

(No Model.)

3 Sheets—Sheet 1.

W. E. HILL.
LOG UNLOADER.

No. 526,624.

Patented Sept. 25, 1894.

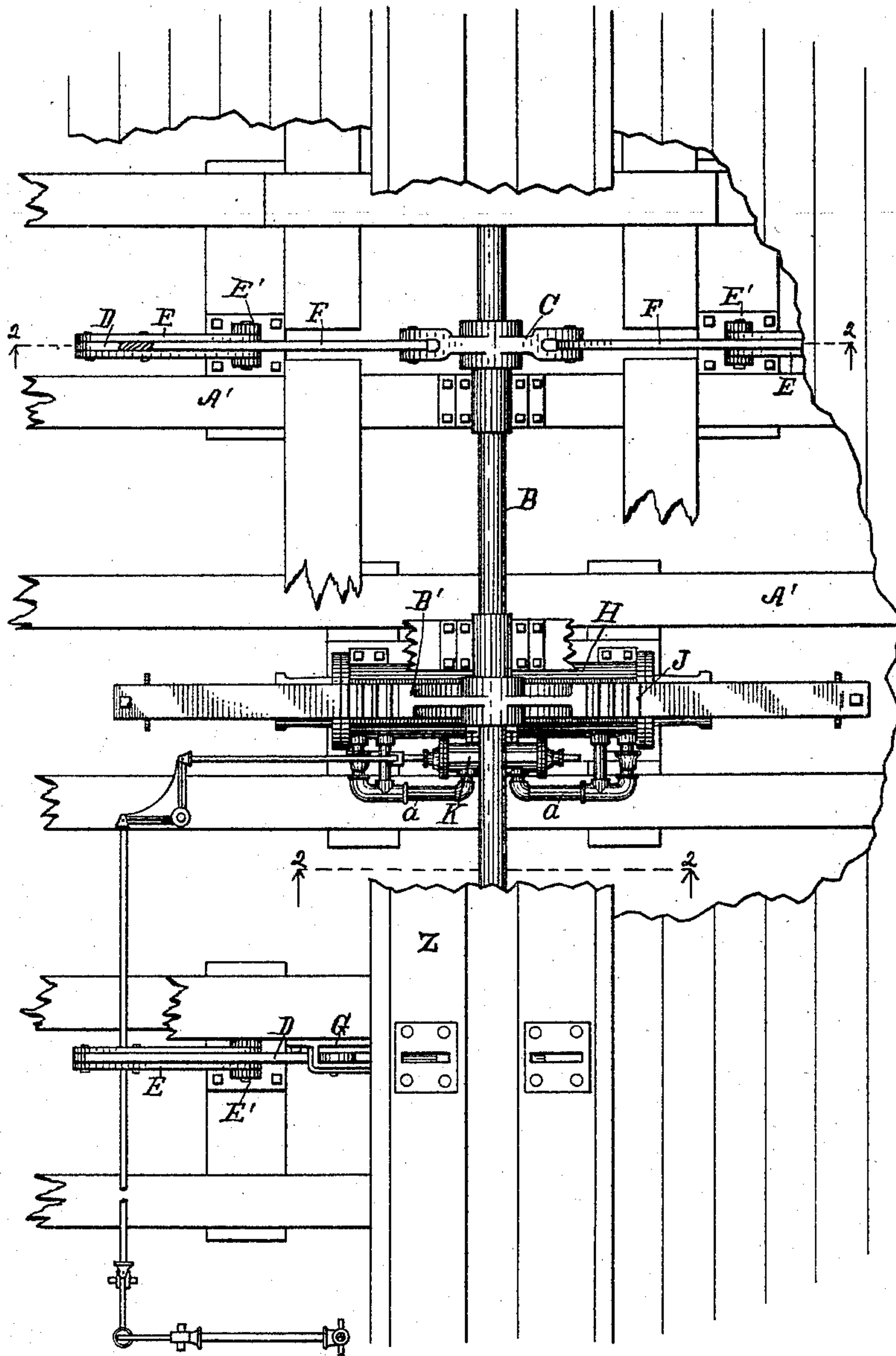


Fig. 1

Witnesses:

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Wm. G. Howard

Inventor.

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

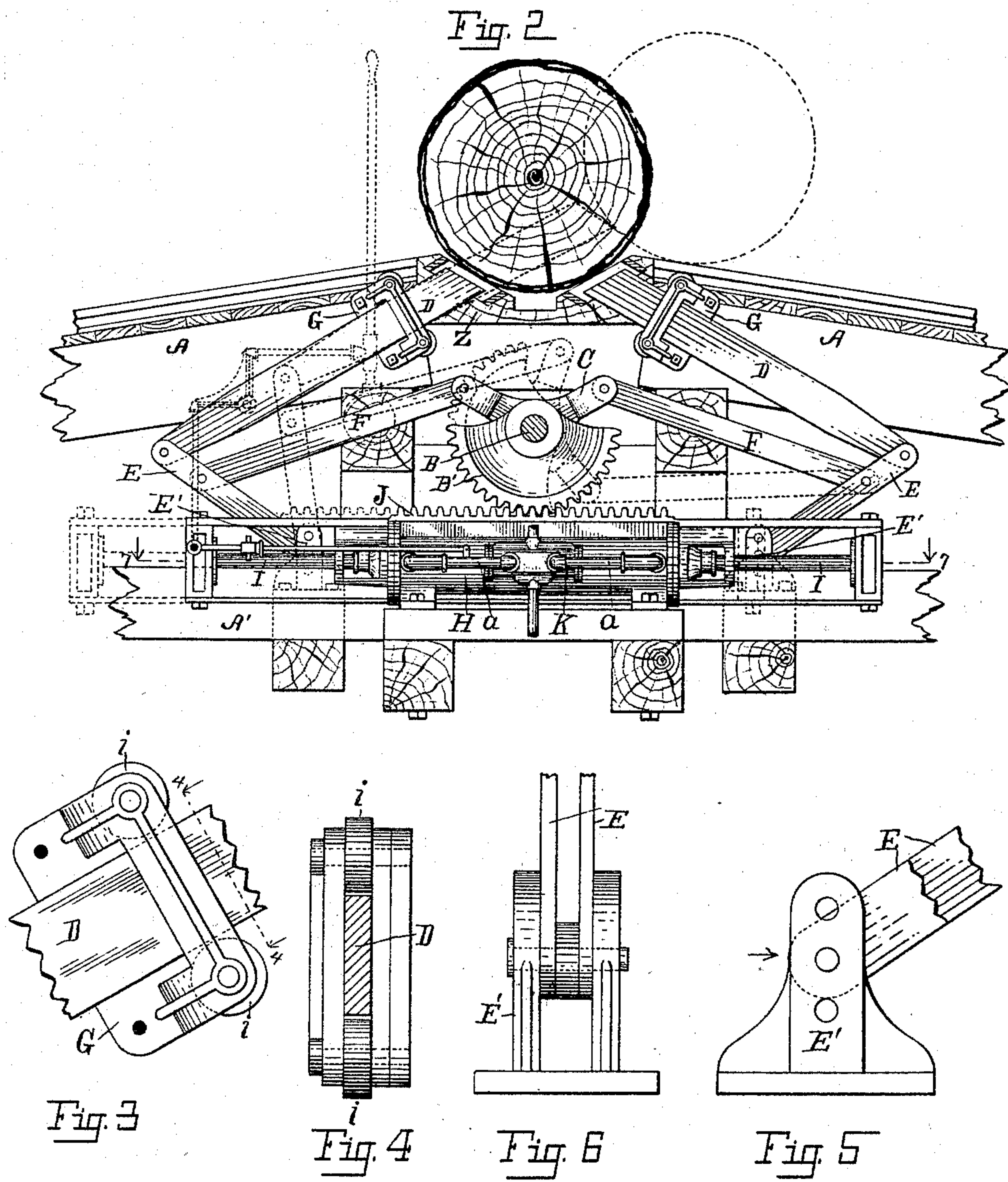
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3 Sheets—Sheet 2.

W. E. HILL.
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Patented Sept. 25, 1894.



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(No Model.)

3 Sheets—Sheet 3.

W. E. HILL.
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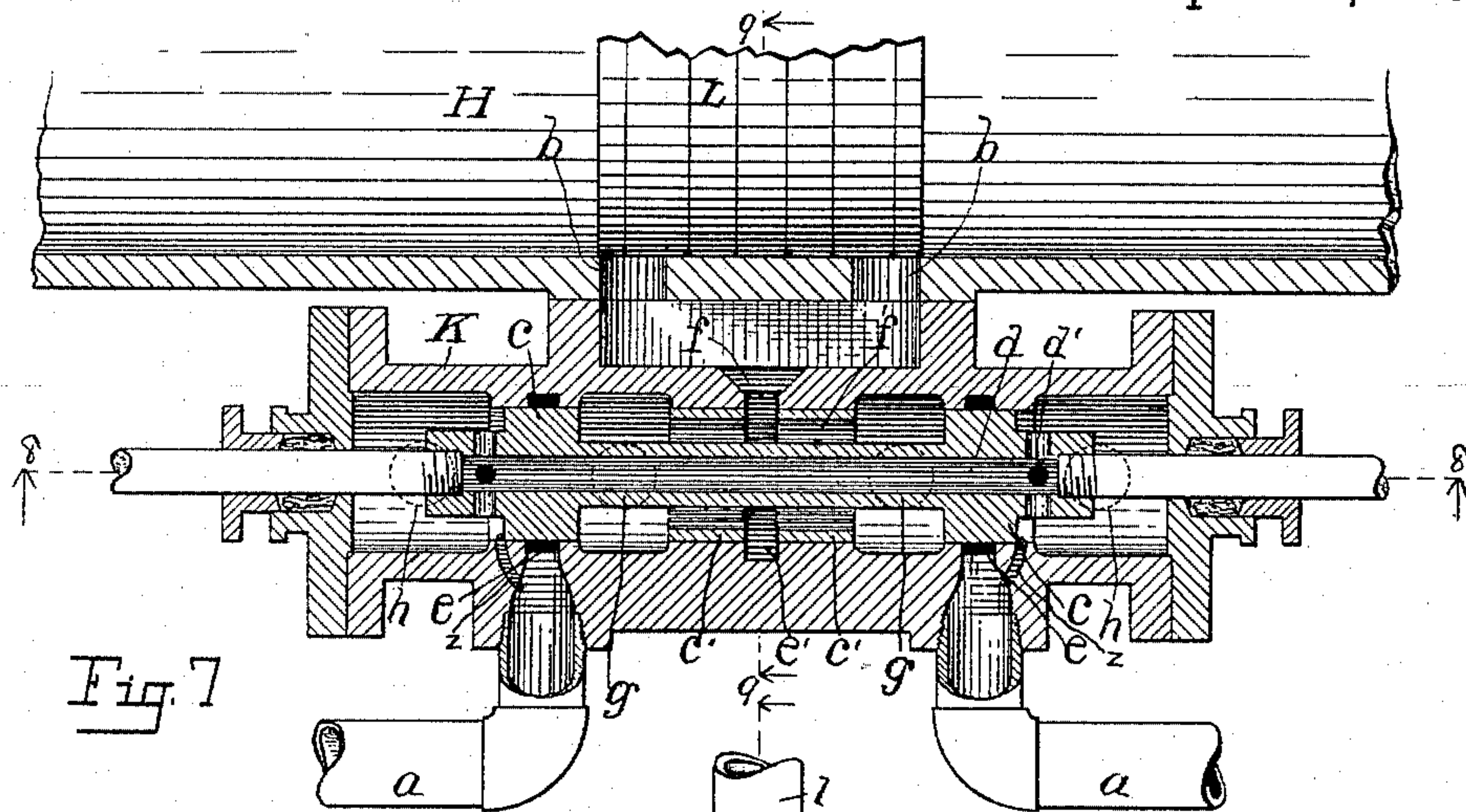


Fig. 7

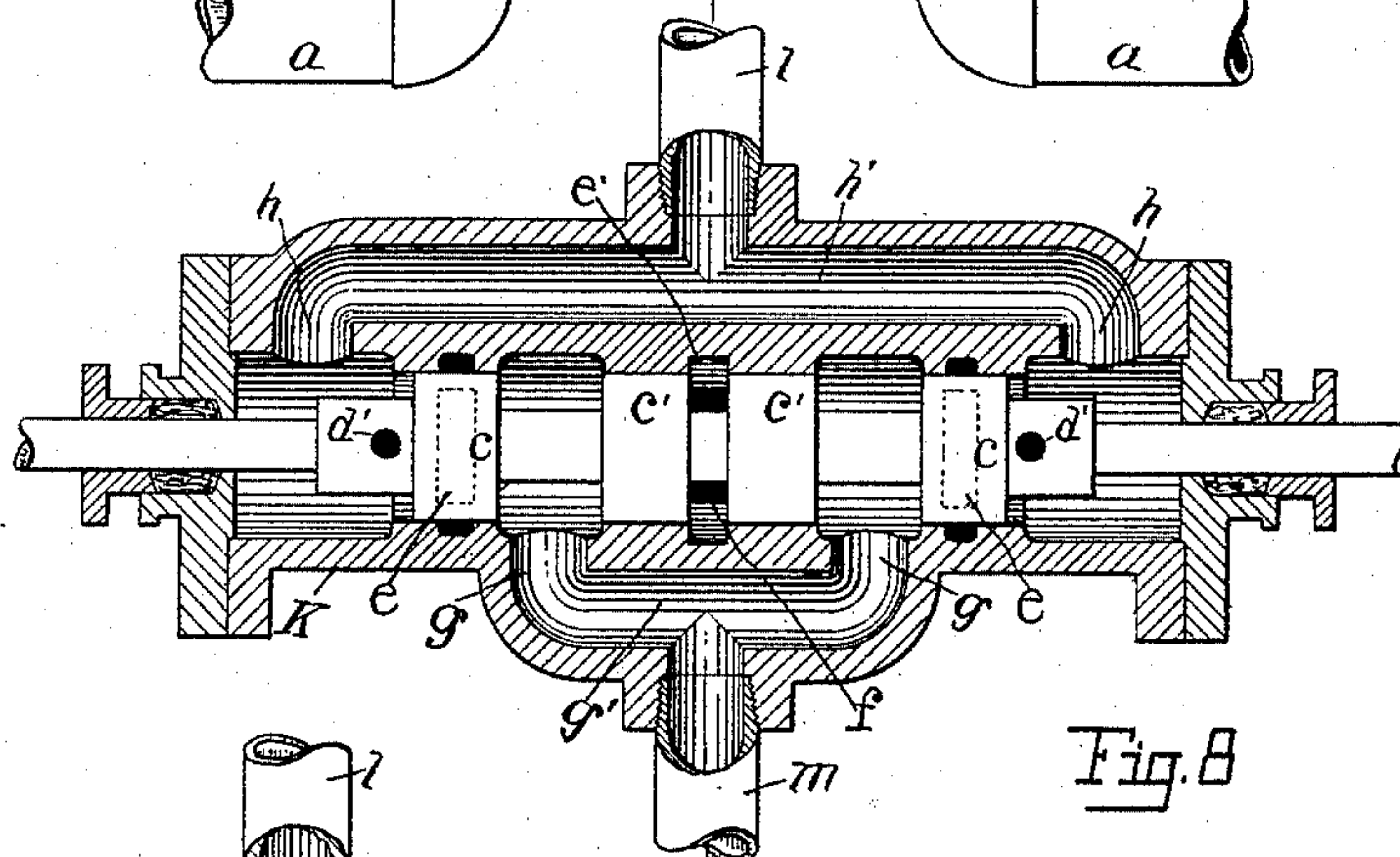


Fig. 8

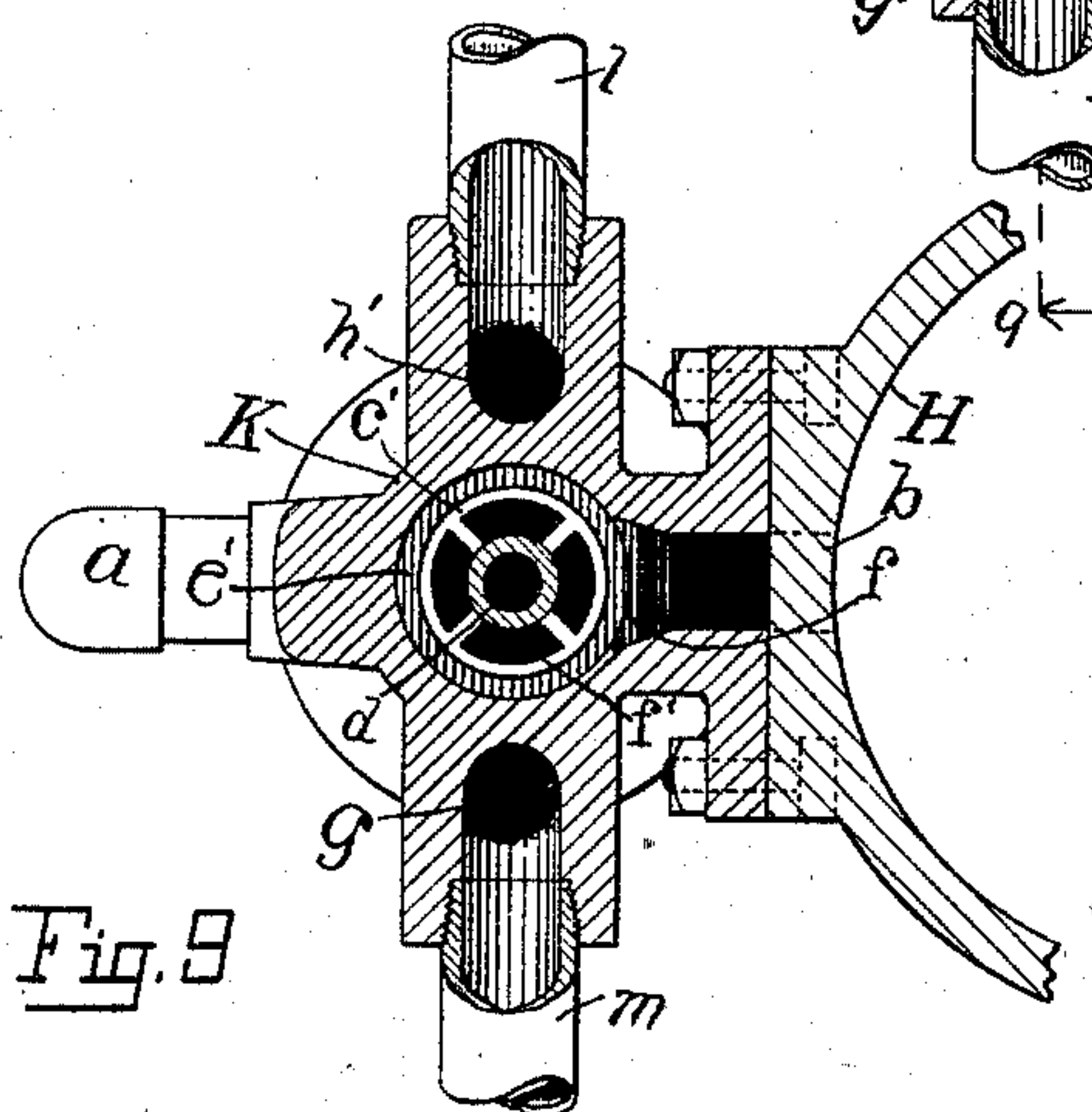


Fig. 9

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UNITED STATES PATENT OFFICE.

WILLIAM E. HILL, OF KALAMAZOO, MICHIGAN.

LOG-UNLOADER.

SPECIFICATION forming part of Letters Patent No. 526,624, dated September 25, 1894.

Application filed October 20, 1893. Serial No. 488,673. (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 Log-Unloaders, of which the following is a specification.

My invention relates to log unloaders which are a kind of log roller designed to throw logs or cants, as the case may be, from the conveyer chain trough (sometimes called the haulup slip) on to the log deck or skidway of a sawmill.

The objects of my invention are, first, to make a log unloader that shall be equally effective in unloading large logs or small ones; second, to provide a double log unloader that shall be operated by a single steam cylinder and rock-shaft; third, to provide a log unloader that shall start a log from the conveyer chain trough with great power, which is the time it is most needed to raise the log from the trough; fourth, to provide a steam log unloader that shall assume the normal position ready for work as soon as its operating lever is brought to or near to the starting point by an improved arrangement of the valve and steam cylinder and balancing of the thrusting bars and levers; fifth, to provide a log unloader as compact and complete in itself as possible so that no great change shall be required in the construction of the saw-mill where it is to be used and very little fitting of the parts outside of the machine shop where the log unloader is made.

I accomplish the objects of my invention by the mechanism shown in the accompanying drawings, in which—

Figure 1, is a top plan view of my invention in position in a saw mill, a part of the log decks and the conveyer chain trough being broken away to show the parts. Fig. 2, is a sectional view on the two lines 2—2 of Fig. 1, looking in the direction of the arrows, the lower part showing the steam cylinder and adjacent parts and the upper portion showing a set of the arms on the rockshaft and their attachment to the thrust bars D. Fig. 3, is a detail view of one of the guides for the thrust bars D. Fig. 4, is a sectional view on line 4—4 of Fig. 3. Fig. 5, is a detail side view of

the bracket E' for adjustably attaching the lever E. Fig. 6, is an end view of the part shown in Fig. 5. Fig. 7, is a detail view of a portion of the steam cylinder and the valve on line 7—7 of Fig. 2. Fig. 8, is a sectional view on line 8—8 of Fig. 7. Fig. 9, is a sectional view on line 9—9 of Figs. 7 and 8.

Similar letters of reference refer to similar parts throughout the several views.

The log decks or skidways A, A, placed on both sides of the conveyer chain trough Z and the trough Z are in the usual form. Through the sides of the trough Z suitable openings or passages are made for the passage of the thrust bars D. On suitable timbers directly below the conveyer chain trough a rock shaft B is located parallel with the said trough Z. The rock shaft B has a series of upwardly projecting arms C on each side which are connected by the connecting bars F, F, to levers E, E, on each side, there being as many arms and levers on each side as there are thrust bars D required. There should be two or more of said thrust bars D on each side to make an effective machine. The upper ends of the levers E are pivoted to the lower end of the thrust bars D. The thrust bars D point up and inward toward the logs in the conveyer chain trough, through the openings in the sides of said trough. Each thrust bar D passes through a loose guide G attached to the timbers of the log deck or skidway. There are friction rollers i on the top and bottom of each of said guides G so that the thrust bars D can pass through them easily. The lower end of the levers E are attached to the brackets E' on the timbers below. A series of holes in the brackets E' afford a means of adjusting the height of the same. It will be seen that as the height of the attachment of the lower ends of the levers E is increased the upper ends of the thrust bars D will be lowered nearer to the bottom of the conveyer chain trough, and vice versa, thus adapting the log unloader to different sized logs. The halves of my improved log unloader are exact duplicates on each side of the conveyer chain trough. It will be seen, also, that the two sides are separately adjustable.

On the rock shaft B is a segment gear B' acted upon by the reciprocating rack J which

I prefer to reciprocate by a steam cylinder H operated by means of the valve K although it can be operated by other means.

In operating my improved log unloader the rack J is moved from the middle to one side. The dotted lines show the position of the parts in unloading a log toward the right. The thrust bar D on the left side will carry the log up and the thrust bars D on the right remain practically stationary the movement being very slight as the arm C attached to it through the bar F moves only a little past the center. After the log is rolled off on the log deck the rack J is moved to the central position again when the thrust bars D will be in position to allow a new log to be drawn up by the conveyer chain or other means when it can be thrown on to the log deck the same as before or to the other side as required. It will be seen on examination that in the movement of the thrust bars D the upper end passes first quite close to the chain and then raises out the log, and, again, when the rock shaft starts the log, the arm C, to which the connecting bar F is attached starts from near the center and consequently with great power.

I prefer to operate the rack J by the following mechanism: A steam cylinder H is placed on the timbers below. A piston rod I passes through the entire length of the cylinder and is attached by a suitable cross head at each end to a guide bar below and to the rack J above. The rack J reciprocates in a suitable guide on top of the cylinder. The steam cylinder H is controlled by the valve K which is operated by a suitable operating lever. The valve K and cylinder H are so constructed that when the valve K is moved to the central position the piston head L will return to the center of the cylinder carrying with it of course by means of its connections the rack J and so operating the log unloader and by stopping it on the center leaves it ready for action when the next log is hauled up. This dispenses with springs and weights and auxiliary steam cylinders for that purpose which have been heretofore used.

The valve K and so much of the steam cylinder H as is necessary to show the details of this construction are shown in Figs. 7, 8 and 9. The valve is a balanced piston valve and is divided into four sections one at each end c, c , and two toward the center c', c' . The valve is reduced in size between the sections for the passage of steam and the chambers are enlarged between each seat and there is a seat to each section. Through the central sections c', c' are openings f' so that steam can pass through them freely from one section c to the other. Pipes a, a run from the annular valve seats of the sections c, c , to the ends of the steam cylinder. There is a port f at the center of the valve opening into the enlarged chamber e' between the seats of the central sections c', c' . This central port

opens through suitable passages to ports b, b , which are an equal distance each side of the center of the cylinder H and near enough together to be covered and closed by the piston head L when it is in the center of the steam cylinder.

Ports h, h , at the extreme end of the valve are connected by passage h' to pipe l which connects with the live steam in the boilers at all times. The places at each end are also connected together by the opening d through the center of the valve. Exhaust ports g, g , connect by passages g', g' to the exhaust pipe m at all times.

When the piston portion of my improved valve is moved to one side of the center, for instance to the left, the right hand section c' will move over the enlarged portion e' of the chamber closing it and the port f . The right hand section c will be moved off from the annular port e which admits live steam from the right hand end of the valve chamber through the right hand pipe a to the right end of the steam cylinder. This will carry the piston head L to the left. The left hand section c will have moved off from the left hand annular port e and will have connected that port through the valve chamber to the exhaust pipe m in the central portion of the valve. The effect so far is only the action of an ordinary steam engine and valve. When the valve is moved back to the center the chamber between the sections c', c' comes opposite the enlarged portion e' and is consequently connected with the port f and exhausts the steam from the center of steam cylinder H back of the piston head through the ports b, b when the compressed air or steam in the opposite end of cylinder H will return the piston to the center. If the expansion of the steam is not sufficient to do so the valve should be moved to give that end a little steam and then be quickly closed, when it will move the piston head L to the center and stop it as soon as it reaches that point for the steam will then exhaust through the passages f out at the center of the valve K. This manipulation of the valve will not be often needed for the parts of the unloader as constructed are balanced to come to rest or be in stable equilibrium only when the parts are at the center.

Where my improved log unloader is not in constant use which is the usual case, the construction of valve K and steam cylinder H as above is preferred because it saves steam.

Where the machine is in constant use I prefer to make small openings as z, z from the pipes a, a on each side into the outer end of the valve seat to the sections c, c so that a little live steam will be admitted to both pipes a, a when the valve is on the center. This effect can also be obtained by shortening the piston portion of the valve so it will not entirely cover both end ports when in the central position as will be readily seen on

examination. When the valve is moved off the center of course these ports have no effect. When the valve is on the center the effect of these openings $z\ z$ is that if the piston head L does not cover the ports in the center of the steam cylinder steam will be exhausted from one side through these center ports b, b , and the pressure on the other end will carry the piston head toward the center and when it covers the port the steam will cease to exhaust and the pressure will be the same on both sides and it will stand till the valve K is moved again. With this variation the steam cylinder H is constantly full of steam. This fact is not objectionable where the unloader is in constant use and acts more quickly and perfectly requiring no extra movement of the operating lever at any time; but when not in constant use the construction first above indicated is preferred because the parts are not filled with steam which causes waste by condensation.

I am aware that my improved log unloader can be varied. Almost any shaped engine can be constructed so that where it stands on its center an exhaust port will be open at the center of the cylinder by simply boring a hole through it and the valve when at that point, and such a construction will accomplish the object of my invention in regard to the valve and cylinder though perhaps not so perfectly as the construction I have shown, the openings inside the cylinder of course corresponding in length to the length of the piston head.

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

1. In a log unloader, the combination of a series of thrust bars, D, adapted to pass through openings on each side of a conveyer chain trough; a lever, E, pivoted to the lower end of each thrust bar, D, and to a bracket below; connecting bars, F, pivoted to each lever, E, and to upwardly projecting arms, C, on a rockshaft, B; and suitable means of rocking the rock-shaft, B, substantially as described.

2. In a log unloader, the combination of the thrust bars, D, on each side of the conveyer chain trough; the levers, E; the bars, F; the rock-shaft, B; the series of arms, C; the segment gear, B'; the rack, J; the steam cylinder, H, having the piston rod, I, passing through it and attached to the rack, J, at each end; and the valve, K, to operate the same, substantially as described for the purpose specified.

3. In a log unloader, the combination of a steam cylinder, H, having a piston rod running through both heads of it and attached by suitable means to a rack, J, to act on a segment gear, B', to rock shaft, B; a piston head, L, attached to the center of said piston rod; a valve, K, adapted to operate said cylinder and to open a central exhaust port

therein when moved to its center to cause the piston head to return to the center; and suitable log thrusting parts connected with said rock-shaft, B.

4. In a steam log unloader, a rock-shaft, B; the segment gear, B', on said rock-shaft; the reciprocating rack, J, adapted to operate said segment and rock the rock-shaft; arms, C, on each side of said rock-shaft pivoted to thrust bars adapted to throw a log from a conveyer chain trough onto a log deck, for the purpose specified.

5. In a log unloader, a series of thrust bars adapted to push the log from a conveyer chain trough; in combination with a rock-shaft having arms pivotally connected by suitable means to said thrust bars; and suitable means of operating said rock-shaft, the arms on said rock-shaft being adapted to start from near the dead center to move said thrust bars in contact with the log so that they shall move with great power to start the log, for the purpose specified.

6. In a log unloader, a series of thrust bars on each side of a conveyer chain trough, suitably guided, in combination with a rock-shaft under the conveyer chain trough; upwardly projecting arms on each side of said rock-shaft; and connecting bars from the arms of said rock-shafts to actuate the thrust bars on their respective sides, so that when the thrust bars on one side of the unloader are operated the other side will move only slightly because the arms will only move a little by the center, as described.

7. In a log unloader, the combination of a series of thrust bars, D, adapted to push a log from a log trough; a lever, E, adjustably pivoted to the bracket, E', below and projecting upwardly and outwardly and pivoted to the thrust bar above so that the unloader can be adapted to different sized logs, as described.

8. In a double log unloader, thrust bars on each side of the log trough; suitable means of actuating the same together; and suitable guides to each side for the thrust bars so that when operated, the thrust bars on one side will be raised to unload a log and the thrust bars on the other side will not be lowered so that when the power is withdrawn the raised thrust bars will of their own weight drop down to the place of beginning to bring the unloader in position for the next log to be hauled up by the conveyer chain, for the purpose set forth.

9. In a double log unloader, the combination of a steam cylinder; log unloader thrust arms connected to said cylinder to be operated by it; an engine valve to control the admission and exhaust of steam to and from said steam cylinder, the said engine valve in addition to the functions of an engine valve being adapted when on its center to open an exhaust port at the center of said cylinder; and small inlet ports for steam at each end of said cylinder to bring the piston head to the center, for the purpose specified.

10. In a double log unloader, the combination of a steam cylinder; log unloader thrust arms connected to said cylinder to be operated by it; an engine valve to control the admission and exhaust of steam to and from the said steam cylinder, the valve being adapted to open a port to the center of said cylinder when the valve is on its center in addition to the functions of an engine valve so as to cause the piston head to return to the center of the cylinder when the valve is in the central position to bring the unloader to the central position, for the purpose set forth.

11. The combination, in a double log unloader, of the cylinder, H, containing the piston head, L, adapted to cover the central exhaust ports, *b, b*, of said cylinder; log unloader thrust arms connected to said cylinder to be operated by it; a valve, K, consisting of a piston portion having end sections, *c, c*, and central sections, *c', c'*; seats in the valve casing for each section, the valve chamber being enlarged between the seats and at each end of the piston portion, and the piston portion reduced in size between the sections and at the ends; pipes, *a, a*, connecting ports, *e, e*, in the end seats to the ports in the end of the steam cylinder; exhaust port, *f*, adapted to open when the valve is in the center; and openings, *f'*, through the central sections, *c', c'*, and opening, *d* through the middle of the valve; and exhaust pipe, *m* connected at all times with the central part of the valve; and

inlet pipe, *l*, connecting the end chamber with the steam supply at all times, all operated as described for the purpose specified. 35

12. The combination in a double log unloader, of log unloader arms; the cylinder connected thereto to operate them, and containing the piston head, L, adapted to cover the central exhaust ports, *b, b*, of said cylinder; a valve, E, consisting of a piston portion having end sections, *c, c*, and central sections, *c', c'*; seats in the valve casing for each section; the valve chamber being enlarged between the seats and at each end of the piston portion, and the piston portion reduced in size between the sections and at the ends; pipes *a, a*; connecting ports, *e, e*, and ports to passages, *z, z*, in the end seats to the ports in the end of the steam cylinder exhaust port, *f*, adapted to open when the valve is in the center; and openings, *f'*, through the central sections, *c', c'*, and opening, *d*, through the middle of the valve; and exhaust pipe, *m*, connected at all times with the central part of the valve; and inlet pipe, *l*, connecting the end chambers with the steam supply at all times; all operated as described for the purpose specified. 50

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

WILLIAM E. HILL. [L. S.]

Witnesses:

WALTER S. WOOD,
THEODORE MERRILL.