Nov. 18, 1924. 1,516,001

W. A. CLARK

HELICOPTER

Filed June 6, 1923

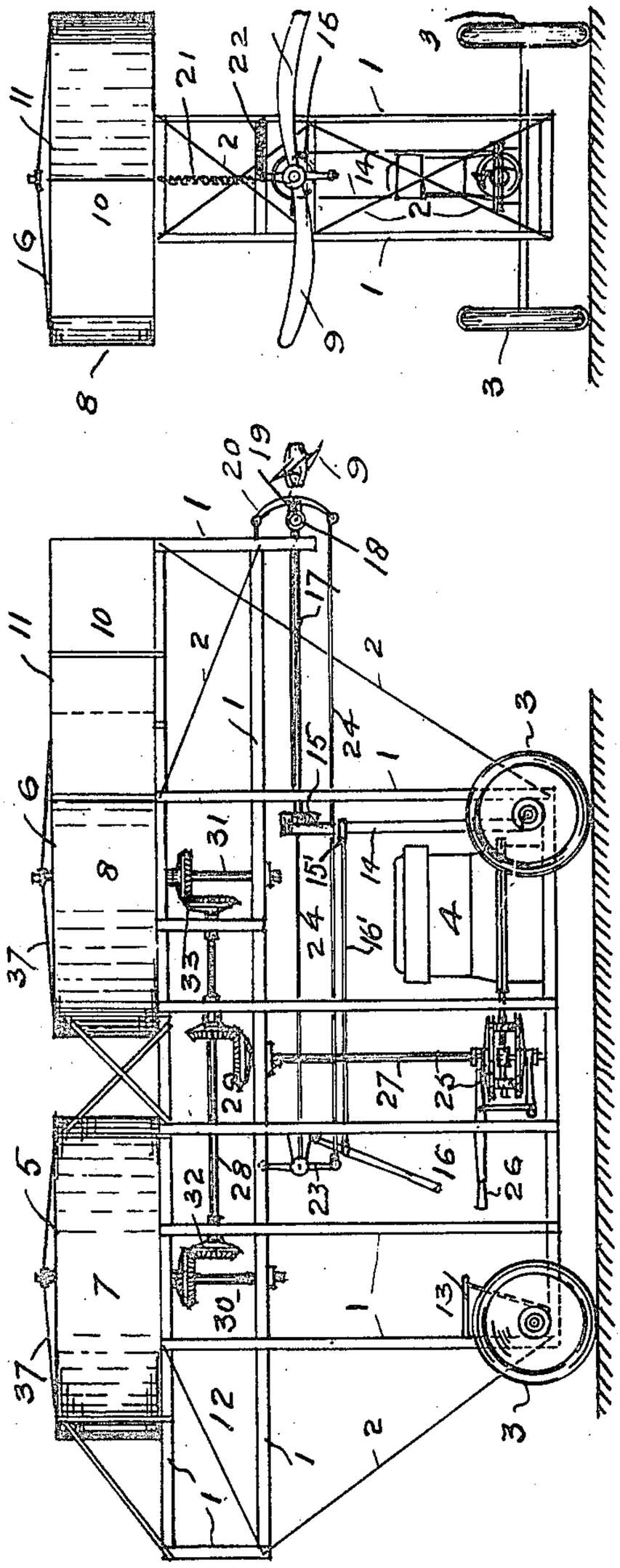

Fig 2.

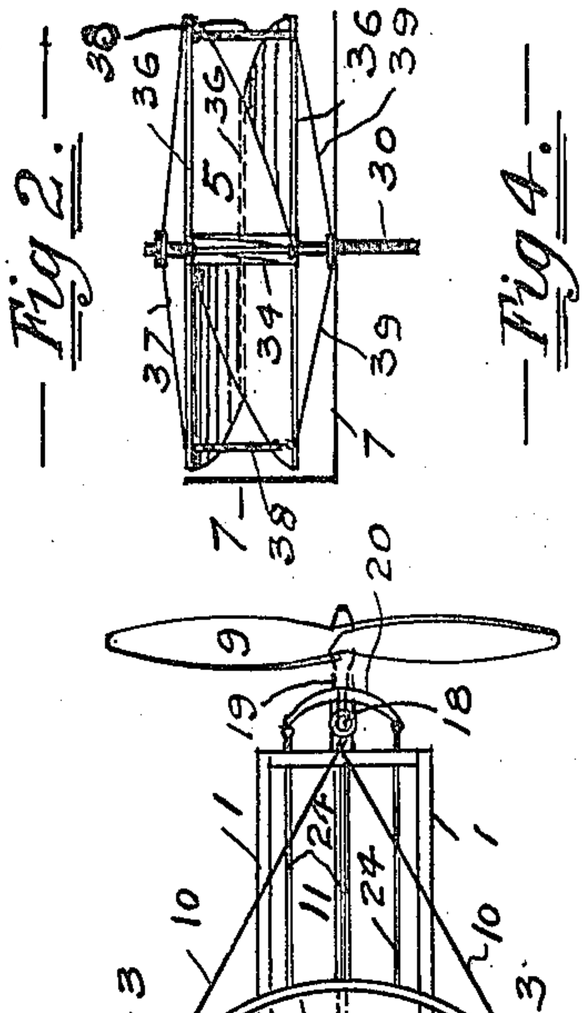

Fig 4.

Fig 1.

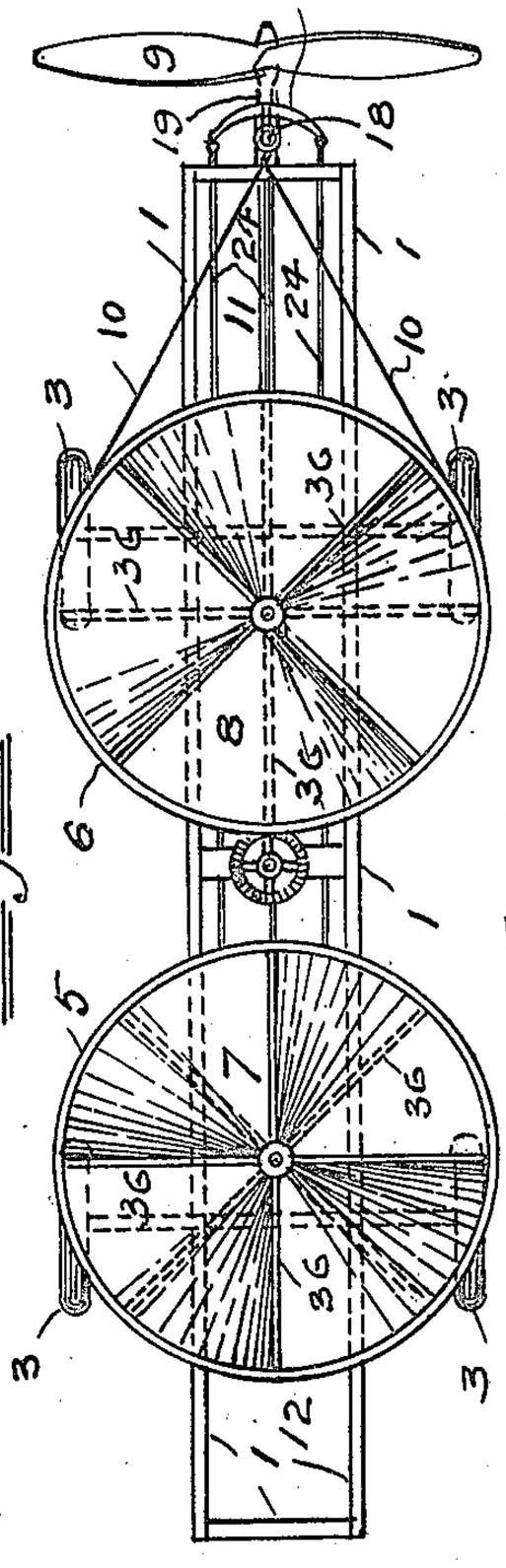

Fig 3.

Witnesses:

A. E. Elliott Jr.

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Inventor.

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UNITED STATES PATENT OFFICE.

WILLIAM ADAMS CLARK, OF SASKATOON, SASKATCHEWAN, CANADA.

HELICOPTER.

Application filed June 6, 1923. Serial No. 643,800.

To all whom it may concern:

Be it known that I, WILLIAM ADAMS CLARK, residing at 1132 12th Street east, in the city of Saskatoon, Province of Saskatchewan, and Dominion of Canada, a British subject, have invented new and useful Improvements in Helicopters, of which the following is a specification.

My invention relates to improvements in lifting and steering apparatus of helicopters and consists in a new form of lifting propeller and the method of steering the machine in a horizontal plane.

I attain these objects by the mechanism illustrated in the accompanying drawings in which Fig. 1 is a side view, Fig. 2 a front end view and Fig. 3 a plan of my helicopter and Fig. 4 is a vertical section through one of the lifting propellers and its casing like numerals refer to like parts in all the figures.

The reference numeral 1 indicates the main frame of the machine which is substantially braced by wire braces 2. The frame is mounted on four ground wheels 3 and is provided with a suitable engine 4. All necessary controls are provided for operating the two lifting propellers 5 and 6 which are disposed in their respective casings 7 and 8 and these casings are rigidly secured to the main frame 1. The traction propeller 9 together with the lifting propellers are operated by the engine through means of the belting and gearings as hereafter described. A "V" shaped shield 10 is attached to the front casing 8 and extending forwardly for the purpose of reducing the resistance of the air when travelling in a horizontal plane, The space 11 behind it and the space 12 at the rear of the machine may be utilized for the storage of parachutes. The operator's seat 13 is located in a manner whereby all control levers may be operated therefrom.

The engine delivers power at both ends of the crank shaft, the front end operating the propeller 9 by the belt 14 being trained over the pullies 15 one of which drives the horizontal shaft 17. The other pulley is loosely mounted upon the shaft and the belt is shifted from one pulley to the other by the control lever 16 through the medium of the belt band 15′ and the rod 16′ as shown. This shaft has a universal joint 18 at its front end connecting with the short propeller shaft carried in the bearing 19 which forms part of a four armed spider 20. This spider 20 is supported and held from rotating by means of the springs 21—22 and is controlled by the spider 23 arranged at the rear of the frame adjacent the operator, the two spiders being coupled by the rods 24 thereby movement of the propeller 9 may be accomplished so as to enable the machine to be steered in any desired direction. The vertical lift propellers 5 and 6 are driven from the rear end of the crank shaft of the engine by means of the variable speed friction gear 25 (controlled by lever 26) driving the vertical shaft 27 and horizontal shaft 28 through bevel gears 29 and the lifting propellers 5 and 6 on the vertical shafts 30—31 in opposite directions through the bevel gears 32—33.

Referring to Figs. 3 and 4. The lifting propellers 5 and 6 revolve in casings 7 and 8 as already stated, and they consist of three sets of four arms each spaced apart vertically and attached to one hub 34 keyed to the vertical shaft 30 or 31, the upper and lower sets of arms are disposed the same plane vertically while the middle arms are arranged midway therebetween. On these arms canvass or other suitable material is stretched spirally to form the lifting wings 36 as shown, the vertical spacing of the arms and pitch of the propeller being determined according to its diameter. The arms are stayed to the hub or vertical shaft by the wire braces 37 and 39 respectively attached at its ends to the vertical shaft 30 or 31. Braces 38 are secured to the upper and lower arms near their extremities as shown. The casings 7 and 8 extend downwards below the propeller for the purpose of retaining the air and thereby increasing the lifting power of the propellers but do not extend above their upper edge.

Having now fully described my invention I hereby declare that I do not claim the invention of a helicopter nor do I claim any particular form of traction propeller as I am

aware that many types have been experimented with and tried, but—

I claim:—

A helicopter of the character described comprising a wheeled frame, a pair of circular casings supported upon the top of said frame one in advance of the other, a lifting propeller operating in each casing, a traction propeller mounted on the frame and a substantially V-shaped shield terminating at the front of the frame and extending from the adjacent casing and being adapted to reduce the resistance created by the machine when travelling in a horizontal plane.

Dated at the city of Saskatoon, in the Province of Saskatchewan, this fifteenth day of May A. D. 1923.

WILLIAM ADAMS CLARK.

Witnesses:
A. E. Elliott, J. P.,
W. E. Etheridge.