

No. 624,196.

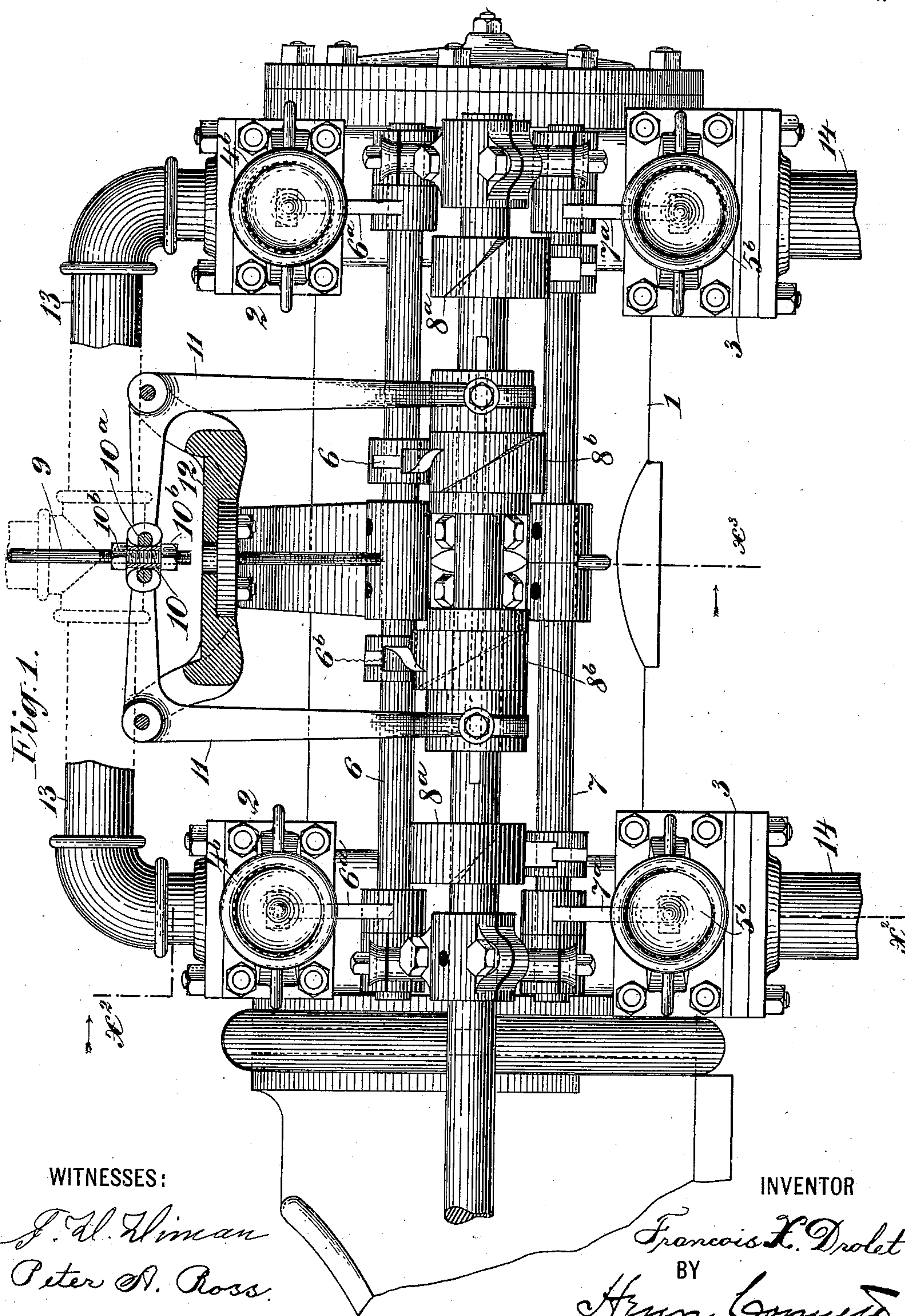
Patented May 2, 1899.

F. X. DROLET.  
VALVE GEAR FOR ENGINES.

(Application filed Aug. 9, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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Fig. 3.

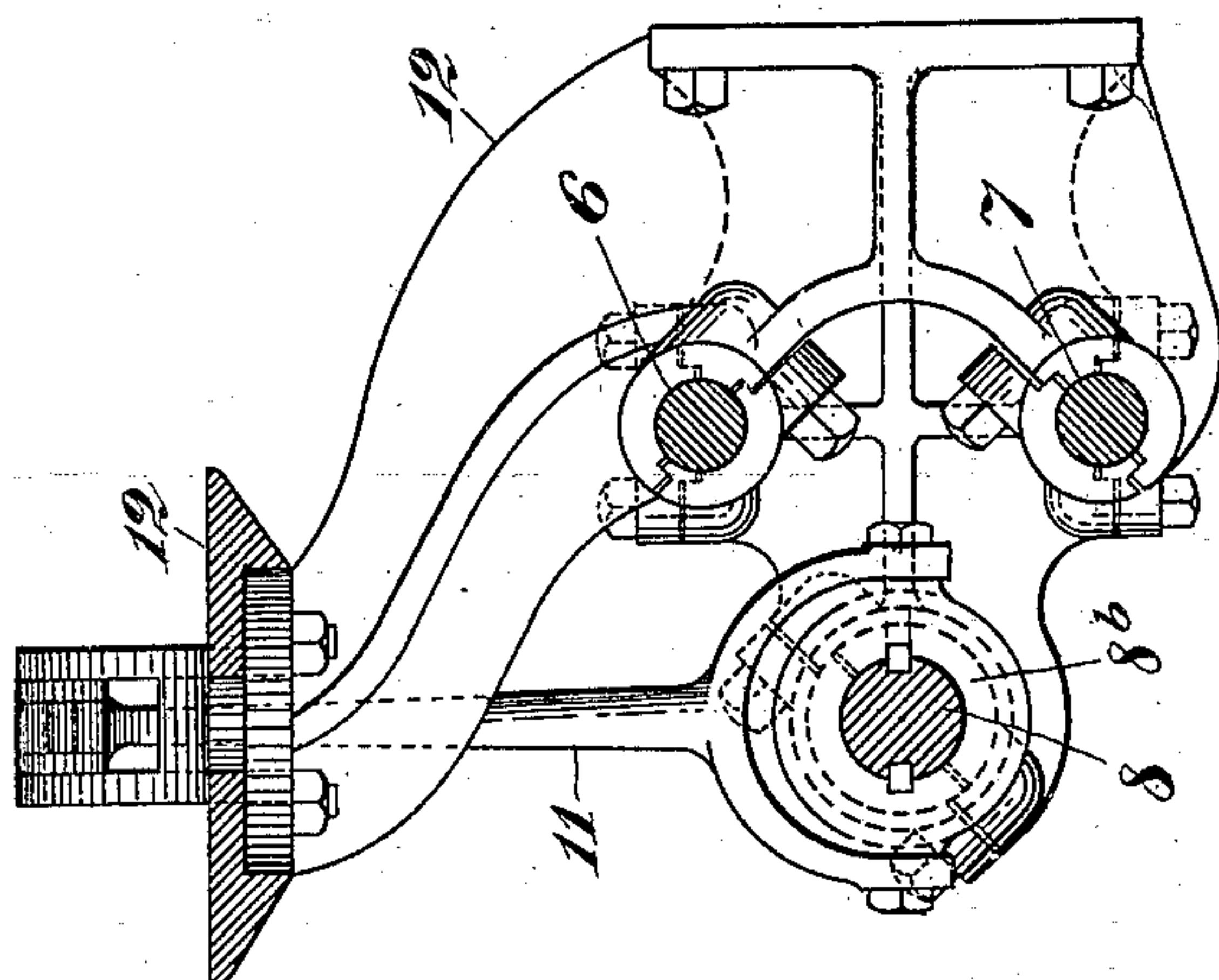
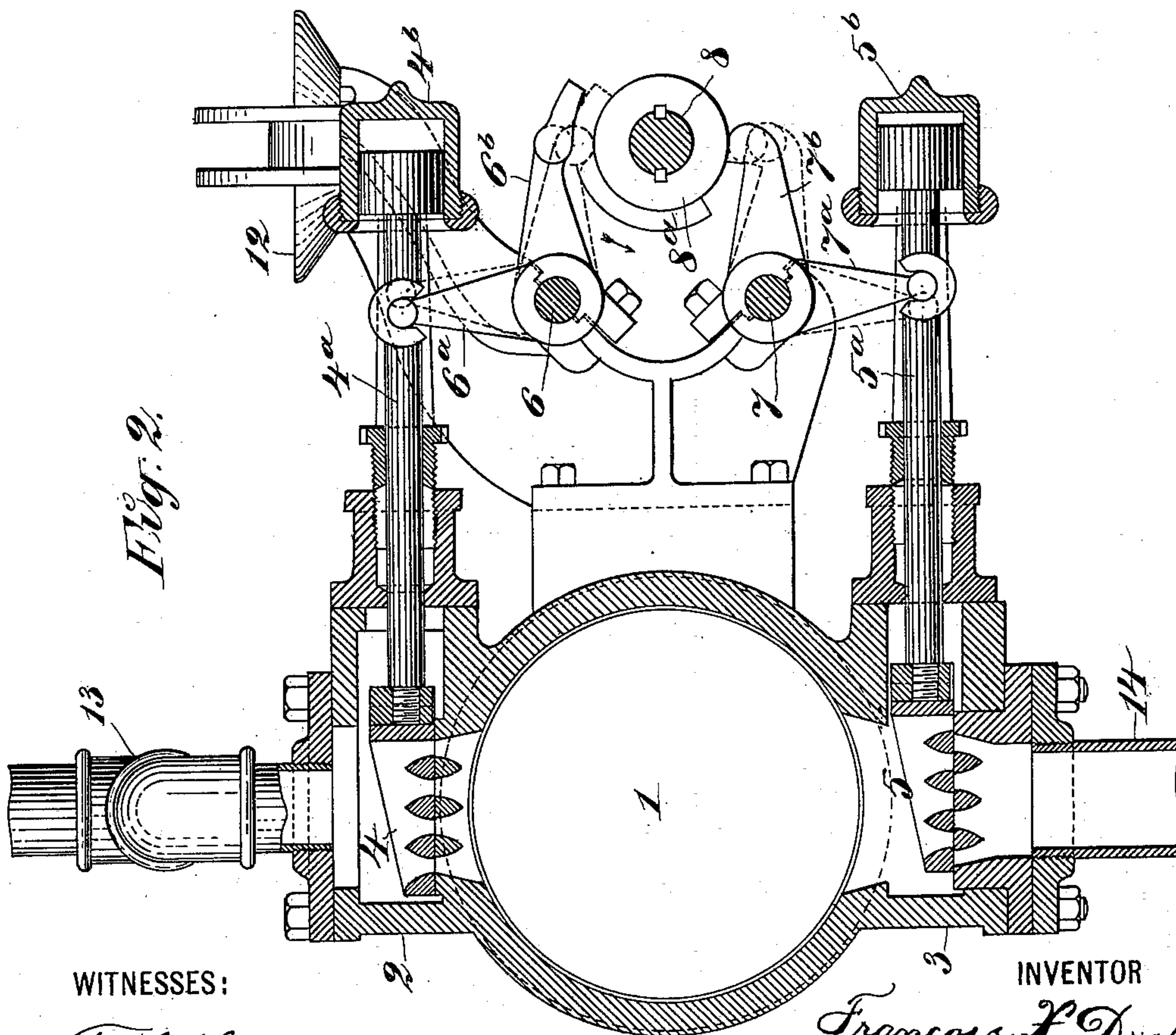


Fig. 2.



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# UNITED STATES PATENT OFFICE.

FRANÇOIS XAVIER DROLET, OF ST. ROCH, CANADA.

## VALVE-GEAR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 624,196, dated May 2, 1899.

Application filed August 9, 1898. Serial No. 688,183. (No model.)

*To all whom it may concern:*

Be it known that I, FRANÇOIS XAVIER DROLET, a subject of the Queen of Great Britain, residing in St. Roch, Quebec, in the district and Province of Quebec, in the Dominion of Canada, have invented certain new and useful Improvements in Valve-Gears for Steam-Engines, of which the following is a specification.

10 This invention relates to governor-controlled valve-gears for steam-engines, the object being, in part, to provide a gear whereby the steam will be automatically cut off from the engine if the governor-belt breaks or the  
15 governor ceases to work from any cause and, in part, to provide quick opening and closing valves.

An embodiment of the invention is illustrated in the accompanying drawings, where-  
20 in—

Figure 1 is a side elevation of the engine-cylinder of the engine provided with the valve-gear and mechanism. Fig. 2 is a vertical transverse section through the valves at  
25 one end of the cylinder, the plane being indicated by line  $x^2$  in Fig. 1. Fig. 3 is a vertical transverse section (not including the engine-cylinder) in the plane indicated by line  $x^3$  in Fig. 1.

30 1 is the engine-cylinder, 2 2 the induction-valve chests, and 3 3 the eduction or exhaust valve chests.

4 4 are the inlet-pipes in the chests 2 2, and 5 5 are the exhaust-valves in the chests 3 3.  
35 Fig. 2 shows the chests and valves at one end of the cylinder, and those at the opposite end are the same.

4<sup>a</sup> 4<sup>a</sup> are the stems of the inlet-valves 4, provided with suitable dash-pots 4<sup>b</sup>, and 5<sup>a</sup> 5<sup>a</sup> are  
40 the stems of the exhaust-valves 5, provided also with suitable dash-pots 5<sup>b</sup>. These pots are supported by arms on the face-covers of the valve-chests.

6 and 7 are rock-shafts, the former carrying arms 6<sup>a</sup> for actuating the inlet-valves and the latter carrying arms 7<sup>a</sup>, which operate the exhaust-valves. The rounded ends of the  
45 arms, Fig. 2, engage rounded recesses in the respective valve-stems.

50 8 is a cam-shaft, on which are cams 8<sup>a</sup>, which act on arms 7<sup>b</sup> on the rock-shaft 7 to rock the latter. On the shaft 8 are splined cams 8<sup>b</sup>,

which act on arms 6<sup>b</sup> on the rock-shaft 6 to rock the latter.

9 is the governor-rod, coming from an ordinary ball-governor. (Not shown.) The  
55 governor in its speed fluctuations imparts an up-and-down movement to the rod 9 in a well-known way. At its lower end the rod 9 has screwed on it a sleeve 10, carrying an annu-  
60 lus 10<sup>a</sup>, which engages the forked extremities of the horizontal arms of two bell-crank levers 11 11, fulcrumed on a frame 12, the pendent arms of said bell-crank levers being  
65 forked and each embracing the boss of one of the cams 8<sup>b</sup>, to which they are pivotally attached. Preferably the forked extremity of the lever-arm will be pivotally secured to a ring rotatively mounted in a keeper-groove  
70 in the cam-boss.

The cam 8<sup>b</sup> has a spirally-inclined margin to its raised cam-surface, whereby when the cam is shifted along the spline through the agency of the governor and the intermediate mechanism above described the steam will be  
75 cut off at different points of the stroke.

The valves and valve-seats, as clearly shown in Fig. 2, are of grid or register form, so that a very slight movement of the valve opens or closes the port fully. The admis-  
80 sion of steam is thus effected quickly, and the inlet-port is also closed quickly, remaining closed during expansion, if the steam be cut off at a fraction of the stroke. At the end  
85 of the stroke the exhaust opens quickly, and it remains open until the moment the induction-valve opens.

Should the governor cease to rotate from any cause, the cams 8<sup>b</sup> will be moved inwardly toward each other to such an extent as to be  
90 inoperative on the induction-valves, and the latter will therefore not open and admit steam.

13 is the steam inlet or supply pipe, and 14 the exhaust-pipe.

The cams 8<sup>b</sup> may be adjusted with respect  
95 to the governor so as to effect the desired cut-off by adjusting the sleeve 10 up or down on the governor-rod, the lock-nuts 10<sup>b</sup> securing it where set.

The cam-shaft 8 will be driven from the engine-shaft in a well-known way. This is too  
100 common a feature to require illustration.

In Fig. 1 the frame 12 is partly broken away to avoid obscuring the more important



parts, and in Figs. 2 and 3 parts back of the plane have been omitted in order to make the drawings clear. The extremities of the arms 6<sup>b</sup> (see Fig. 1) are beveled laterally to correspond substantially to the oblique lateral faces of the cut-off cams 8<sup>b</sup>. The oblique lateral faces on the exhaust-cams 8<sup>a</sup> is to vary the point of compression in setting these cams.

Any good governor may be used, as the Porter governor, for example.

I am well aware that grid-like valves and seats are not in themselves new and that it is not broadly new to control the induction of steam from a governor by rotating cam with an inclined face. These features I do not claim. The novel features of my invention are the four gridiron-valves and the four cams for actuating them, arranged and operating as shown, and the construction whereby the stopping of the governor from any cause closes the induction-valves and stops the engine.

Having thus described my invention, I claim—

1. In a steam-engine, the combination with the upright governor - rod 9, and the bell-crank levers 11, at opposite sides of said rod, and having their horizontal arms coupled thereto, of the cam - shaft 8, the cams 8<sup>b</sup>, splined on said shaft and provided each with a circumferential groove engaged by a fork on the pendent arm of one of said bell-crank levers, and valve-operating mechanism be-

tween said cams and the respective valves controlling the induction-ports of the engine, whereby should the governor cease to rotate, the said cams will be simultaneously shifted into inoperative positions, as set forth.

2. In a valve mechanism for steam-engines, the combination with the cylinder, provided with two induction and two exhaust ports, all provided with grid-like valve-seats, the four grid-like valves controlling the said ports, and their respective stems, of the rotating cam-shaft 8, the cams 8<sup>b</sup> splined on said shaft, the rock-shaft 6, the arms 6<sup>a</sup>, fixed on said rock-shaft and engaging the stems of the respective induction-valves, the arms 6<sup>b</sup>, fixed on said rock-shaft and bearing on the respective cams 8<sup>b</sup>, the cams 8<sup>a</sup>, fixed on the cam-shaft, the rock-shaft 7, the arms 7<sup>a</sup>, fixed thereon and engaging the stems of the respective exhaust-valves, the arms 7<sup>b</sup>, fixed on said shaft 7 and bearing on the respective cams 8<sup>a</sup>, the rod 9 of the governor, and means between said governor and the cams 8<sup>b</sup>, for displacing them simultaneously in opposite directions, substantially as set forth.

In witness whereof I have hereunto signed my name, this 4th day of August, 1898, in the presence of two subscribing witnesses.

FRANÇOIS XAVIER DROLET.

Witnesses:

ELZÉAR AUDIBERT,  
EUGÈNE VOCELLE.