving direction of the machine and can quickly and positively turn the body of the ship to the desired angle to ascend or descend, he also having full control over the steering-vane, it being understood that in practice suitable signal mechanism can be easily arranged
 45 between the pilot-car and the engineer's car, whereby the pilot can signal to the engineer to stop or set in motion the rear propellers.

50 From the foregoing description, taken in connection with the drawings, it will be ob-

served that by means of the construction shown I have provided an air-ship which will possess the required degree of buoyancy, so as to render its ascent or descent positive and
 55 under the complete control of the operators, and by supplying a number of gas-reservoirs on the frame they may be readily stocked with a supply sufficient not only to help carry the weight of the machine, but to supply the en-
 60 gines, and also the proper lighting and heating devices for the passenger-cars, if desired.

Any suitably-constructed propeller-wheels may be employed which may be varied according to the power which may be required on
 65 differently constructed and weighted frames made according to my invention. I prefer, however, in practice to employ eight-bladed propellers, as shown.

In the practical construction of the machine the gas bags or reservoirs will be formed in the form of bellows, their expanding and contracting part being arranged to be adjacent the engines.

Having thus described my invention, what I
 75 claim, and desire to secure by Letters Patent, is—

An air-ship comprising the skeleton frame A, having a smooth and closed bottom, the gas-bags E and D, held over said frame, where-
 80 by a space intermediate the closed bottom of the frame A and the bottom of the gas-bags is provided, said frame A having a divided rear portion, the drive mechanism located in such space consisting of the forward pro-
 85 pellers, the crank-shafts G G, the rear propeller-shafts J', the rear propellers J, the engines l l for operating the shafts G G, gear connections between the crank-shafts G and the shafts H, the swinging frame S, hung from
 90 the main frame, provided with an engineer's cabin in its upper portion and a carriage T at its lower portion, and means for elevating the balloon-body relatively to the frame S and the steering devices, all arranged sub-
 95 stantially in the manner and for the purpose described.

STEWART CAIRNCROSS.

Witnesses:

O. E. SAUTER,
 F. H. WELCH.