

No. 637,301.

Patented Nov. 21, 1899.

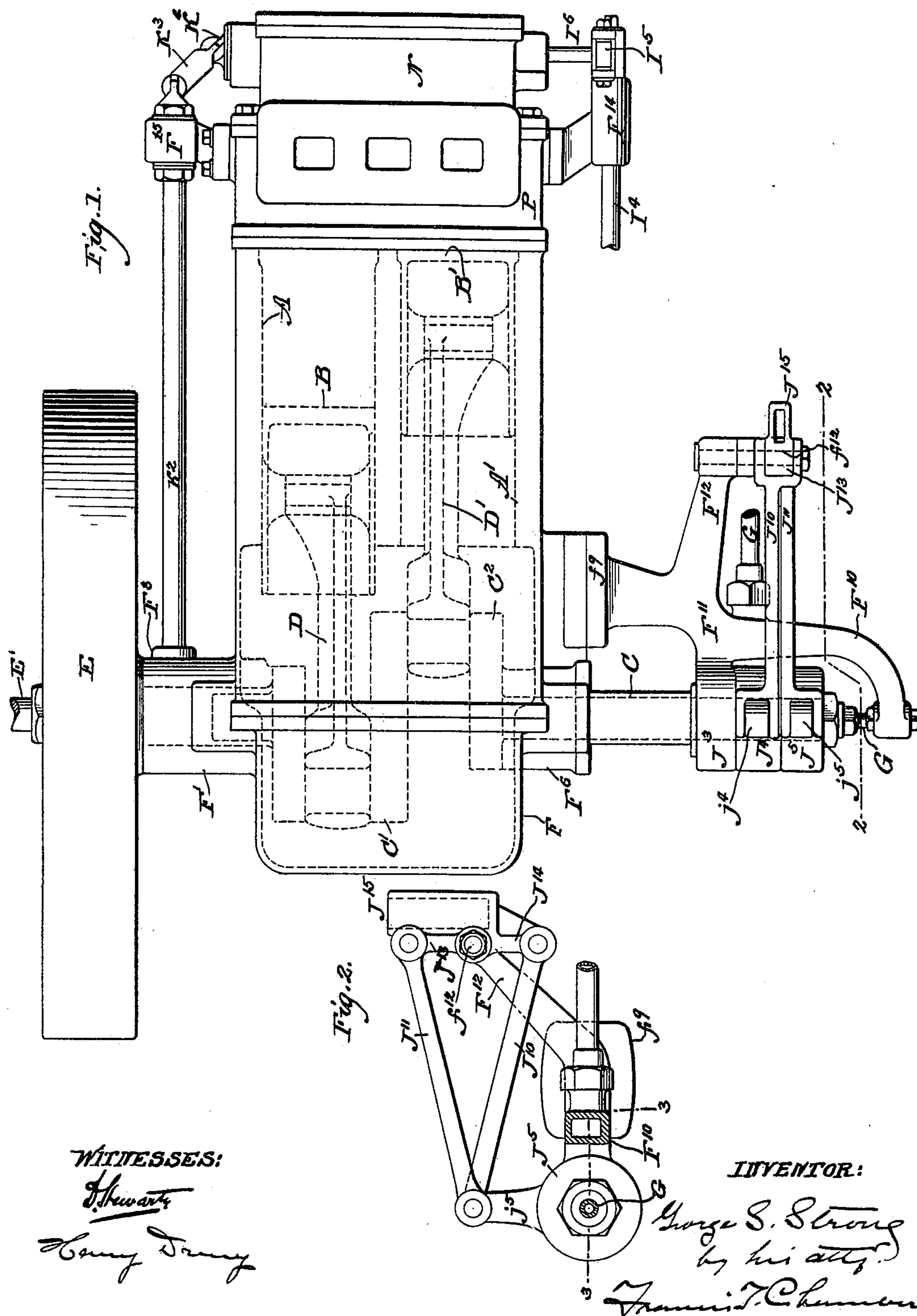
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SHAFT CONTROLLING AND STARTING MECHANISM.

(Application filed May 5, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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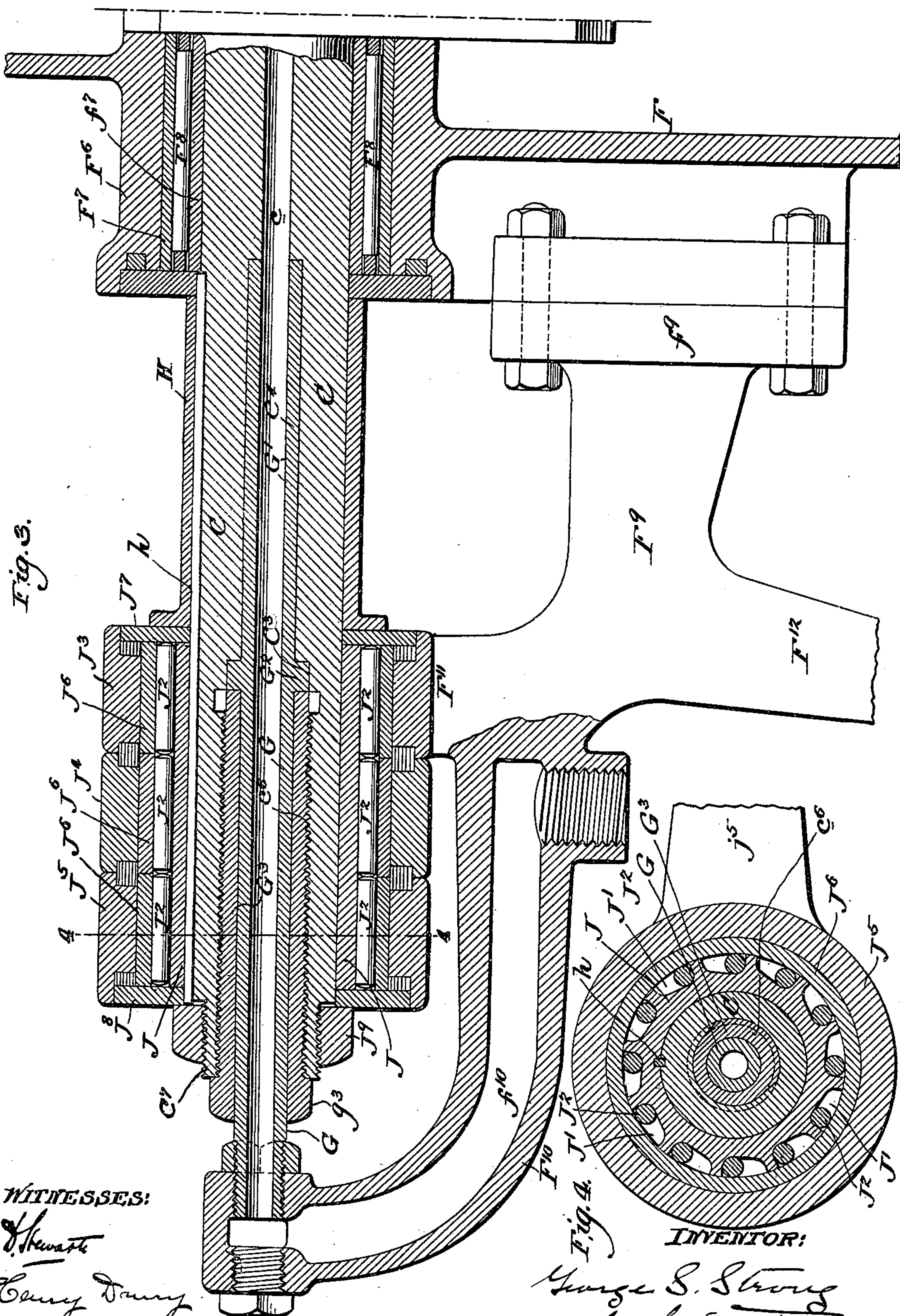
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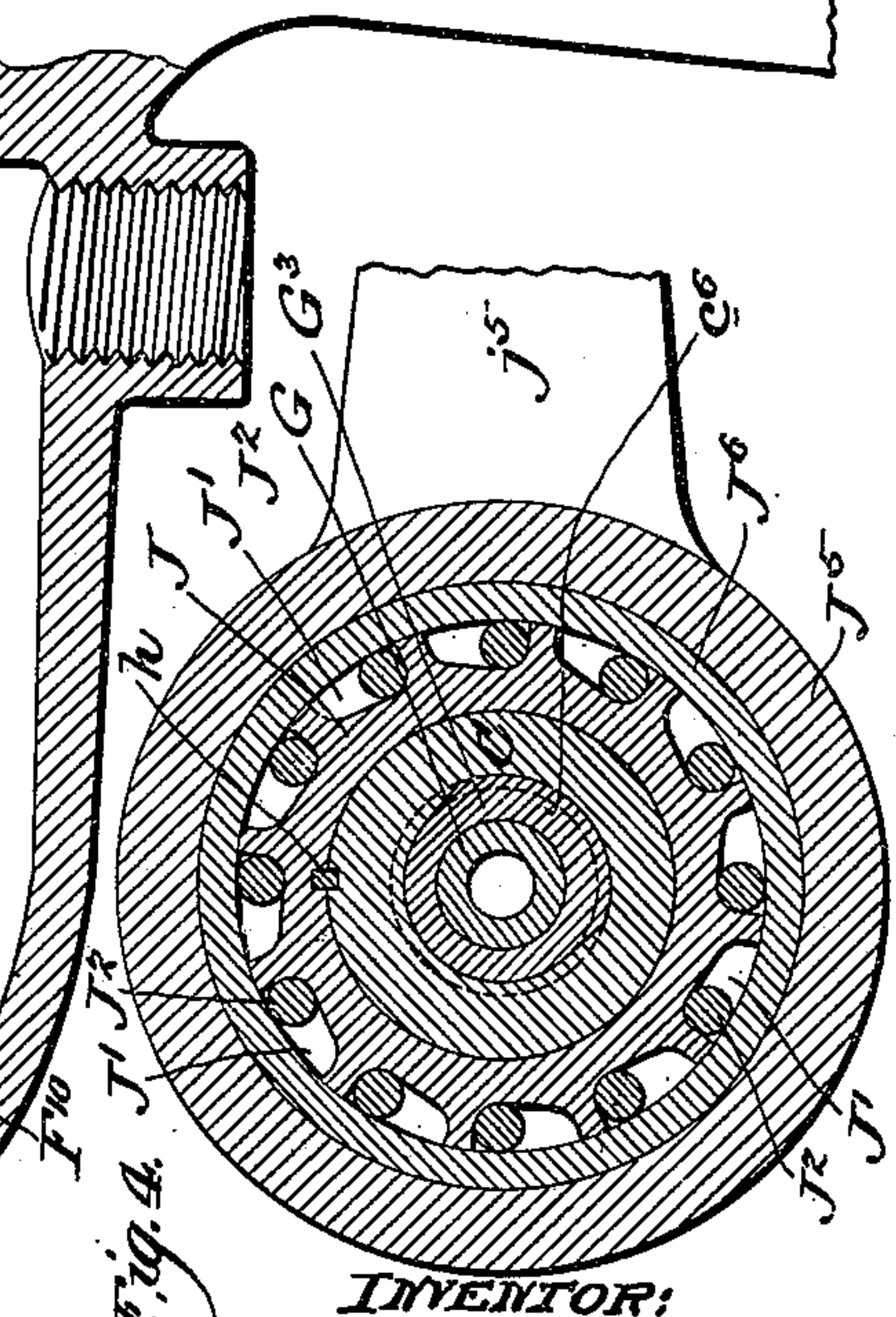
(No Model.)

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UNITED STATES PATENT OFFICE.

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SHAFT CONTROLLING AND STARTING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 637,301, dated November 21, 1899.

Original application filed December 15, 1898, Serial No. 699,312. Divided and this application filed May 5, 1899. Serial No. 715,696. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. STRONG, a citizen of the United States of America, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Shaft Controlling and Starting Mechanism for Gas-Engines, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to mechanism having for its object to prevent the revolution of the crank-shaft of a gas-engine in the reverse direction and also provide means for starting the engine by revolving the crank-shaft and setting the parts connected therewith into operation.

My improved device is especially designed for use with my improved gas-engine forming the subject-matter of my application, Serial No. 699,312, filed December 15, 1898, of which case my present application is a division, although it will be understood that my invention is also adapted for use with gas-engines of materially different construction.

The nature of my improvements will be best understood as described in connection with the drawings in which they are illustrated, and in which—

Figure 1 is a plan view of a gas-engine such as is described in the before-mentioned original application and showing my shaft-controlling mechanism in connection therewith. Fig. 2 is a side elevation of the shaft-starting mechanism, taken as on the section-line 2 2 of Fig. 1. Fig. 3 is a longitudinal section through the shaft and my shaft-controlling devices, taken as on the section-line 3 3 of Fig. 2; and Fig. 4 is a cross-section taken as on the line 4 4 of Fig. 3.

A and A' indicate cylinders of the gas-engine, in which work pistons, (indicated at B and B',) said pistons being connected by rods D and D' with the cranks C' and C², formed on the crank-shaft C.

E is the fly-wheel, secured on one end of the crank-shaft C and having a crank-pin E' attached or connected therewith.

F is a casing thrown around the cranks of the crank-shaft and connected with the cylinder-castings.

F' and F⁶ are bearings for the crank-shaft; F⁹, a bracket secured to the cylinder-casting by a flange f⁹, said bracket having an arm F¹⁰, with the passage f¹⁰ formed in it, as shown, by which fluid under pressure is conducted to a perforation in the crank-shaft. The bracket has also an arm F¹¹, at the end of which is formed or to which is secured a clutch-ring J³. Another arm F¹² of the bracket supports the clutch-actuating mechanism, to be hereinafter described.

F⁸ and F¹⁵ are bearings supporting a shaft K², which is actuated by mechanism (not shown) from the crank-shaft and which by means of a universal joint (indicated at K³) rotates a shaft the end of which is indicated at K⁴ and which passes through a cam-box N and supports cams (not shown) for governing the valves of the engine.

F¹⁴ is one of the bearings for a rock-shaft I⁴, which is actuated by a governor (not shown) and has attached to its end a lever (indicated at I⁵) operating a rod I⁶, which enters the cam-box N and serves to adjust, by mechanism not shown, the cams actuating the valves.

P indicates the cylinder-head casting of the engine.

Referring now to Fig. 3, it will be noticed that the shaft-bearing F⁶ is provided with a steel liner F⁷, between which and a similar steel liner f⁷, secured to the shaft C, is a nest of rollers (indicated at F⁸ F⁸) making the bearing-roller bearing. It will also be seen that the shaft C is formed with a longitudinal perforation, (indicated at c,) which, near the end of the shaft, is enlarged, as indicated at C⁴, still further enlarged at C⁵, and formed with an internal thread C⁶ at its end.

G is a tube screwing into the end of the hollow arm F¹⁰ of the bracket, its inner end G' fitting in the enlarged perforation C⁴, as shown, while a collar G² fits against the shoulder between the perforations C⁴ and C⁵.

G³ is an externally-threaded cylinder fitting

neatly on the outside of the tube G and screwing into the threaded perforation C⁶, so that its end comes in contact with the collar G².

g³ indicates a head on the outer end of the threaded cylinder G³.

H is a sleeve secured by key h to the shaft C and which serves in my engine to support a governor. (Not shown in the drawings.)

J is a clutch-drum secured to the shaft C, as shown, by means of the key h and formed, as shown in Fig. 4, with a multiple series of roller-chambers, (indicated at J',) the bottoms of these chambers slipping upward in one direction, as shown, and each containing three rollers J² J² J², set in line with each other, thus providing three annular series of clutch-rollers.

J⁶ J⁶ J⁶ are steel annular clutch-faces fitting over the drum J, as shown in Fig. 4, and each connected with one of the clutch-rings J³ J⁴ J⁵. The clutch-ring J³ is formed with or attached to bracket-arm F¹¹ and is immovable. Its function is to prevent a reverse motion of the shaft C without interfering with the forward motion of the shaft. The clutch-rings J⁴ J⁵ are movable about the center of the shaft and moving in a forward direction engage the clutch-rollers and turn the shaft, disengaging the clutch-rollers and turning freely back on the shaft when moved in the reverse direction. In order to move these clutches in opposite directions, they are each provided with lever-arms, as indicated at j⁴ j⁵, (see Figs. 1 and 2,) and these lever-arms are connected by links J¹⁰ J¹¹ with the opposite ends J¹⁴ and J¹³ of a lever centrally pivoted at f¹² on the bracket-arm F¹². This lever is also provided with a socket J¹⁵, into which a lever can be inserted to operate it, an up-and-down motion of this lever working the clutch-rings in opposite di-

rections and turning the shaft over in a forward direction, while at all times the shaft is prevented from revolving backwardly by the stationary clutch J³.

I may state that the construction of the shaft C and the means for introducing pressure to its end, as indicated in Fig. 3, form in part the subject-matter of another application, filed by me in the Patent Office December 8, 1898, Serial No. 698,623.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a gas-engine, a shaft coupled to the piston or pistons thereof in combination with a clutch automatically acting to prevent backward revolution of said shaft.

2. In a gas-engine, a shaft coupled to the piston or pistons thereof in combination with a clutch automatically acting to prevent backward revolution of said shaft, a clutch or clutches arranged when operated to rotate the shaft in a forward direction and means for operating the same.

3. In a gas-engine, a shaft coupled to the piston or pistons of the engine in combination with a clutch J³ automatically acting to prevent backward revolution of the shaft, two clutches J⁴ J⁵ having actuating-levers j⁴ j⁵ extending out from them said clutches being adapted when moved in the direction of rotation of the shaft to engage it and when moved in the other direction to disengage it, a pivoted lever J¹³ J¹⁴ and connecting-rods J¹⁰ J¹¹ coupling said lever with the arms j⁴ j⁵.

GEORGE S. STRONG.

Witnesses:

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