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Fig. 1.

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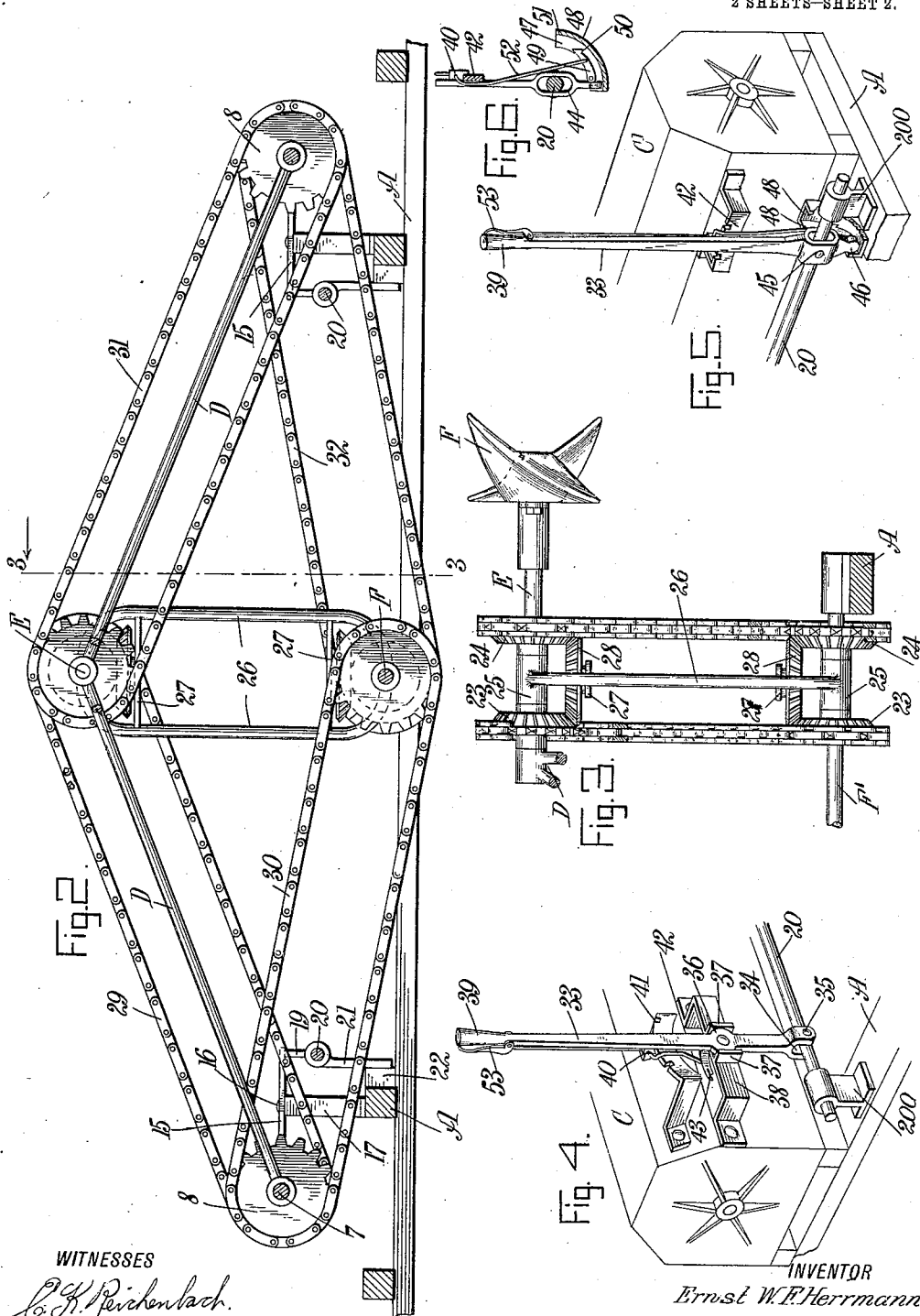
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GEARING.

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2 SHEETS—SHEET 2.



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To all whom it may concern:

Be it known that I, ERNST W. F. HERRMANN, a citizen of the United States, and a resident of San Antonio, in the county of Bexar and State of Texas, have invented a new and Improved Gearing, of which the following is a full, clear, and exact description.

My invention relates to a gearing, and an object of my invention is to couple up at will two independent drive shafts with two independent engines, so as to connect either engine with either shaft, both engines with either shaft, or both engines with both shafts.

The present invention will be described with reference to its application to a flying machine, in which there is a front and a rear propeller, but it is, of course, to be understood that this is merely an embodiment of the invention and that the device may be of general application for use wherever a drive of this character is desired.

The invention consists in certain novel features of construction and combinations of parts, all of which will be fully set forth hereinafter and particularly pointed out 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 figures, and in which—

Figure 1 is a plan view of a preferred embodiment of my invention applied to an aeroplane. Fig. 2 is a transverse sectional view taken on the line 2—2 of Fig. 1, and looking in the direction of the arrow, certain portions of the frame and propeller being omitted; Fig. 3 is an end view taken on the line 3—3 of Fig. 2 and looking in the direction of the arrow; Fig. 4 is a perspective view of the engine casing and clutch lever shown to the left of Fig. 1; Fig. 5 is a similar view of the engine casing and clutch lever shown to the right of Fig. 1, and Fig. 6 is a detailed transverse sectional view taken through the lower part of the clutch lever shown in Fig. 5.

In the several figures, I have shown the wooden frame-work A of an aeroplane centrally disposed upon which is the operator's seat B. On opposite sides of the seat and supported by the framework, are engines C and C', supported from both of which engines, by means of braces D, is a rear

propeller shaft E, the rear end of which shaft carries a propeller F. Disposed centrally between the two engines C and C' and in vertical alinement below the propeller shaft E and below the seat B, is a front propeller shaft F' carrying the forward propeller G. The engines and their connecting driving mechanism are similarly constructed, and it will be understood that the description of one of the engines and its connecting parts, will apply equally to the other.

Extending rearwardly from the engine and driven thereby, is a drive shaft 7, loosely mounted upon which is a pair of spaced-apart sprocket wheels 8 and 9, each of which sprocket wheels has a toothed crown head 10, said crown heads facing each other and forming one member of a clutch. Slidably mounted upon the shaft 7, between the heads 10, and fastened to the same by keys 11, is a sleeve 12 having the end facing the crown 10 corrugated to form the coacting member of the clutch. Each of the sleeves 12 has a groove 13 extending about the periphery thereof, which groove 13 is engaged by the forked end 14 of a lever 15, the two levers being pivoted, intermediate their length by means of pins 16, to the top of a bracket 17 extending upwardly from the framework A. The levers 15, opposite their forked ends, diverge from each other and are connected together by links 18. One of these links is engaged by a pin 19 extending upwardly and rigidly connected with a reach rod 20 extending forwardly to a position adjacent the operator's seat B. Integral with the pin 19 and extending downwardly from the rod 20, is an arm 21, adapted to abut against a stop 22 on the framework A, to limit the forward movement of the pin 19 when the rod 20 is rotated on its own axis by a means hereinafter described.

It will be seen that the rod 20 is capable of two movements; one, a longitudinal movement by which one of the sleeves 12 is brought into coöperation with its coacting crown head 10, or the rod 20 may be rotated about its own longitudinal axis, which drawing the divergent arms of the levers 15 together, will force the sleeves 12 away from each other and into engagement with their corresponding crown heads, so that by a longitudinal movement of the rod 20, either the sprocket wheel 8 or the sprocket wheel

9 may be connected with the engine at will, or by rotating the shaft 20, the engine may be connected with both of these sprocket wheels, simultaneously.

5 A bevel gear sprocket wheel 23 is loosely mounted and a similar gear wheel 24 is rigidly mounted upon each of the shafts E and F', the bevels of which wheels face each other. These wheels are maintained in their
 10 spaced-apart relation by means of sleeves 25 loosely mounted one on each of the shafts E and F', said sleeves being connected together by means of a pair of frame rods 26. Connecting the rod 26 are a pair of sup-
 15 porting plates 27, centrally journaled upon each of which plates is a bevel gear wheel 28 meshing with the bevel gears on both of the wheels 23 and 24. An endless link drive chain 29 connects the sprocket wheel 9 with
 20 the transversely-alined sprocket wheel 24 on the shaft E, and a similar chain 30 connects the sprocket wheel 8 with the sprocket wheel 23 on the shaft F'. Similarly, a connecting chain 31 unites the sprocket wheel 8 on the
 25 shaft of the other engine, with the sprocket wheel 23 on the shaft E, and a chain 32 connects the sprocket wheel 9 on the shaft of said other engine with the sprocket wheel 24 on the shaft F'. It will be seen by this con-
 30 nection that both engines may be connected, at will, with both shafts or either engine may drive each of the shafts E or F'.

The rod 20 is mounted in suitably placed bearing brackets 200, to permit longitudinal
 35 and rotary motion of the same.

Two means are here disclosed for actuating the rod 20. Referring more particularly to the disclosure in Fig. 4, the clutch lever 33 has its lower end formed
 40 into a fork 34 straddling the rod 20 and pivoted thereto by means of a pin 35. Above the fork 34, the lever 33 is enlarged to form a circular bearing 36, which bearing is adapted to be positioned between a
 45 pair of spaced-apart walls 37 projecting from a plate 38, offset from and rigidly attached to the face of the engine C. By this construction, it will be seen that the bearing 36 acts as a fulcrum between the walls
 50 37, so that moving the lever 33 by means of a handle 39, in a direction parallel to the rod 20, the rod 20 is moved to bring either of the clutches on the shaft 7 into engage-
 55 ment with one or the other of the sprockets 8 or 9, and the lever 33 may be locked in position to couple up either one of the sprockets with the engine shaft by means of
 60 a finger 40 carried by the lever 33, and engaging in one of the notches 41 in an arched segment plate 42 offset from the face of the engine C and substantially in the plane of the plate 38. Should it be desired to rotate the rod 20 on its own axis, in order to connect both of the rotating
 65 sleeves 12, the lever 33 is drawn forward

out of its engagement between the walls 37 and may be locked in this position by means of a curved notched plate 43 engaging with the plate 38.

Referring more particularly to the disclosure in Fig. 5, there is formed, adjacent
 70 the lower end of the lever 33, a yoke 44, embracing the rod 20 and pivoted thereto by means of a pin 45. The extreme lower end of the lever 33 is formed into a sub-
 75 stantially circular extension 46, disposed between the spaced-apart walls 47 of an arch-shaped box 48, which box is rigidly mounted upon the frame A carrying the engine C', and is so positioned that the walls 47
 80 are in planes transversely of the rod 20. It will be seen by this construction, that moving the lever 33 to the right or left, will form a clutch connection between the shaft 7 of the engine C' and one of the sprockets
 85 8 or 9 mounted on said shaft, and, as has been described with reference to the plate 42 (see Fig. 4), the clutch may be locked in any one of the three positions shown.

Pivoted to the rear of the extension 46, as shown more particularly in Fig. 6, is a
 90 catch 49, the nose 50 of which is adapted to engage with the rear wall 51 of the box 48. In order to withdraw the catch 49 from its engagement with the box, there is
 95 attached to the catch, a rod 52, the upper end of which is connected with the finger 40 engaging the notches 41, so that by actuating the handle 53, shown in Fig. 4, both
 100 of the levers 33 shown in Figs. 4 and 5, are disengaged from the notches 41, and, at the same time, the rod 43 is disengaged from the plate 38, shown in Fig. 4, or the catch 49 is disengaged from the box 48, as
 105 shown in Figs. 5 and 6.

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

1. In combination, two independent engines, a drive shaft connected with each engine, a pair of independent shafts, a pair
 110 of sprocket wheels suitably mounted upon each of said independent shafts, a pair of sprocket wheels loosely mounted upon each of the engine shafts, a chain connection between one of the wheels on each engine shaft and one of the wheels on each of said independent shafts, a clutch mechanism mounted on each engine shaft between the wheels mounted thereon, and means for actuating said clutch mechanism, to connect
 115 said wheels with said engine shaft.

2. In combination with a right-hand and a left-hand engine, a rotating engine shaft projecting from each of said engines, said
 120 shafts being disposed parallel to each other and spaced apart, an upper and a lower shaft positioned between said engine shafts and parallel thereto, a pair of wheels mounted on each of said engine shafts, 130

means for connecting said wheels with said first-mentioned shafts, a pair of wheels carried by said upper shaft, one connected to said upper shaft, a second pair of wheels carried by said lower shaft, one of said pair connected to said lower shaft, a motion-transmitting connection between one of the wheels on the right-hand engine with one of the wheels on the upper shaft, a motion-transmitting connection between the other of the wheels on said right-hand engine with one of the wheels on the lower shaft, a motion-transmitting connection between one of the wheels on the left-hand engine shaft with the other of said wheels on the upper shaft, and a motion-transmitting connection between the other of the wheels on the left-hand engine shaft with the other wheel on the lower shaft.

3. In combination with a right-hand and a left-hand engine, a rotating engine shaft projecting from each of said engines, said shafts being disposed parallel to each other and spaced apart, an upper and a lower propeller shaft positioned between said engine shafts and parallel thereto, a pair of wheels mounted on each of said engine shafts, means for connecting said wheels with said propeller shafts, a pair of wheels, carried by said lower shaft, one of said pair connected to said upper shaft, a pair of wheels, one connected to said lower shaft, a motion-transmitting connection between one of the wheels on the right-hand engine with one of the wheels on the upper shaft, a motion-transmitting connection between the other of the wheels on said right-hand engine shaft with one of the wheels on the lower shaft, a motion-transmitting connection between one of the wheels on the left-hand engine shaft with the other of said wheels on the upper shaft, a motion-transmitting connection between the other of the wheels on the left-hand engine shaft with the other wheel on the lower shaft, and a pair of clutches, one for each engine, said clutches each adapted to connect its engine shaft with either or both of said propeller shafts.

4. In combination with a right-hand and a left-hand engine, a rotating engine shaft projecting from each of said engines, said shafts being disposed parallel to each other and spaced apart, an upper and a lower propeller shaft positioned between said engine shafts and parallel thereto, a pair of wheels mounted on each of said engine shafts, means for connecting said wheels on the upper propeller shaft with said shafts, a pair of wheels, one connected to said shaft, a pair of wheels on the lower propeller shaft, one connected to said shaft, a motion-transmitting connection between one of the wheels on the right-hand engine with one of the wheels on the upper shaft, a motion-transmitting connection between the other of the

wheels on said right-hand engine with one of the wheels on the lower shaft, a motion-transmitting connection between one of the wheels on the left-hand engine shaft with the other wheel on the upper shaft, a motion-transmitting connection between the other of the wheels on the left-hand engine shaft with the other wheel on the lower shaft, and a gear permanently in mesh with the wheels on each of said propeller shafts.

5. A rotating shaft having a pair of spaced apart wheels loosely mounted thereon, each of said wheels having a crown head on the face thereof, said crown heads facing each other, a pair of sliding sleeves keyed to said shaft, each of said sleeves having a crown head adapted to coact with a crown head on the adjacent wheel, to form a clutch therewith, each of said sleeves having peripheral grooves therein, a pair of levers, each lever having a forked end adapted to ride in one of the grooves in said sleeves, a link connecting the opposite ends of said levers, and means connected to said link for moving said levers in either direction, to form a clutch connection between one of said sleeves and its adjacent wheel.

6. A rotating shaft having a pair of spaced apart wheels loosely mounted thereon, each of said wheels having a crown head on the face thereof, said crown heads facing each other, a pair of sliding sleeves keyed to said shaft, each of said sleeves having a crown head adapted to coact with a crown head on the adjacent wheel, to form a clutch therewith, each of said sleeves having peripheral grooves therein, a pair of levers, each lever having a forked end adapted to ride in one of the grooves in said sleeves, a link connecting the opposite ends of said levers, and means connected to said link for moving said levers in either direction, to form a clutch connection between one of said sleeves and its adjacent wheel.

7. In combination with a rotating shaft, a pair of sliding clutch members mounted upon said shaft, a pair of levers each pivoted intermediate its length and having an end in sliding engagement with one of said clutch members, means connecting the opposite ends of said levers, a rod disposed below said means, said rod being capable of longitudinal and rotary movement, a pin extending from said rod and rigid therewith and engaging said connecting means, whereby a longitudinal movement of said rod will move both of said clutch members in one direction and a rotary movement of said rod will move said clutch members relative to each other.

8. In combination with a rotating shaft, a pair of sliding clutch members mounted upon said shaft, a pair of levers each pivoted intermediate its length and having an end in sliding engagement with one of

said clutch members, means connecting the
opposite ends of said levers, a rod disposed
below said means, said rod being capable of
longitudinal and rotary movement, a pin ex-
5 tending from said rod and rigid therewith
and engaging said connecting means,
whereby a longitudinal movement of said
rod will move both of said clutch members
in one direction and a rotary movement of
10 said rod will move said clutch members

relative to each other, and means carried by
said rod for locking said clutch members in
position.

In testimony whereof I have signed my
name to this specification in the presence of 15
two subscribing witnesses.

ERNST W. F. HERRMANN.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
