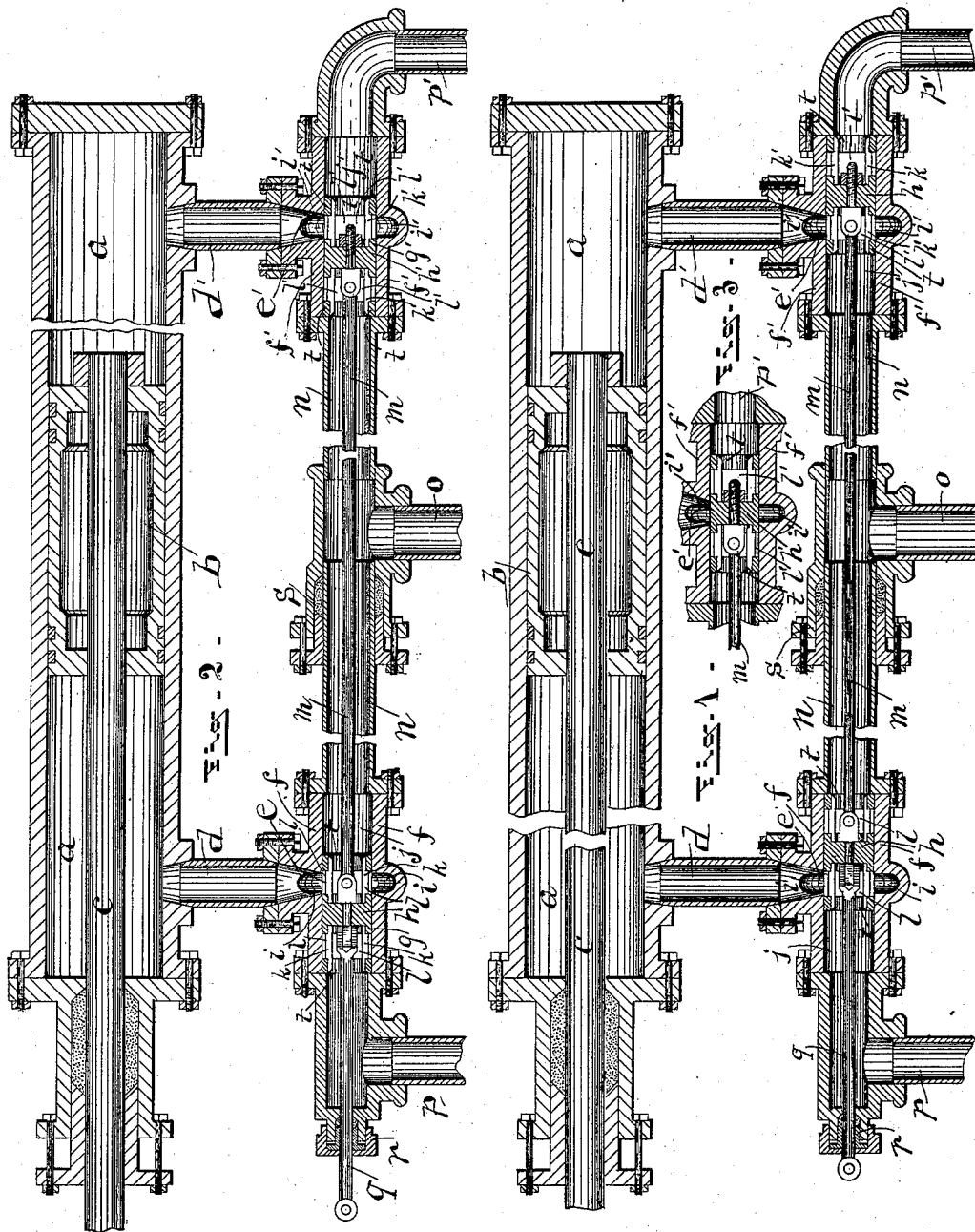


(No Model.)

L. T. KLINE.
STEAM FEED VALVE.

No. 384,263.

Patented June 12, 1888.



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UNITED STATES PATENT OFFICE.

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STEAM-FEED VALVE.

SPECIFICATION forming part of Letters Patent No. 384,263, dated June 12, 1888.

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To all whom it may concern:

Be it known that I, LEWIS T. KLINE, a citizen of the United States, residing at Alpena, in the county of Alpena and State of Michigan, have invented certain new and useful Improvements in Steam-Feed Valves; 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

15 This invention pertains more especially to devices for imparting a reciprocating motion to a log-carriage in a saw-mill by the use of steam operating directly upon a piston within a steam-cylinder, the outer end of the piston-rod being attached directly to the log-carriage. 20 The steam-cylinders in most cases of this kind are of great length, the steam being admitted and exhausted at or near the ends of the cylinder, the valve governing the admission of steam to the cylinder being usually quite short and arranged with a casing, which is located at or near the central portion of the length of the cylinder, while the steam is taken from the valve-casing by pipes which lead therefrom to the ends of the cylinder, and the steam-inlet pipe leads from the casing to the boiler, and an exhaust-pipe leads from the casing to the open air, the casing and valve being properly provided with ports which communicate 35 with the pipes. The length of the travel of the saw-carriage requires a steam-cylinder used for moving the carriage to be of considerable length, usually from twenty to fifty feet, and the pipes leading from the valve-casing, located at the middle portion of the cylinder, to the ends of the cylinder are of a suitable corresponding length and of a usual diameter of about three inches, which forms a large space in one pipe which must be filled 45 with steam from the boiler when the steam is admitted thereto from the valve, while the opposite pipe is exhausted. The operation of filling the pipe with live steam requires some time, as the steam is at first expanded to fill the pipe and does not operate with a full pressure 50 upon the piston within the cylinder until the

piston is slowly started upon its way toward the opposite end of the cylinder, and when the steam is exhausted from the cylinder that portion filling the pipe, and which performs no portion of the labor, is also exhausted and lost, so that about one-fourth of the steam used in the operation of propelling the carriage is passed through the apparatus without performing any portion of the labor required. Besides, the time 60 lost by the expansion of the steam when it first enters the pipes from the valve is considerable, and the operation of the device is unsatisfactory and annoying.

The objects of my invention are to overcome 65 and obviate these difficulties and objections by forming the valve and casing in such a manner and connecting the same to the cylinder in such a location that the steam will pass at once from the valve and casing to the cylinder and operate directly upon the piston with full-boiler pressure, and so that when the exhaust takes place only a trifle more than the amount of steam contained within the cylinder is exhausted; and the invention consists 75 in the novel arrangement, construction, and location of the valve-casings and valves and their connecting-pipes, and in the combination of the same with a steam-feed cylinder, as I hereinafter more fully describe and claim. 8c

My improvement is illustrated in the accompanying drawings, Figure 1 being a longitudinal central sectional view of a steam-feed cylinder and of any improved device 85 having the valves thereof in a position for admitting steam to one end of the cylinder. Fig. 2 is the same with the valves in a position for admitting steam to the opposite end of the cylinder. Fig. 3 is a longitudinal central sectional view of one of the valve-casings with 90 the valve in a position for closing the ports.

a represents the steam-cylinder of an ordinary steam-feeding device for the carriage of a saw-mill, and *b* is the piston contained therein. *c* is the piston-rod with one end attached to the piston *b*, and with its opposite 95 outer end connected with the log-carriage in the ordinary manner. This cylinder and piston may be of any required length, and are usually located and secured to the floor beneath and supporting the log-carriage. At or 100 near the opposite ends of this cylinder are

connected short steam-pipes d and d' , the opposite ends of the pipes being connected with the steam-ports e and e' of the valve-casings f and f' . These valve casings f and f' are provided with suitable valve-chambers, j and j' , in the central portions of which and extending entirely around the chambers and communicating with the pipes d and d' are formed the enlarged portions or grooves i and i' , and the casings are so arranged that the chambers thereof will lie parallel with the cylinder a , and are provided within the chambers with the reciprocating valves g and g' . These valves g and g' consist of the central portions or disks, h and h' , of a suitable diameter to pass within the chamber, so that their peripheries will cover the grooves i and i' , and k and k' are parallel bars, which project outward from the opposite sides of the disks h and h' , the outer ends of the bars being secured to and surrounded by a ring or band, t , which has a diameter equal to the diameter of the disks, whereby the disks are held true and in proper position relative to the valve-chamber, and port-openings l and l' are formed between the bars and between the disks and the rings t , so that when the valves are moved in either direction one series of the ports is brought over the grooves i and i' , which permits the ingress or egress of the steam to or from the cylinder.

In order that the valves may move and operate in unison, the disks or portions h and h' are joined or connected with each other by a rod, m , the opposite ends of the rod being pivoted to the eyebolts u and u' , which pass through and are secured to the disks.

By pivoting the ends of the rod m to the eyebolts a free and easy movement of the valves is obtained, which is a very important feature of the invention, as on account of the great distance between the valve-casings the expansion of the parts and the variation and springing of the supporting medium of the casings (which is usually the floor-joists of the mill) it is impossible to preserve a proper alignment of the casings with each other, and the result of any variation of the alignment of the casings is, when the valves are secured to each other by a rigid connection, to cramp and bind the valves within the casings and cause great friction and heavy labor to reciprocate the valves.

The inner ends of the casings f and f' are joined to the opposite ends of the steam-pipe n , which surrounds the rod m , and a branch pipe, o , is connected with the pipe n and with the boiler. Connected with the outer ends of the valve-casings are the exhaust-pipes p and p' , which lead to any convenient point, and q is a valve-stem which passes through a packing-box, r , at the outer end of the valve-casing f , and is arranged with its inner end secured to the valve g , and with its outer end provided with a lever or other suitable means of imparting the necessary reciprocating movement to the valves.

On account of the length of the pipe n an expansion-joint, S , is attached to the central portion of the pipe to prevent any undue strain of the parts or movement of the valve-casings by the expansion of the pipe by heat.

All of the parts being properly connected, the valves are placed in a position to bring the disks h and h' over the grooves i and i' , which shuts off or closes the ports e and e' to the cylinder. Steam from the boiler is then admitted to the pipes o and n , and the valve-stem is then operated to move the valves in the required direction, which, if inward, as shown in Fig. 1, passes the ports l' of the valve g' over the groove i' and allows the steam from the pipe n to pass through the ports l' and e' and pipe d' to the cylinder a on one side of the piston b , and also passes the ports l of the valve g over the groove i and allows the steam within the cylinder on the opposite side of the piston to pass through the pipe d and ports e and l and exhaust through the pipe p . When the piston b is driven by the steam to the opposite end of the cylinder, or so far as is required, the valves g and g' are moved to the opposite ends of the valve-chambers, as shown in Fig. 2, and this allows steam from the pipe n to pass through the ports l and e and the pipe d to the cylinder, and to exhaust from the opposite end of the cylinder through the ports l and e and the exhaust-pipe p . The advantages of this arrangement and construction of the steam-pipes and valves are that the steam is held within the pipe n at full-boiler pressure until used, and the distance between the valve and the cylinder is so short that a very small amount of steam is required to fill the space thereof, and consequently no expansion of the steam takes place when first admitted to the cylinder, as with the ordinary way, and the steam passes into the cylinder with full-boiler pressure and at once acts to start off the piston and affords the sawyer a better and more satisfactory control of the carriage and log, so that more lumber can be sawed in the same length of time.

By constructing the valves g and g' and connecting them together by the rod m , as herein described, the steam-pressure within the pipe n operates in opposite directions upon the disks h and h' and places a tension upon the rod m , which retains the rod at all times true and straight and allows a small light rod to be used without springing, permits a smaller pipe, n , to be used, and forms a means of balancing the steam-pressure upon one disk against the pressure upon the other disk, so that the steam-pressure in no way interferes with the free and easy working of the valves, which is a very great advantage, as the valves are operated by a hand-lever, and any unusual or unnecessary friction or pressure has to be overcome by the strength of the operator, and causes great trouble and delay, besides rendering the work of operating the valves too great for continued practice.

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

1. In a valve for a steam-feed cylinder, the combination, with a valve-casing, *f*, having a steam-inlet pipe connected with one end and an exhaust-pipe connected with the opposite end, and provided with a groove, *i*, having a steam-port, *e*, of the valve *g* within the said casing, and provided with the solid portion *h* and the supporting-rings *t* upon each side of the portion *h*, and the bars *k*, connecting the said part *h* to the rings *t*, and the stem *q*, passed through the packing-box *v* and connected to the portion *h*, substantially as set forth.

2. The combination, with a log-carriage and a steam cylinder inclosing a piston, having a piston-rod connected with the said carriage for propelling the same, of the valve-casing *f*, provided with a groove, *i*, having a steam-port, *e*, connected to one end of the said cylinder by the pipe *d*, the valve *g* within the casing *f*, and provided with the solid portion *h*, and having the bars *k* and supporting-rings *t*, the valve-casing *f'*, provided with a groove, *i'*, having a steam-port, *e'*, connected with the opposite end of the said cylinder by the pipe *d'*, the valve *g'* within the casing *f'*, and provided with the solid portion *h'*, and having the bars *k'* and the supporting-rings *t'*, the rod *m*, with its ends secured to the valves *g* and *g'*, the pipe *n*,

surrounding the said rod *m*, and with one end connected to the valve-casing *f* and its opposite end connected to the valve-casing *f'*, the valve-stem *q*, connected to one of the said valves, the steam-inlet pipe *o*, connected to the pipe *n*, and the exhaust-pipes *p* and *p'*, connected, respectively, to the outer ends of the valve-casings *f* and *f'*, substantially as and for the purpose set forth.

3. The combination, with a steam-cylinder provided with valve-casings *f* and *f'*, located at and connected by port-openings to each end of the said cylinder, a steam-pipe, *n*, connecting the inner ends of the said casings to each other and provided with a steam-inlet pipe, of the valve-disks *h* and *h'* within the said casings, a rod, *m*, within the pipe *n*, and pivotally secured by its opposite ends to the said disks, the valve-stem *q*, passed into the outer end of one of the said casings, and with its inner end pivotally connected to the outer side of one of the valve-disks, and exhaust-pipes connected to the outer ends of the valve-casings, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

LEWIS T. KLINE.

Witnesses:

J. C. COMFORT,

JOHN J. PATERSON.