N° 27,672 A.D. 1909

(*Under International Convention.*)

Date claimed for Patent under Patents and Designs Act, 1907, being date of first Foreign Application (in France), 15th Dec., 1908

Date of Application (in the United Kingdom), 27th Nov., 1909

At the expiration of twelve months from the date of the first Foreign Application, the provision of Section 91 (3) (a), of the Patents and Designs Act, 1907, as to inspection of Specification, became operative

Accepted, 25th Aug., 1910

COMPLETE SPECIFICATION.

Improvements in Fluid Pressure Engines for Aerial Machines.

We, GEORGES HENRI MARIUS CANTON, Engineer, of 1, rue de Tourville, Le Havre (Lower Seine), France, and PIERRE GEORGES UNNÉ, Engineer, of 1, Place St. Joseph, Le Havre (Lower Seine), France, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to fluid pressure engines for aerial machines, of the kind in which the crank case and the cylinders rotate in one direction while the crank shaft rotates in the opposite direction, each of these parts being connected by any suitable means to a screw and the two screws being of opposite pitch. The object of the invention is to provide suitable means of connection between the crank case and the crank shaft and means for compensating the forces of inertia and the centrifugal forces.

In the accompanying drawings, which illustrate the invention,

Figures 1 and 2 show diagrammatically two examples of a fluid pressure engine according to the invention.

Figure 3 is a longitudinal section and

Figure 4 a transverse section of a fluid pressure engine in accordance with this invention.

Figure 5 shows to enlarged scale the arrangement for control of the magneto.

Figures 6 and 7 show in end elevation and in section an arrangement of the connection of the crank shaft and the connecting rods.

On reference to Figure 1 it will be seen that the engine shown comprises two screws 1 and 2 of opposite pitch, arranged at opposite sides of an internal combustion engine one of said screws (1) being driven by the casing and the cylinders 3 of the said engine rotating in one direction and the other (2) driven by the crank shaft 5 rotating in the opposite direction.

Figure 2 shows a modified arrangement wherein the two screws are arranged on the same side of the engine.

It will be seen that as a result of this arrangement the engine has no other connections with the aviation apparatus than the two supports or bearings 6 and 7. The screws in place of being driven directly as shown in the drawings

[*Price* 8*d.*]

might be driven by means of chains, gearing or any other means whatever. The screws 1 and 2 of opposite pitch will preferably be of equal dimensions.

An engine having an odd number of cylinders arranged in the same plane will preferably be employed. The annexed drawings (Figures 3 and 4) show by way of example, an engine having five cylinders.

The connecting rods 8 of this motor are connected on a single bush 9 rotating on a crank pin of a crank 10.

The connection between the bush and the connecting rods is obtained in the following manner:—

Each connecting rod connected at one end to the pin 11 of its respective piston is pivoted at the other end on a pivot 12 held on the bush 9 by two cheeks 13 on the said bush. The bush 9 is operated so as to rotate on the crank of the crank shaft 10 at a velocity equal to the angular velocity of the latter while the centre of the said bush describes a circle of a diameter equal to the stroke.

On reference to Figures 6 and 7 it will be seen that this movement is obtained in the following manner:—

A gear wheel 14 integral with the bush 9 engages through the medium of a train of pinions 15 with a gear-wheel 17 integral with the casing 3. The two pinions 14 and 17 are equal in size. The intermediate wheels may be of any suitable diameter and are pivoted at 16 on an arm 18 of the crank shaft. It will be seen that the relative path of the pivots 12 for each cylinder with regard to the casing is a circle of diameter equal to the stroke and of which the centre is moved towards the cylinder in question a distance equal to the distance between the centre of the bush 9 and the centres of the pivots 12.

Balancing of the forces of inertia due to the pistons and the centrifugal forces due to the parts in rotation is obtained by two counter weights 19 and 20 opposite the crank 10.

The engine acts on the four stroke cycle. The gases flow from the carburettor through a fixed tube 21 and pass to the valves through the tube 31 movable with the casing.

The inlet valves may be either automatic or mechanically operated; the exhaust valves are operated by arrangements similar to those used in other engines. For example, in order to actuate the valves, cams 22 and 23, arranged concentrically with the crank shaft may be used. These cams are mounted on a drum 24 provided with an internal gear crown 27 meshing with a pinion 32 made integral with a toothed wheel 26 which meshes in turn with a pinion 25 keyed on the motor shaft. The speed and number of these cams depends on the number of cylinders. When five cylinders are used, the number of cams is equal to two and their speed is four times slower than that of the motor. Supposing n be the number of cylinders, the number of cams will be $\frac{n-1}{2}$ and the speed of these cams with relation to the motor will be $\frac{1}{n-1}$.

For operating the magneto two bevel wheels a and b (Figure 5) are provided, the first being mounted on the casing 3 and the other on the crank shaft 5. Each of these pinions engages with another pinion c and d respectively.

The pinions c and d are connected by their axes with two other equal bevel pinions e and f forming with two pinions h and k a differential gear, the casing j of this differential moving the shaft of a magneto i by means of a pin u in the casing j entering an opening in the plate v on the shaft v^1 of the magneto i.

The current supplied by the magneto is led to a commutator fixed on a pinion 29 driven by the gearing 25, 26, 28 in order that it may rotate with the same velocity as the crank shaft and in the same direction. A contact finger P conveys the current to the corresponding cylinder by striking against the insulated contacts m. Ignition occurs in the cylinders in the order I, III, V, II, IV; I, III, V, *etc.* . . .

Cooling of the motor is ensured by the air circulated by the cylinders the radiating surfaces of which are increased by ribs.

The crank shaft is carried in the casing in two ball bearings 30, 30 and the whole of the engine is supported by the apparatus through the medium of two ball bearings 6 and 7 in which the casing revolves.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In a fluid pressure engine for aerial navigation in which the crank case and the cylinders rotate in one direction while the crank shaft rotates in the opposite direction, the arrangement wherein the crank case is connected to the crank by a train of gears one (14) of which is integral with a bush (9) to which the connecting rods are attached, and the other (17) is integral with the crank case while the intermediate gearing (15) is mounted on an axle formed on an arm on the crank shaft.

2. A fluid pressure engine according to Claim 1, wherein compensation of the forces of inertia due to the pistons and the centrifugal forces due to the parts in rotation is effected by two counter-weights opposite the crank.

Dated this 27th day of November, 1909.

CRUIKSHANK & FAIRWEATHER, LIMITED,
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Agents for the Applicants.

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FIG_1_

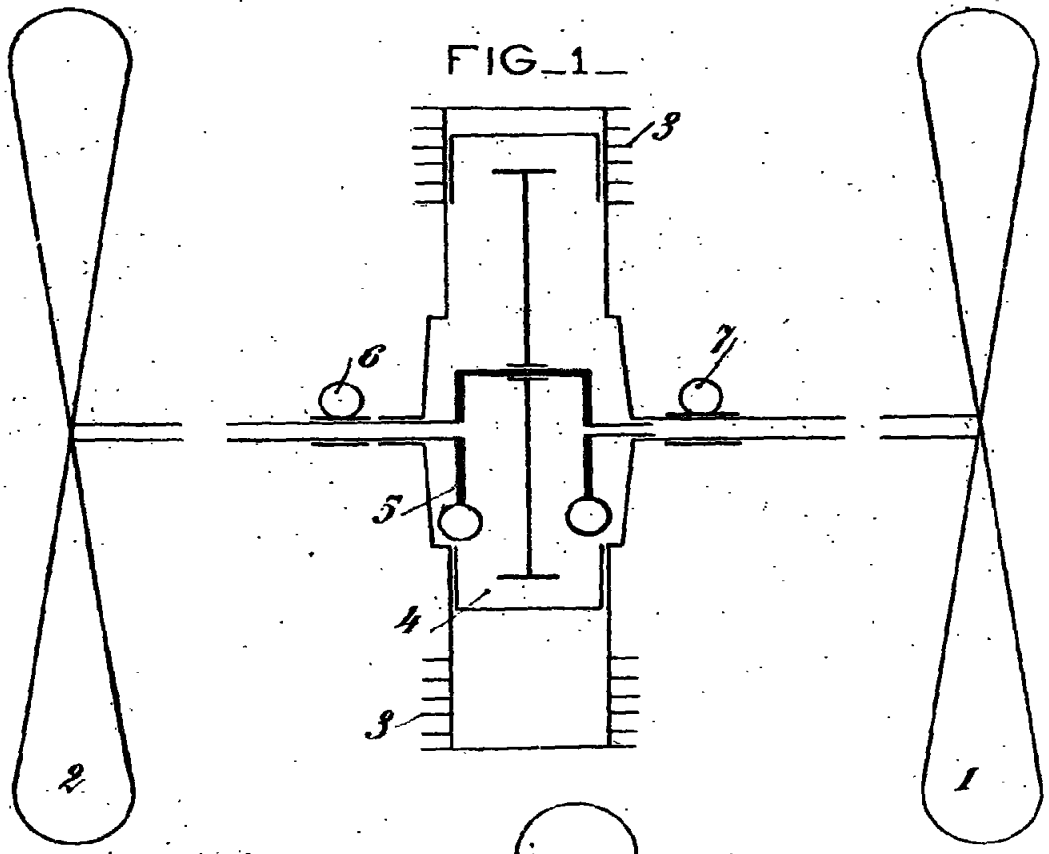

FIG_2_

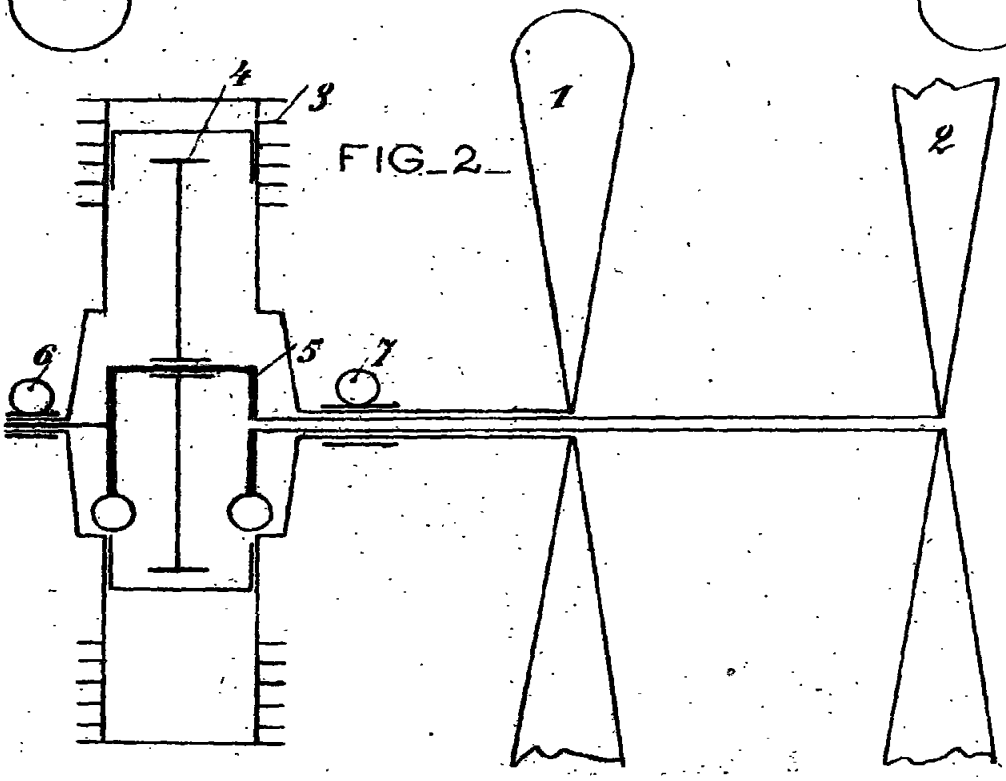

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FIG_3_

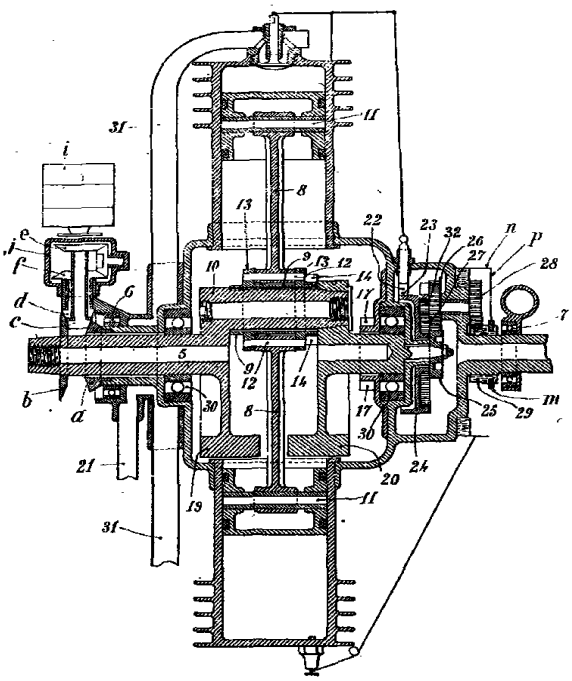
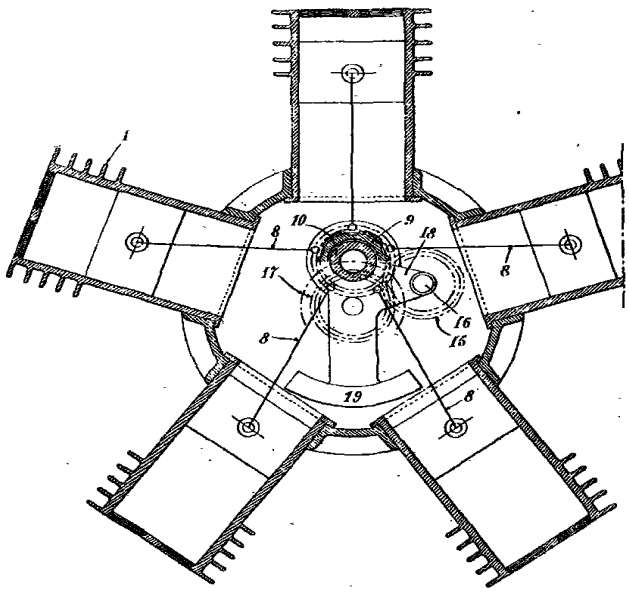


FIG_4_



[This Drawing is a reproduction of the Original on a reduced scale.]

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[*This Drawing is a reproduction of the Original on a reduced scale.*]

FIG. 3.

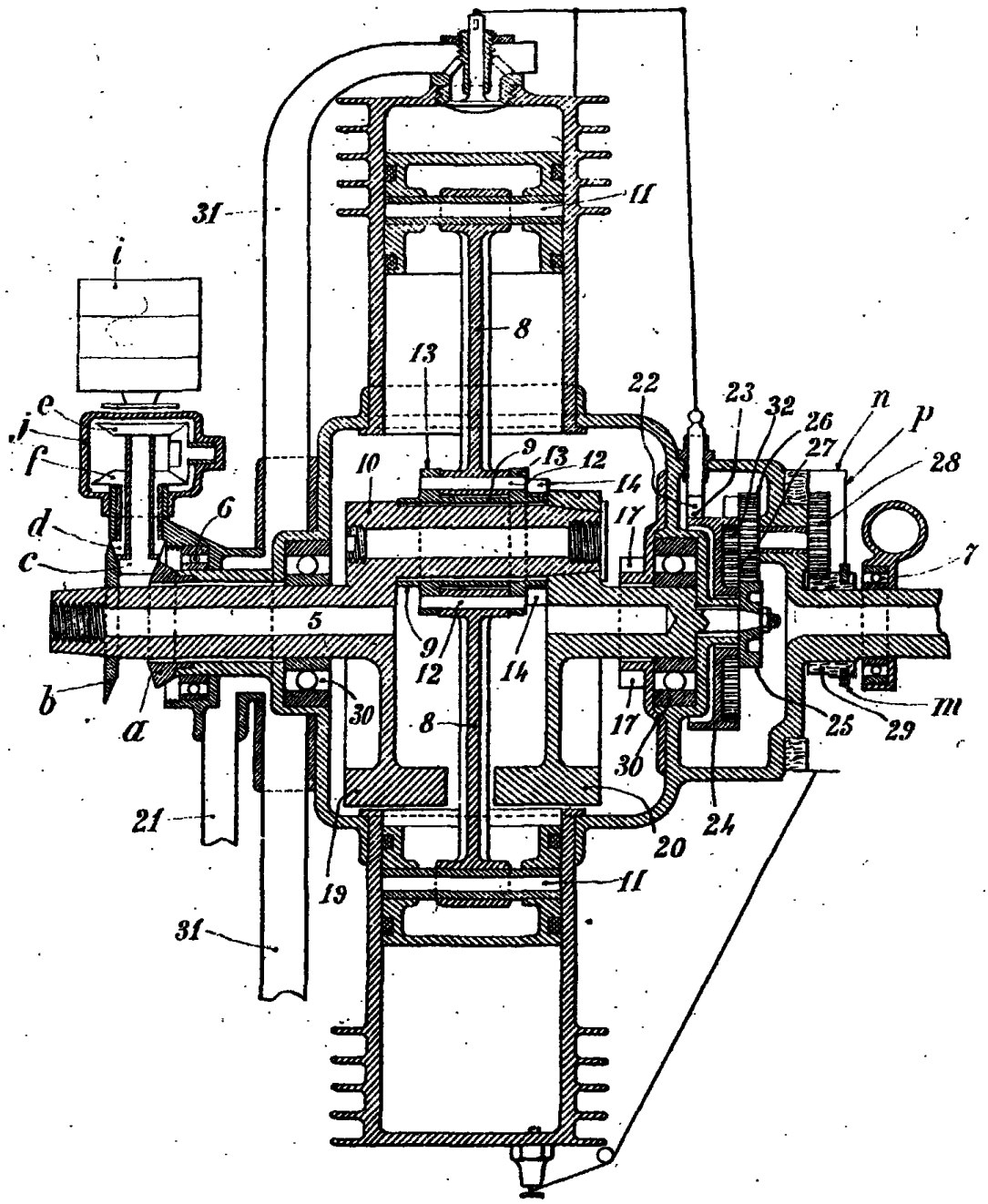

FIG 4

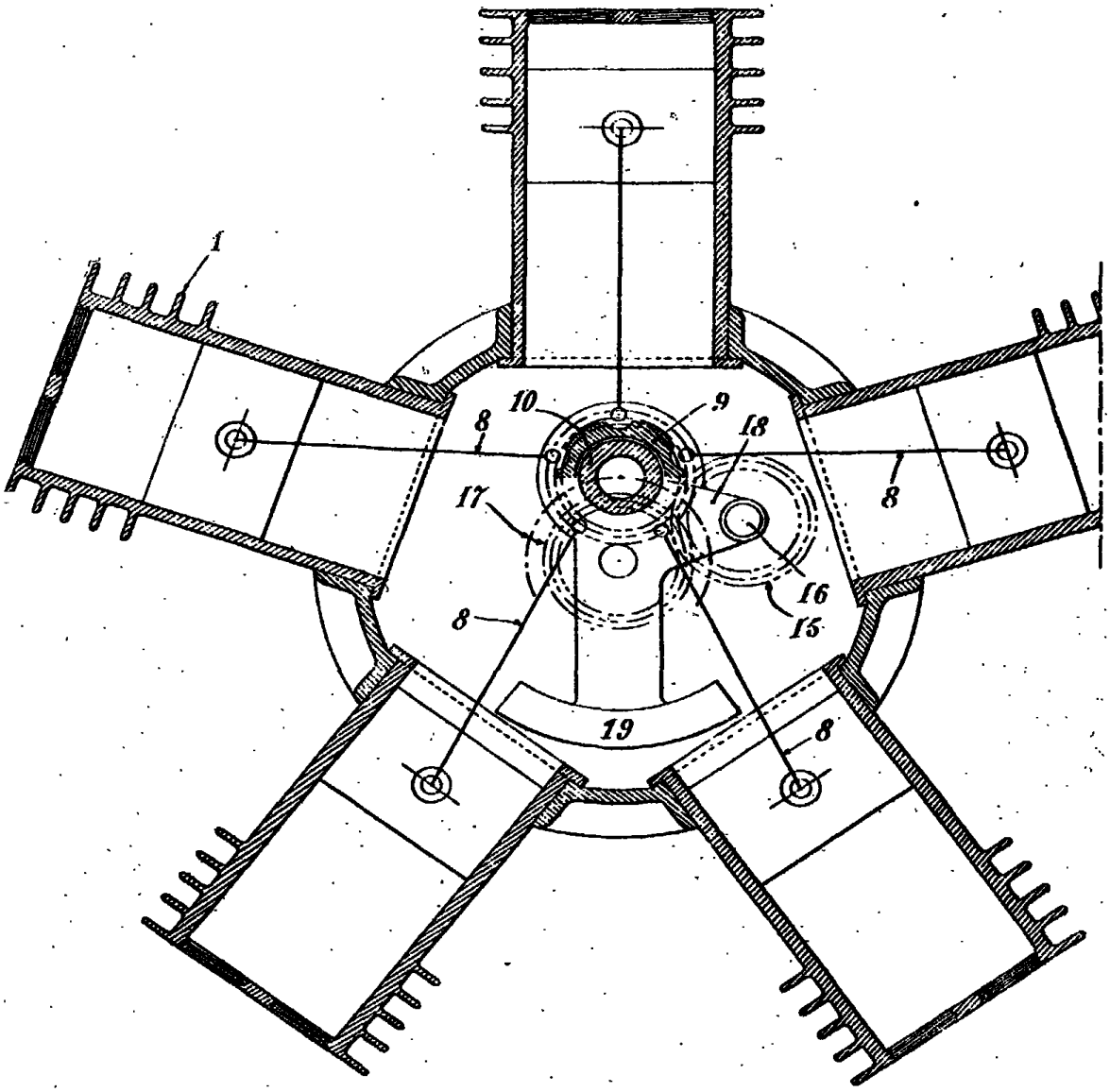

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FIG_5_

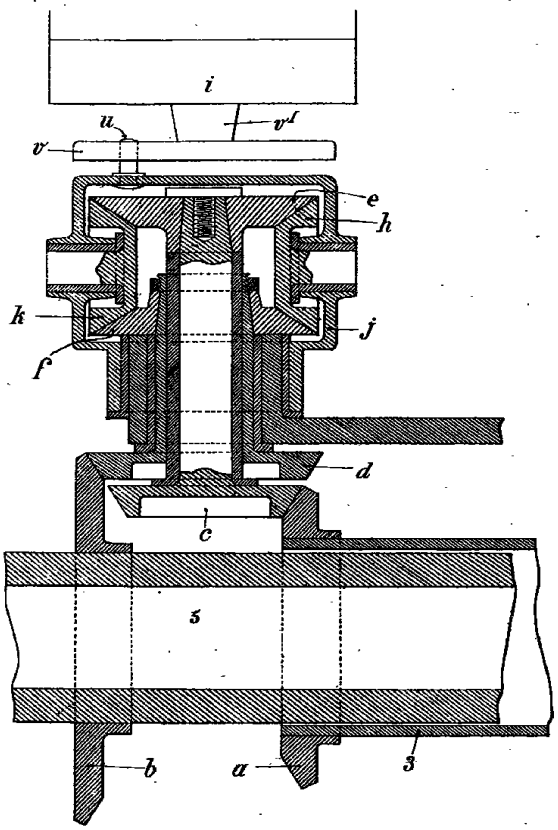


FIG_6_

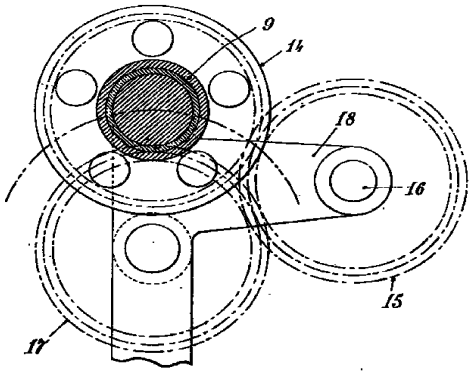


FIG_7_

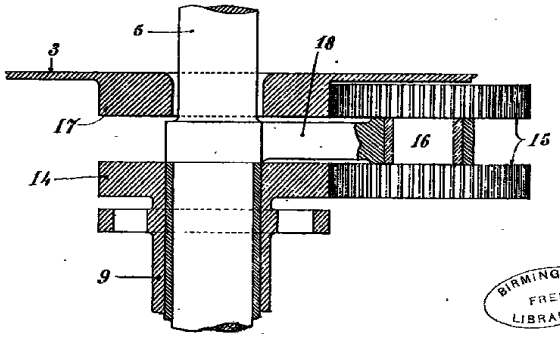


FIG_5_

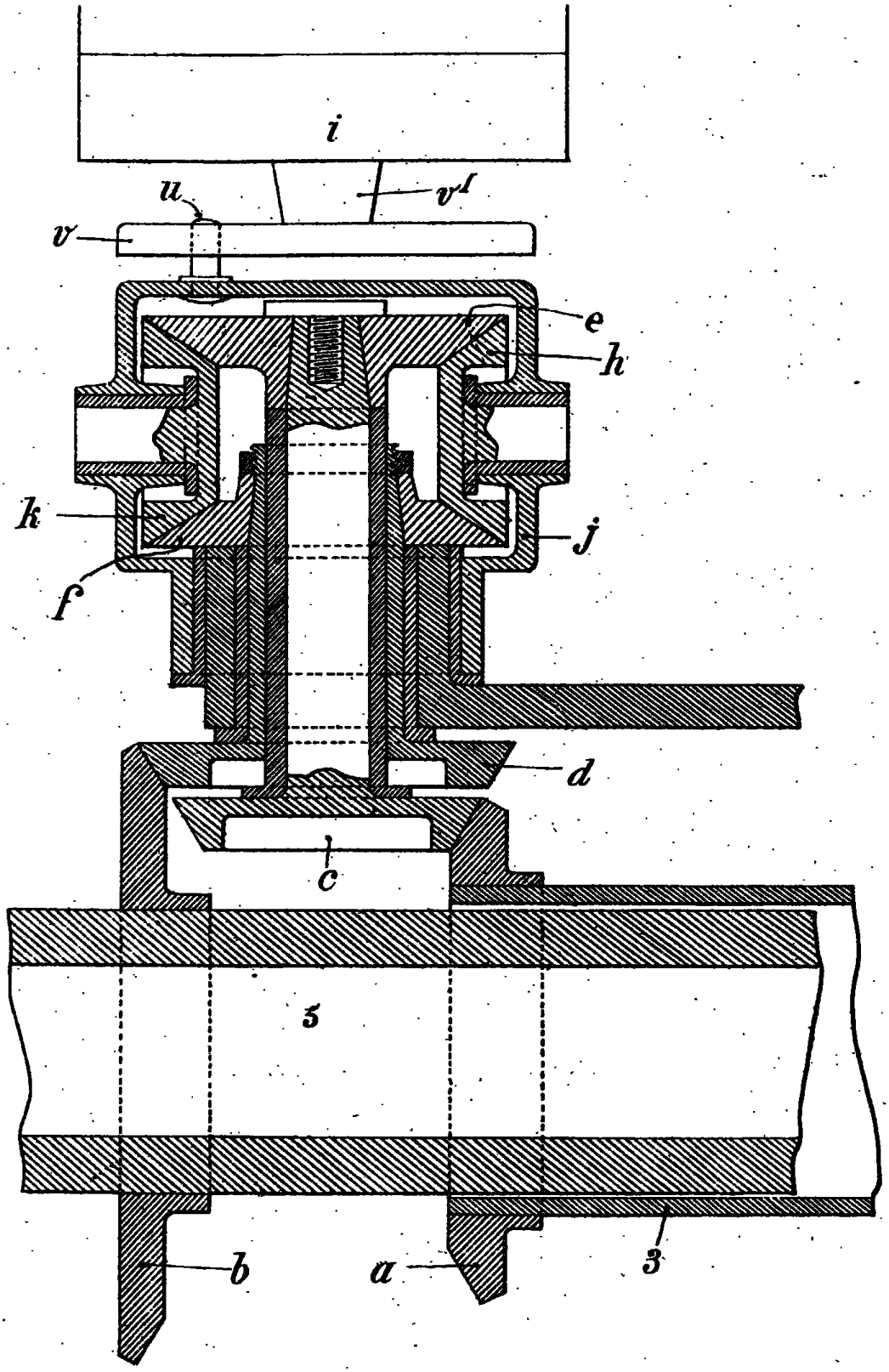


FIG _ 6 _

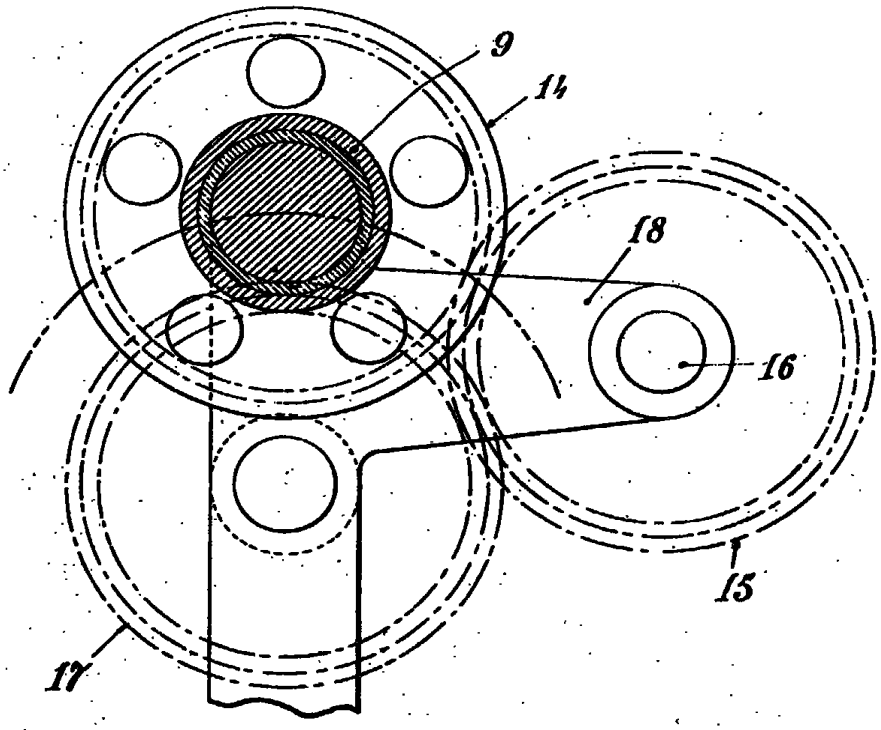
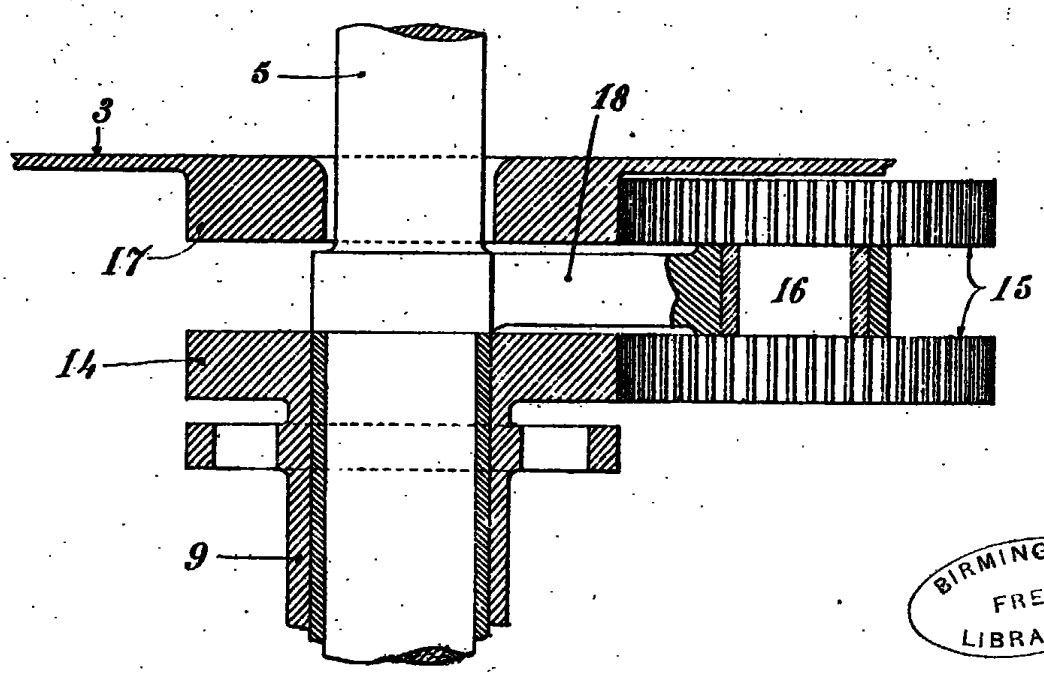


FIG _ 7 _



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