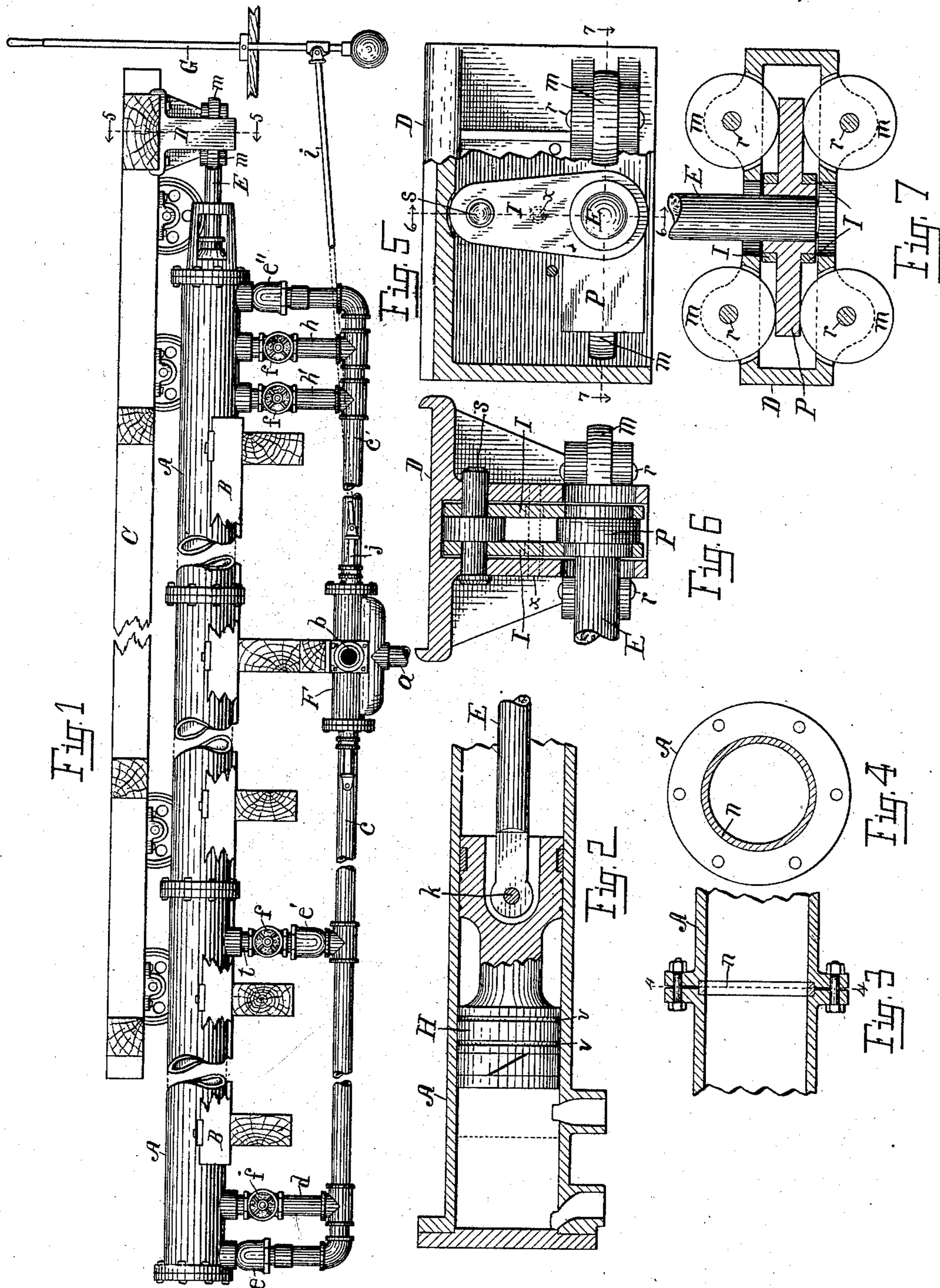


(No Model.)

W. E. HILL.
STEAM FEED FOR SAWMILLS.

No. 509,737.

Patented Nov. 28, 1893.



Witnesses:

Walter S. Hood
Lena C. Westbrook

Inventor.

William E. Hill
By Fred L. Chappell
Att'y.

UNITED STATES PATENT OFFICE.

WILLIAM E. HILL, OF KALAMAZOO, MICHIGAN.

STEAM-FEED FOR SAWMILLS.

SPECIFICATION forming part of Letters Patent No. 509,737, dated November 28, 1893.

Application filed December 23, 1892. Serial No. 456,146. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. HILL, a citizen of the United States, residing at the city of Kalamazoo, in the county of Kalamazoo and State of Michigan, have invented certain new and useful Improvements in Steam-Feeds for Sawmills, of which the following is a specification.

My invention relates to feeding devices for saw-mills, and more particularly to that kind of feeding devices where the saw-mill carriage is moved back and forth by the piston rod of a steam cylinder directly attached to it.

The objects of my improvements are first to provide a suitable means of attaching the piston rod to the carriage so that the carriage can be off-set; second, to provide an elastic cushion of steam in the ends of the cylinder to prevent the piston striking solid against the heads of the cylinder; third, to provide a suitable cut-off so that only a portion of the entire length of the cylinder need be used; fourth, to provide a pivotal connection of the piston rod to the piston in the cylinder; fifth, to so shape the piston that it will guide itself; and sixth, to provide a suitable joint to unite the sections of the cylinder. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1, is a side view of the entire machine in sections. Fig. 2, is a detail view of the rear end of the cylinder and the piston, partly in section. Fig. 3, is a view of a longitudinal section through one of the joints between sections of the steam cylinder. Fig. 4, is a view on line 4—4 of Fig. 3. Fig. 5, is a view of the case D, partly in section, on line 5—5 of Fig. 1. Fig. 6, is a view on line 6—6 of Fig. 5, and Fig. 7, is a view on line 7—7 of Fig. 5.

Similar letters refer to similar parts throughout the several views.

C is the farther half of a saw-mill carriage in the usual form. The long steam cylinder A is placed directly under the carriage and is fastened by means of lugs to timbers B that rest on the mill floor.

The piston H, of the cylinder is made of considerable length so that it acts as a guide to itself and needs no support from the piston rod to keep it in position. The piston rod E is pivoted to the piston H, so that there will

be no tendency to bind from any sagging of the cylinder, or of the piston rod, which is very likely to occur on account of the great length. The piston rod E, projects through a stuffing box and guide at the head of the cylinder and is attached to the carriage C, by means of the case D, which is bolted to the under side of the carriage, and its contained mechanism. The end of the piston rod E, is attached firmly to the plate P., (Figs. 5, 6, and 7.) The plate P, and with it the end of the piston rod E are suspended by the links I, I, to the case D, by the pin S. The links I, I, make it possible to off-set the carriage without any transverse motion to the piston rod E which would cause it to bind. The plate P, is held in position by the four antifriction rollers *m, m, m, m*, two being placed on each side of the pins *r, r, r, r*, which are attached to the case D. Should the feed be used with a carriage that does not off-set a pin *x*, as shown by the dotted lines in Figs. 5, and 6, can be passed through the case D, and through a hole a little larger than the pin, in the links I, I, which will limit its motion but still allow sufficient play to prevent any binding of the piston rod. The rollers *m*, are not cylindrical, the periphery being convex. This allows the plate P, to tip and accommodate itself to any sag in the piston rod E. All binding of the plate P, between the rollers is also thereby prevented.

The valve F, which is operated by the lever G, connected by the connecting rod *i*, is adapted to admit steam at either end of the cylinder and allow it to discharge from the opposite end at the same time. I do not show details of this valve as it is not material to this invention. The pipes *c*, and *c'*, both supply the steam and serve as exhaust pipes, the steam being received at *a*, and is discharged at *b*. The pipes *c*, and *c'* open into the extreme ends of the cylinder A. *d*, and *t*, are pipes leading across from the pipe *c*, to the cylinder A. *h*, and *h'* are pipes leading across to cylinder A, from pipe *c'*. At the end of the pipe *c*, near the point where it enters the cylinder A, is a check valve *e*, that prevents any passage of steam from the cylinder A, at that point, but allows steam to enter. At the end of the pipe *c'* is located a check valve *e''*, that prevents any steam from

passing from the cylinder A, at that point but allows steam to enter. In the cross pipe *t* is located a check valve *e'* that prevents any steam passing into the cylinder A, through that pipe. Globe valves *f*, *f*, *f*, and *f*, are placed in all the cross pipes. As it will not be necessary to make frequent changes in these valves I have thought best to operate them by the common hand wheels. Where the length of logs sawed is constantly varying, lever valves can be used and operated by levers above the floor or by levers similar to the lever G, could be placed in reach of the sawyer. This, however, will seldom be found necessary, and when it is any skilled mechanic can supply the necessary mechanism.

My machine is operated and controlled by the lever G, which I have weighted at the bottom to cause it to return to the vertical position. Pushing the top of the lever toward the cylinder admits steam through the pipe *c*, past the check valve *e*, to the rear of cylinder A. This forces the piston H, forward carrying the piston rod and the carriage. The steam in the opposite end of the cylinder escapes through the pipes *h* or *h'* or both. The check valve *e''* prevents the steam from passing out at the end of the cylinder so that after the end of the piston passes the pipes *h'* or *h*, whichever is open, it compresses the steam in the end of the cylinder which acts as a cushion and prevents the cylinder head from receiving a violent blow, which would cause injury. Pulling the lever G in the opposite direction admits steam through the pipe *c'* past the check valve *e''* to the front end of the cylinder A. This forces the piston H, back and returns the carriage; the steam in the rear of the piston escaping through the pipe *d*, the valve *f*, in the pipe *t* being closed, the steam acting as a cushion in the rear end of the cylinder the same as in the front end. The dotted line in Fig. 2, shows the position of the piston H, where the steam or air is acting as a cushion. Of course, the air in the cylinder acts as a cushion when the machine first starts. The piston H, is made long enough so that it never passes to the end of the cylinder A, beyond the ports of the pipes *d* or *h'* and *h* as the case may be. There is a check valve *e'* in the pipe *t*, that prevents steam passing into the cylinder A, from the pipe *c*. By closing the valve at *f*, in the pipe *d*, and opening the valve *f*, of the pipe *t*, the piston will begin to cushion on the steam in the end of the cylinder on passing the port to the pipe *t*. This in effect shortens the cylinder to that point. The object of having the cross pipe *t* and check valve *e'* is to enable the operator to cut off a part of the cylinder so that it will not be necessary to use the entire length of the cylinder A, when sawing short logs. It is necessary to close the valve *f* in this pipe *t*, when using the whole length of the cylinder, for if it were not closed the steam, when the piston returning toward the rear end passed the pipe *t*, would escape from the cylinder

past the check valve *e'*. Similar cross pipes with check valves can be inserted at intervals on the cylinder so as to give several different lengths of stroke to the piston. The extra cross pipe *h'*, with its valve is for a different purpose than shortening the stroke of the piston in the cylinder. Its object is to increase the amount of steam and the length of the steam chamber against which the piston cushions. The two pipes *h*, and *h'*, are to make this cushion adjustable in length. Where very heavy timber is on the carriage the longer cushion should be used as it will be required to overcome the momentum. Of course check valves are not needed where the cross pipes are so near the end of the cylinder that the piston cannot pass clear by them. The cylinder A, being very long to answer its purpose in sawing long timbers it is necessary to make it in sections and unite the sections. The method of joining the sections is shown in Fig. 3, and Fig. 4. Flanges are cast on each end of the sections of the cylinder as shown. A shoulder is turned into the end of each section and a ring of gun metal or some other metal that expands more rapidly when heated than the metal of the cylinder, is placed between, the object being to have the ring expand and fill the space, making it steam tight. The ring is long enough to keep the flanges of the cylinder a little distance apart so that the bolts draw the sections of the cylinder solid against the ring *n*. The edges of the ring and of the cylinder are slightly rounded to prevent the joint injuring the piston and to let the piston pass smoothly.

While I have shown my invention specially adapted to use as a saw-mill feed, it is capable of many other uses, such as carrying a cut-off sawing machine back and forth, or moving a carriage back and forth, for a limited distance for any purpose.

I am aware that steam cylinders with their piston rods attached to the carriage have been used for this purpose before, so I do not claim that broadly, but

What I do claim, and desire to secure by Letters Patent, is—

1. In a steam saw-mill feed the combination of the cylinder A, containing the elongated piston head H, the piston rod E, pivoted thereto, passing through a stuffing box at the end, and attached to the log carriage for the purpose specified.

2. In a steam saw-mill feed a steam cylinder cast in sections with a ring of metal highly expansive, when heated, between, in combination with a piston and piston rod attached to a carriage and suitable means for operating the same.

3. In a saw-mill feed operated by the direct action of a piston and piston rod, the combination of the piston rod E, secured to the plate P, which is guided by the convex anti-friction rollers *m*, *m*, *m*, *m*, and suspended by the links I, I, all being in a suitable frame attached to the carriage C.

4. In a saw-mill feed provided with suitable means for controlling it, the combination of a steam cylinder and its piston and piston rod, the piston rod being securely attached at right angles to a transverse plate, which is movable transversely in a suitable frame attached to the carriage, for the purpose specified.

5. In a steam saw-mill feed having a steam cylinder with a piston and piston rod attached to the carriage, the valve F operated by any suitable means, in combination with the pipes *c* and *c'*, entering at each end of the cylinder A, with check valves *e*, and *e''*, at the ends checking from the cylinder, cross pipes *d*, *h'* and *h*, through which the steam exhausts for the purpose specified.

6. In a saw-mill feed operated by the direct action of the piston of a steam cylinder, the combination of the pipes *c*, and *c'*, with check valves at the ends opening into the inlet ports at each end of the steam cylinders with two or more closable outlet ports at different

distances from the end, (check valves being placed in the exhaust pipes when necessary,) so as to cut off a portion of the cylinder and shorten the stroke of the piston when required.

7. In a steam saw-mill feed, the combination of the cylinder A, the elongated piston H, the piston rod E, pivoted to the piston H, the case D, containing the transverse plate P, the antifriction rollers *m*, the links I; the carriage C; the steam-pipes *c*, and *c'*, containing the check valves *e* and *e''*; the cross pipes *d*, *t*, *h'* and *h*, containing valves, the check valve *e'* in the cross pipe *t*, and the valve F, operated by the lever G, connected to the valve stem *j*, by the connecting rod *i*, substantially as described for the purpose specified.

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

WILLIAM E. HILL. [L. S.]

Witnesses:

E. S. ROOS,

CORA E. WESTBROOK.