(No Model.)

J. W. MELLING.

REVERSING GEAR FOR ENGINES.

No. 489,130. Patented Jan. 3, 1893.

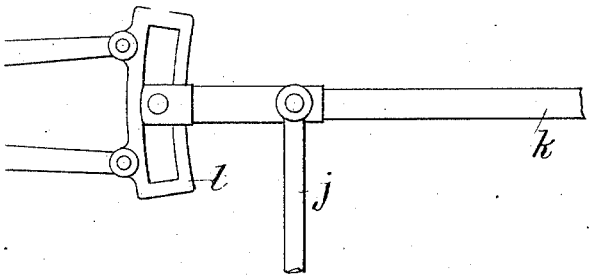


Fig. 1.

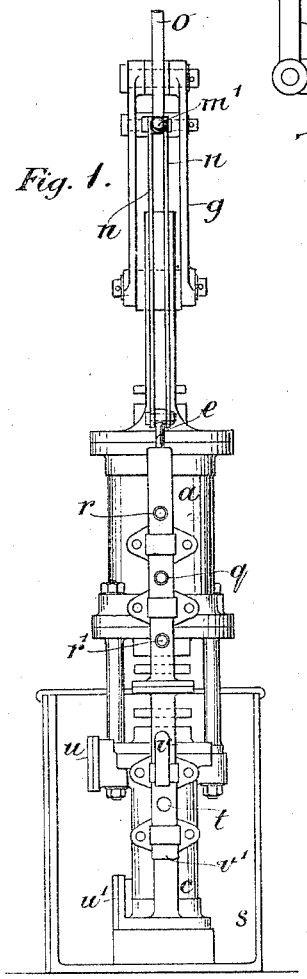
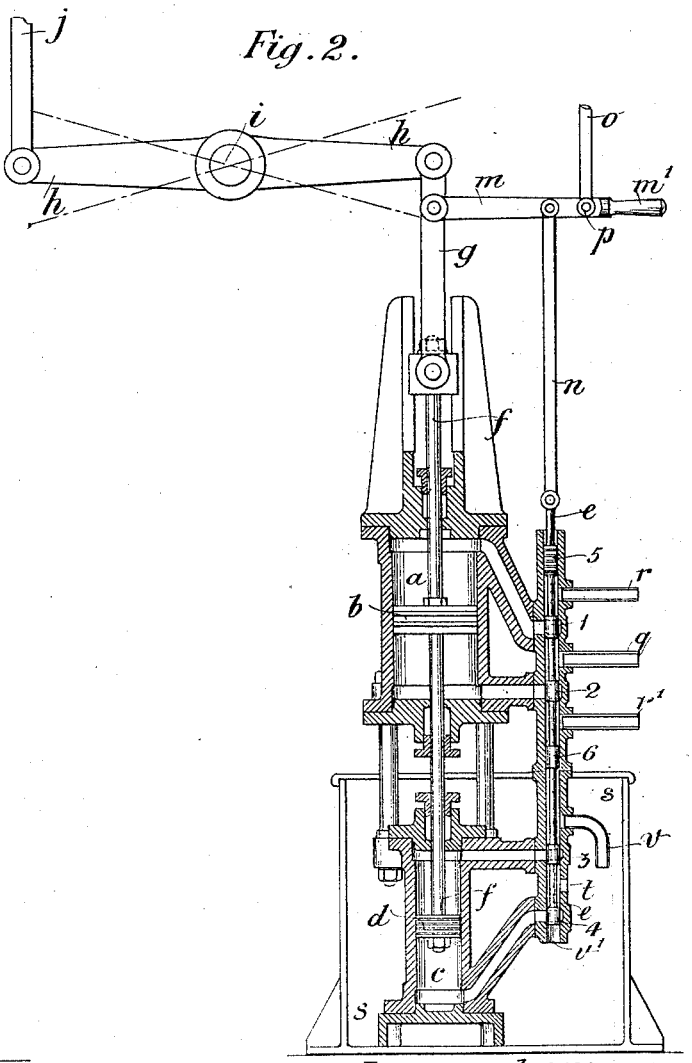


Fig. 2.



Witnesses:
E. B. Bolton
E. K. Sturtevant.

Inventor:
John William Melling
By Richards & Co.
his Attorneys.

UNITED STATES PATENT OFFICE.

JOHN WILLIAM MELLING, OF WIGAN, ENGLAND.

REVERSING-GEAR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 489,130, dated January 3, 1893.

Application filed June 29, 1892. Serial No. 438,373. (No model.) Patented in England March 10, 1891, No. 4,219.

To all whom it may concern:

Be it known that I, JOHN WILLIAM MELLING, a subject of the Queen of Great Britain, residing at Wigan, in the county of Lancaster, England, have invented certain new and useful Improvements in Regulating and Reversing Gear for Steam and other Fluid-Pressure Engines, (for which I have obtained a patent in Great Britain, No. 4,219, dated March 10, 1891,) of which the following is a specification.

My invention relates to improvements in regulating and reversing gear for steam and other fluid pressure engines, and the chief object of my improvements is to assist the engineman (or the governor as the case may be) and to enable him or it to effect the required regulation or reversal of the engine with a comparatively slight exertion of force.

I apply my improvements to an engine fitted with a cylinder to which steam or other fluid under pressure is admitted to impart a reciprocating movement to a piston the rod of which is connected to the reversing shaft or equivalent and where a separate cylinder with a piston upon the aforesaid piston rod or upon a separate rod connected to the first is employed, the second cylinder being supplied with water or other liquid so as to form a hydraulic lock or regulator to control the movement of the first named piston.

According to my present invention under such conditions I reverse the positions of the steam or other fluid admission ports and the exhaust ports (or cross the ports or pipes to obtain the same result) so that steam or other fluid under pressure is necessarily admitted to the cylinder by a movement which is the reverse of that required in an engine as ordinarily arranged and I operate the admission and exhaust valve or valves of this cylinder from some intermediate part of a single lever one end or part of which is worked by the attendant (or the governor) and the other end is jointed or connected to the piston rod with which it travels.

In order that my invention may be fully understood and readily carried into effect I will describe the accompanying sheet of drawings reference being had to the figures and letters marked thereon.

Figure 1 is an end elevation and Fig. 2 is a side sectional elevation of part of a reversing engine to which my improved regulating and reversing gear is applied.

In the views,—*a* designates the steam or other fluid cylinder and *b* its piston, *c* the water or other liquid cylinder and *d* its piston, *e* the valve spindle on which are the valves 1, 2, 3, 4, and also the balancing pieces 5 and 6; *f* is the piston rod on which are both the pistons *b* and *d*, *g* is the link through which the movement of the pistons is transmitted to the rocking or reversing lever *h* which is fixed on the reversing shaft *i* and connected by the link *j* to the valve rod *k* and reversing link *l*. To the link *g* is pivoted one end of the lever *m* which is pivoted to the link *n* which is jointed to the valve spindle *e* and at the other end the lever *m* is coupled by the link *o* to the governor or reversing lever not shown or it may be extended and formed into a handle *m'*. When the connection to the governor is not required the link *o* may be disconnected by removing the pin *p*.

The steam cylinder *a* is supplied with steam from the pipe *q* and exhausts through the pipes *r r'*.

The water cylinder *c* is placed in the tank *s* which is kept full of water or other liquid which enters the cylinder *c* through the pipe *t* and also through the two valves *u u'*; or the liquid may be stored in any other convenient way. The liquid escapes from the cylinder *c* through the outlets *v v'*.

The pistons *b*, *d*, are shown midway of their stroke and if a downward movement were required the engineman by operating the handle *m'* or the governor by operating the link *o* and drawing the spindle *e* and valves upward would cause steam from the pipe *q* to be admitted to the cylinder *a* above the piston *b* and simultaneously allow any steam below the piston *b* to escape through the exhaust pipe *r'*. In like manner the said upward movement of the valves allows the water below the piston *d* to escape from the cylinder *c* through the outlet *v'* and simultaneously allows water to be admitted to the upper part of the cylinder *c* through the pipe *t* from the tank *s* or other source of supply.

When the pistons *b*, *d*, move downward in consequence of the upward movement of the

valves as described, they through the lever m and link n move the valve spindle e and valves downward and so close the valves thus preventing any further escape of water from the lower part of the cylinder c and thereby locking the pistons until a further movement be given to the valves by the engineman or governor as the case may be.

It will be understood that when the lengths of the two arms of the lever m are properly proportioned relatively to the stroke of the piston and of the reversing lever or governor travel the movement of the piston must correspond with and be proportionate to the movement of the reversing lever or travel of governor.

If sufficient water or other liquid to fill the cylinder c had not been admitted by the valve 3 it would enter through the inlet valve u as the level of liquid in the tank or other supply will always be maintained above the top of the cylinder c.

If a hand pump were employed for reversing it would by preference be connected to the orifice t.

I prefer to place the power cylinder and the locking cylinder tandem in which case the piston of the latter is mounted upon the piston rod of the former and the valves for both cylinders are preferably mounted upon the same valve spindle; if the cylinders are not placed tandem they would have separate piston rods and valve spindles but coupled together so that a movement given to one would be repeated or shared by the other, whereby, when by a movement of the valves, steam or other fluid source of motive power is admitted to one end of the power cylinder and a movement of its piston takes place, water or other liquid is released and discharged from one end of the locking cylinder by the corresponding movement of its piston.

Any suitable kind of valves may be employed but for moderate pressure I prefer to use those of the piston type as shown and described.

If liquid under sufficient pressure be available the steam or other fluid power cylinder may be dispensed with and the single cylinder made to serve both purposes.

My improvements are particularly applicable to winding rolling and marine engines and any other engines where quick reversal or movement of the valve mechanism is required as for instance in steam steering gear or where it is advantageous to assist the governor or regulating mechanism.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim and desire to secure by Letters Patent of the United States is:—

1. In combination, the steam cylinder a, the piston therein, the piston rod, the connection from said rod to the valve rod k, the hydraulic cylinder d, with its piston and valves u, u', the piston in said cylinder connected with the piston of the steam cylinder the tank around the said cylinder d, the outlet ports v, v', from the cylinder to the tank, and the inlet port t, the valves controlling said ports, the valves for controlling the supply of steam to the cylinder a, the valve rod connected to all of said valves, and the connection between the valve rod and the piston rod, substantially as described.

2. In combination, the steam cylinder, the piston and rod therefor, the connection from said rod to the main valve rod k, the valve device for controlling the admission of steam to the said cylinder, the connection m, between the valve rod and the piston rod, the hydraulic cylinder having its piston connected with the piston of the steam cylinder, the tank surrounding the hydraulic cylinder, the inlet and outlet ports leading from the tank to the hydraulic cylinder, and the valve mechanism connected with the valves of the steam cylinder, substantially as described.

3. In combination, the steam cylinder and hydraulic cylinder arranged tandem, the piston rod carrying the pistons for both cylinders, the tank around the hydraulic cylinder, the series of slide valves for the steam and hydraulic cylinders arranged in line with each other and valve rod for said valves connected with the piston rod, substantially as described.

4. In combination, the steam cylinder and hydraulic cylinder arranged tandem, the piston rod connected to the main valve rod k, the series of slide valves arranged tandem for controlling the ports of the steam and hydraulic cylinders and the valve rod connected to the piston rod for operating said slide valves, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

JOHN WILLIAM MELLING.

Witnesses:
H. B. BARLOW,
HERBERT R. ABBEY.