(No Model.)

F. F. SCHOFIELD.

STEAM CYLINDER.

No. 351,657. Patented Oct. 26, 1886.

Fig. 2.

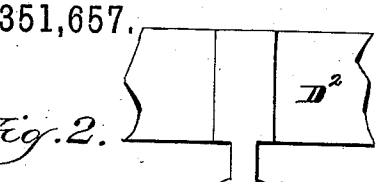
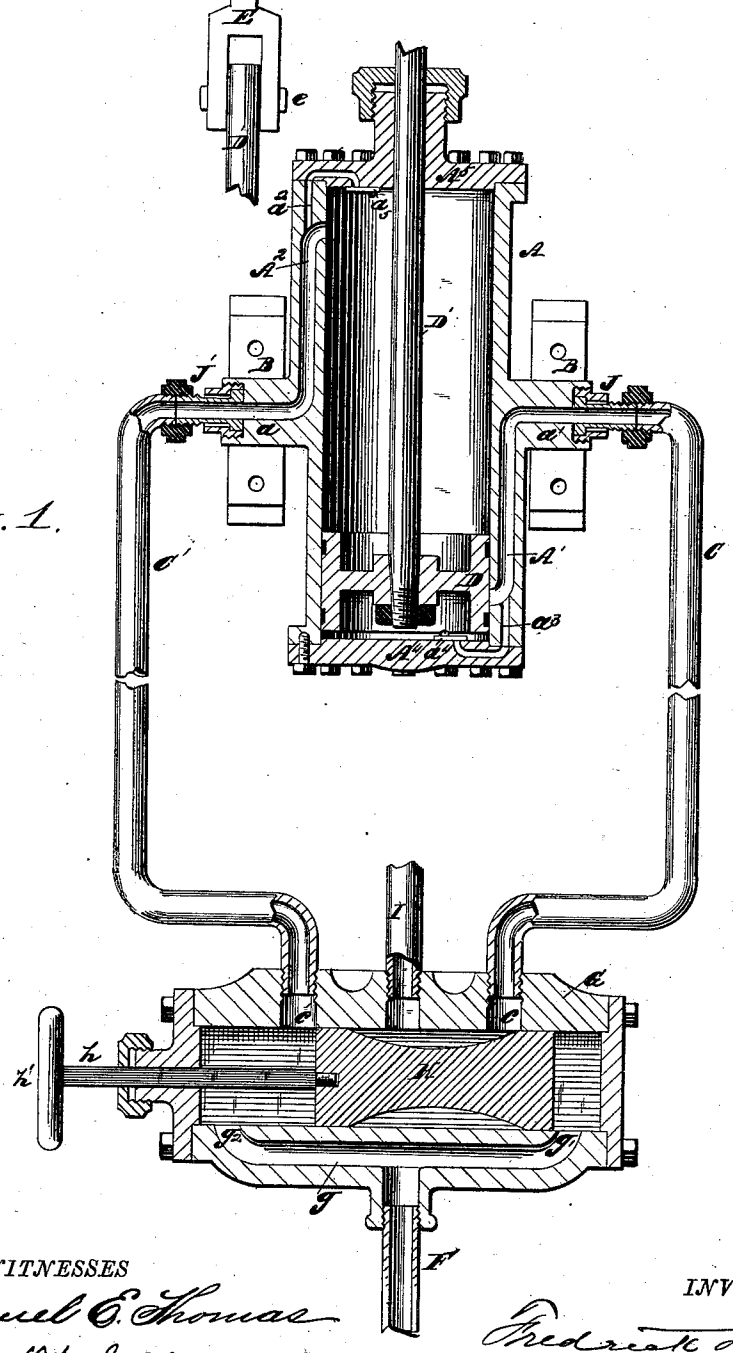


Fig. 1.



WITNESSES

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STEAM-CYLINDER.

SPECIFICATION forming part of Letters Patent No. 351,657, dated October 26, 1886.

Application filed March 1, 1886. Serial No. 193,680. (No model.)

To all whom it may concern:

Be it known that I, FREDRICK F. SCHOFIELD, of Oscoda, county of Iosco, State of Michigan, have invented a new and useful Improvement in Steam-Cylinders; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain new and useful improvements in the construction of steam-cylinders and their attachments; and it consists of the combinations of devices and appliances hereinafter specified, and more particularly pointed out in the claims.

The object of my invention is to provide a cylinder whereby the piston-head will be cushioned by the steam, the piston-rod being directly engaged with the device to be operated without an intervening pitman, the cushioning of the piston-head being requisite to prevent the head of the cylinder being driven out.

My device is more particularly designed for use in lumber-mills for various purposes, where the piston is in intermittent operation, under the control of the operator, so as to be thrown in any desired direction by the admission of steam to either end of the cylinder, as desired by the operator, the direction of the steam being controlled by a valve under the hand of the operator at will. It is found desirable to have a cylinder in connection with various log-rolling devices common in lumber-mills, which shall not be automatic in its operation, but may be applied as desired, at the option of the attendant.

My device is particularly adapted for such a purpose, although I would have it understood that I do not limit myself to the scope of its operation.

I carry out my invention as follows: As illustrated in the drawings, Figure 1 is a horizontal section of a device embodying my invention. Fig. 2 illustrates the connection of the piston with a crank-arm.

A represents an oscillatory cylinder journaled upon trunnions *a a'*, upon any suitable bed, B.

C C' are steam-pipes communicating with said trunnions, respectively. The cylinder is constructed with steam-ports A' A^2, leading from the trunnions toward each end of the cylinder, communicating with the interior of the cylinder and with said trunnions, as shown, so that steam may be conveyed from the pipes C C' into the cylinder. The steam-ports A' A^2 communicate with the interior of the cylinder short of its ends, as shown.

D represents the piston-head, and D' the piston-rod. The object of leading the steam into the cylinder short of the heads of the cylinder is in order that when the piston-head has passed the inner orifice of either of said steam-ports A' A^2 the steam will be cut off and the body of the steam caused to remain in the end of the cylinder, upon which the piston-head will be cushioned and thereby checked.

a^2 a^3 represent auxiliary ports leading, respectively, from the steam-ports A' A^2 to communicate with the interior of the cylinder from the cylinder-heads A^4 A^5, the communication of said auxiliary ports into the cylinder being controlled by valves a^4 a^5, located directly in the cylinder-heads. By this construction it is evident that when the steam is cut off at either end of the cylinder by the piston-rod, the steam upon which said head is cushioned will close said valves. The piston-head, however, having passed the orifices of the incoming-steam ports A' A^2, it is evident that when it is desired to drive the piston-head in either direction, steam could not be admitted through either of said steam-ports A' A^2 until the piston-head has been driven back past their respective orifices, and it is for this purpose that the auxiliary ports are provided. Steam admitted, for instance, into the steam-port A', when the piston-head is in the position shown in the drawings, will be permitted to pass through the auxiliary port a^3, lifting its governing-valve and driving the piston-head back from the orifice of the port A', when the same will be admitted in larger volume to operate the piston-head, the auxiliary ports being preferably of smaller diameter.

D^2 represents a shaft upon which a crank-arm, E, is engaged.

It is the purpose of cylinders of my improved construction to be engaged with such a crank-arm without an intervening pitman,

as by a wrist-pin, *e*. There being no pitman-rod, the piston-rod is not controlled within any precise limits, and unless its head were cushioned in this manner there would be a liability of its driving out the cylinder-head. By this device, however, as already explained, when the piston-head has passed the orifice of the inlet-steam channels it is immediately checked and effectually cushioned, and this tendency entirely overcome.

F represents the steam-pipe leading from the boiler communicating with a valve-case, G, provided with a valve, H, having its stem *h* provided with any suitable handle, *h'*, and preferably made reciprocatory in said case. The case is constructed with an inlet-channel, *g*, communicating with either end of the case. The steam-pipes C C', as shown, also communicate with the interior of the case, as shown at *c c'*.

I is an exhaust-pipe. It is evident that when the steam is admitted through the orifice *g'* it will have a free passage through the channel C into the cylinder and will be permitted to exhaust through the steam-port A', steam-pipe C', and exhaust-pipe I. So, on the other hand, when the valve is operated to admit the steam into the valve-case through the orifice *g²*, steam will be permitted to pass through the channel C', to the piston-head, and to exhaust through the steam-port A^2, steam-pipe C, and exhaust-pipe I. This valve-case may have any desired location in the mill, so that it may be readily and conveniently operated by the attendant. It may be located near the cylinder or at any desired distance therefrom, as may be required. It is evident, thus, that whenever it is desired to throw the crank-arm in one direction to operate its shaft, steam may be admitted by the attendant through the proper port into the cylinder by the proper movement of the valve H, and thereby he may control at will the rotation of said shaft. The cylinder, being trunnioned upon a bed, is permitted to oscillate to conform to the position of the piston in its engagement with the crank-arm. It is evident that the steam-pipes C C' will communicate with the trunnions through suitable stuffing-boxes, J J'. This forms an economical device for certain varieties of work, dispensing with the pitman-rod and other connections, and yet one very efficient for the purposes for which it is desired to be used.

What I claim is—

1. A steam-cylinder provided on opposite sides with steam-inlet pipes communicating with the interior of the cylinder at each end, distant from the cylinder-heads, and in combination therewith auxiliary steam-ports communicating with each end of the cylinder and having valves located directly in the cylinder-heads, substantially as and in the manner described.

2. An oscillating steam-cylinder journaled upon trunnions, said cylinder provided on opposite sides with steam-inlet ports communicating with the cylinder at each end, distant from the cylinder-heads, said ports communicating through said trunnions with steam-inlet pipes, and in combination therewith auxiliary steam-ports communicating with the ends of the cylinder and provided with valves located directly in the cylinder-heads, substantially as and in the manner described.

3. A steam-cylinder provided with steam-inlet ports communicating with the interior of the cylinder at each end, distant from the cylinder-heads, having in combination therewith auxiliary steam-ports communicating with the ends of said cylinder and provided with controlling-valves located in the cylinder-heads, to control the admission of steam to either end of said steam-cylinder, substantially as described.

4. An oscillatory steam-cylinder provided with a piston-head, said cylinder constructed with inlet steam-ports communicating therewith at either end, distant from the adjacent cylinder-head, auxiliary steam-ports communicating with said ports and the ends of said cylinder, respectively, said auxiliary ports provided with controlling-valves located directly in the cylinder-heads, the construction being such that the piston-head may close off the steam from said channels and be cushioned upon the steam at the ends of the cylinder, substantially as described.

5. The combination, with a cylinder, of inlet-ports connecting with the interior of the cylinder on opposite sides and distant from the adjacent cylinder-head, steam-pipes communicating with said ports, a valve to control the admission of steam to either of said steam-pipes, and an exhaust-pipe communicating with said valve, the construction being such that steam admitted through one pipe may enter the cylinder and exhaust through the same pipe, substantially as and in the manner described.

6. The combination, with the cylinder A, having steam-ports A A^2 on opposite sides, said ports communicating with the interior of the cylinder at a point distant from each cylinder-head, and auxiliary ports a^2 a^3, provided with valves located directly in the cylinder-heads, of the piston D, the steam-pipes C C', and the valve-case G, communicating with said pipes and having valve H, inlet F, and exhaust I, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

FREDRICK F. SCHOFIELD.

Witnesses:
J. F. MOUNT,
DUNCAN MCKAY.