

APPLICATION FILED APR. 13, 1909.

4 SHEETS—SHEET 1.

Witnesses
C. Raeder
H. E. Montague

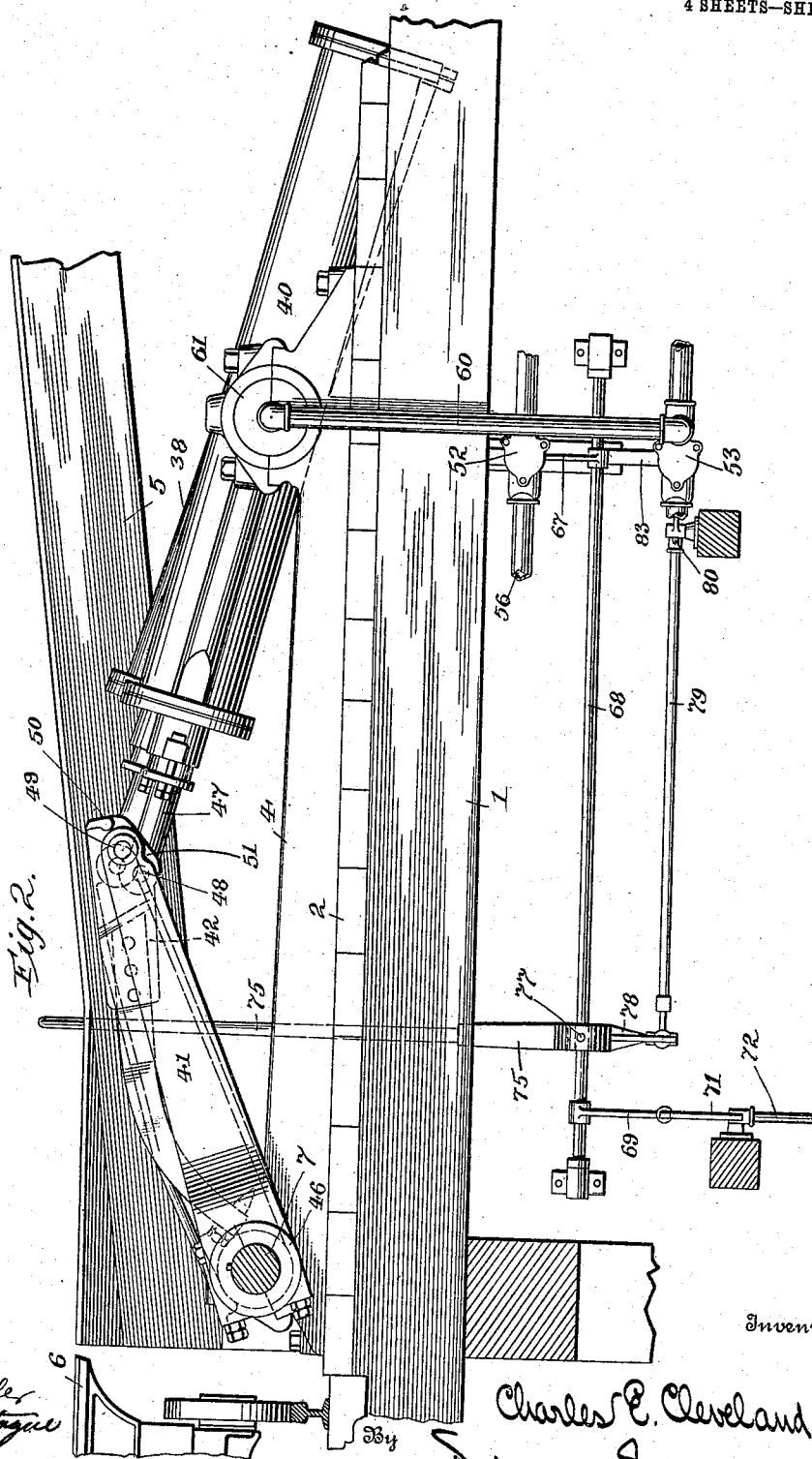
Charles E. Cleveland,
Dodge and Sons, Att

Attorney's

933,231.

C. E. CLEVELAND.
LOG HANDLING MECHANISM.
APPLICATION FILED APR. 13, 1909.

Patented Sept. 7, 1909.
4 SHEETS—SHEET 2.



Witnesses
E. H. Rade
H. C. Montague

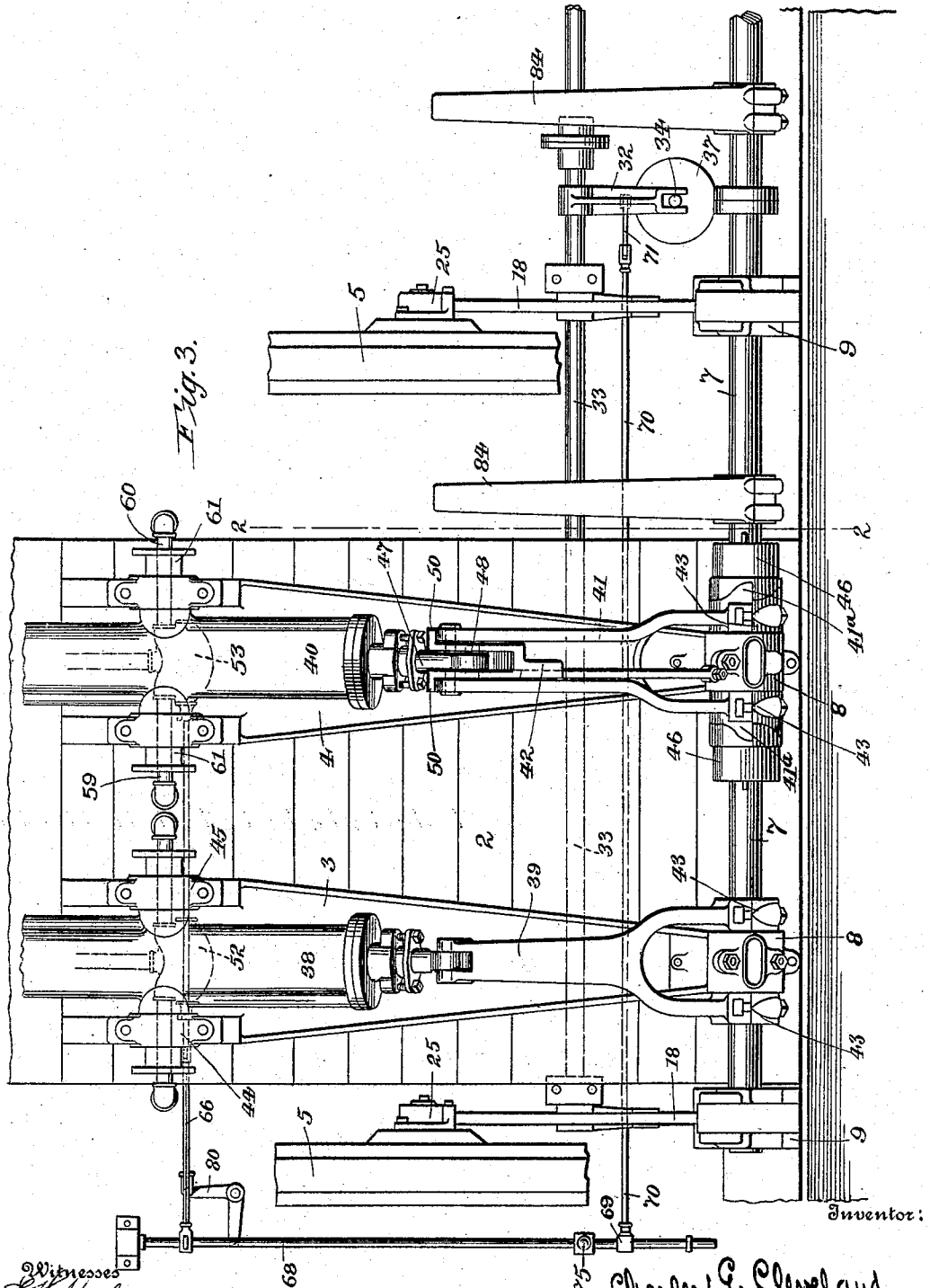
Inventor,
Charles E. Cleveland,
Sage and Sons Attorneys.

933,231.

C. E. CLEVELAND.
LOG HANDLING MECHANISM.
APPLICATION FILED APR. 13, 1909.

Patented Sept. 7, 1909.

4 SHEETS—SHEET 3.



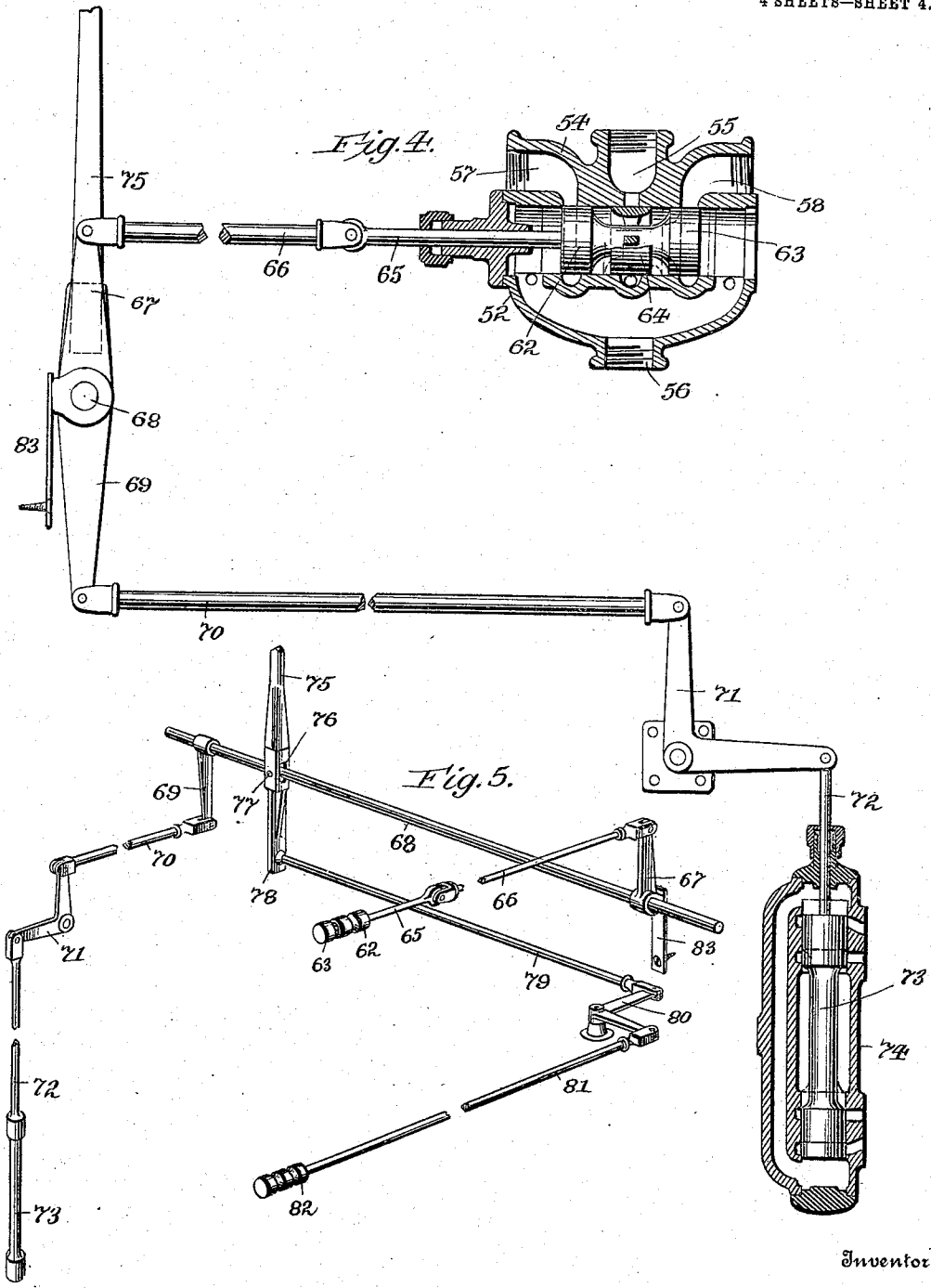
Witnesses
C. E. Cleveland
H. C. Montague

334

Charles E. Cleveland,
Dodge and Sons,

Attorneys.

C. E. CLEVELAND.
 LOG HANDLING MECHANISM.
 APPLICATION FILED APR. 18, 1909.
 933,231.
 Patented Sept. 7, 1909.
 4 SHEETS—SHEET 4.



Witnesses
C. A. Taylor
A. C. Montague

Inventor:
Charles E. Cleveland
 By *Dodge and Sons*,
 Attorneys

UNITED STATES PATENT OFFICE.

CHARLES E. CLEVELAND, OF FOND DU LAC, WISCONSIN.

LOG-HANDLING MECHANISM.

933,231.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed April 13, 1909. Serial No. 489,675.

To all whom it may concern:

Be it known that I, CHARLES E. CLEVELAND, a citizen of the United States, residing at Fond du Lac, in the county of Fond du Lac and State of Wisconsin, have invented certain new and useful Improvements in Log-Handling Mechanism, of which the following is a specification.

My present invention pertains to an improved log-handling mechanism, designed more particularly to load the log onto a saw-mill carriage, to turn the same after a slab has been cut therefrom, to elevate and replace the log on the carriage.

The invention is illustrated in the annexed drawings, wherein:

Figure 1 is an end elevation of the apparatus, showing more specifically the independent skid-lifter or lifter-arm and the mechanism for operating the same; Fig. 2 a vertical sectional view on the line 2—2 of Fig. 3; Fig. 3 a top plan view of the mechanism as a whole; Fig. 4 a diagrammatic sectional view of the valve for operating the lifter, the valve for controlling the push arm (or arms) and the connections for operating the same; Fig. 5 a diagrammatic perspective view of the connections between the single operating lever and the three controlling valves, one each for the lifter, the push arm and the hook arm; Fig. 6 a vertical sectional view of the mechanism employed to raise and lower the lifter or movable skid member; Fig. 7 an end elevation of the supporting member for the outer end of the skid; Fig. 8 a perspective view of the lever or combined lever and rocker arm employed in connection with the skid; Fig. 9 a perspective view of the base or pillow-block upon which the lever is seated and rocks; and Fig. 10 an elevation of a modified structure which may be employed to raise and lower the movable skid.

The main object of the present invention is to produce a simple and efficient loading mechanism by which the log may be readily placed upon the saw-mill carriage, removed therefrom and turned, and again replaced.

A further object is to provide a suitable valve mechanism for controlling the pistons of the machine, which mechanism may be controlled by a single hand-operated lever, thus leaving the operator the free use of his feet, one of which may be employed to con-

trol a foot-lever or pedal which in turn controls the usual chain-feed, or the like, employed in connection with the skid-way.

A still further object is to provide a structure in which the valves and all joints which become subject to leakage due to wear are removed from the power cylinders and placed at a point or points where they are readily accessible.

Another object of the invention is to provide a superior form of bed-plate, upon which the power cylinders are mounted, and further, to so form the main push-arms that they may have a more extended and firmer bearing on their supporting shaft.

It is also an object of the invention to provide a simple and effective mechanism for raising and lowering the skid or lifter-arms.

With these and other objects in view, a detail description of the invention will be given, reference being had to the construction illustrated in Figs. 1 to 9 inclusive. In said figures, 1 denotes the main framework of the structure, upon which is placed the decking 2 which forms the support for the bed-plates 3 and 4, best shown in Fig. 3.

The fixed, inclined skid-way 5 may be of any improved form, and leads to a point adjacent to the carriage 6, partly shown in Fig. 2.

Any suitable feed mechanism for advancing the logs along the skid-way and any suitable lumber-stop device, such as those now commonly employed, may be used in connection with the skid-way, but inasmuch as these form no part of the present invention they are not illustrated.

A shaft 7 extends along the framework, parallel to the runway or tracks of the carriage, at the lower end of the skid-way, the shaft passing through bearings 8 formed at the outer ends of the bed-frames or plates 3 and 4 and through suitable pillow-blocks 9 arranged to one side of the skid-way 5, as indicated in Fig. 3. One of said blocks is shown in detail in Fig. 9, and is provided with an opening through which the shaft 7 extends. Each pillow-block is bolted securely to the timbers and is provided with two upstanding lugs or ears 10, between which is formed a rounded bearing 11, which is seated a rounded member 12, formed upon the lower end of a combined lever and rocker-arm, shown in detail in Fig.

8. Said member is provided with an outwardly-extending arm 13, and in its upper face with a V-shaped recess or seat 14, adapted to receive the lower end of a link 15, the upper end of which fits in a rounded seat 16 formed in the under face of a supporting member or casting 17, in which the outer end of the movable or lifting skid-arm 18 is secured. Said casting is provided with downwardly-projecting side faces or walls 19, which at their lower ends are each provided with a curved or semicircular recess 20. Flanges or collars 21 extend outwardly from said lower walls and conform to the curvature of said recess, so that when the parts are lowered said flanges will come to rest upon the rounded faces of the lugs or ears 10 formed upon the pillow-block. Between the vertical walls 19 is formed a transversely-extending wall 22 and an inclined wall or web 23, the wall 22 tending to strengthen the structure and the web 23 likewise preventing the link 15 from being thrown too far forward upon the upward movement of the arm 13. The skid-arm, at its free end, is seated between upwardly-extending arms 24 (see Fig. 7), formed upon the casting, the skid-arm being bolted in place. The opposite end of the arm is fulcrumed or pivoted in a box or bearing 25 bolted to the side of the permanent skid-way 5. When the arm or lever 13 is thrown upwardly, into the position shown in Fig. 1, the toggle formed by the link and the rocker-arm will be straightened, and the movable skid-arm 18 is elevated at its lower end, so that it extends a distance above the upper face of the fixed skid-way 5. When the lever 13 is lowered, the free end of the skid arm will pass to a point just below the upper face of the fixed skidway 5. Under this construction it will be noted that the movable skid member 18 is not supported upon or actuated by the shaft 7, it being entirely independent thereof. If, however, it should be desired to support said member from the shaft, the construction shown in Fig. 10 may be employed, wherein a rocker-arm 26, having a rounded bearing 27 on its under face, is seated directly upon the shaft 7, the rocker-arm having formed in its upper face a seat or recess 28, adapted to receive the lower end of a link 29 which at its upper end is seated in a recess formed in a supporting frame or casting 30 for the movable skid member. In this, as in the former construction, there is substantially a toggle arrangement which, when the lever is thrown upwardly, tends to straighten the toggle thereby elevate the movable skid member, and when lowered acts to break the toggle or to throw the link to one side, thereby permitting the skid member to be lowered. Two of said movable skid members are shown in Fig. 3, and it will be readily ap-

preciated that as many skid members may be employed as may be found desirable in any particular plant. They are all actuated simultaneously through the connection about to be described.

Extending downwardly from each of the rocker-arms or levers is a link 31, each of said links in turn being connected to an arm or lever 32, see Fig. 1, arranged in line with the link, said arms being rigidly secured upon a counter-shaft 33 which extends beneath the framing, as best shown in Fig. 3. To one of the arms 32 (Fig. 1) is secured, at its outer end, a link 34, which in turn is pivotally attached to the upper end of a slide 35, carried at the upper end of a piston-rod 36, working in a cylinder 37. The valve which controls the admission and exhaust of steam to and from the cylinder 37 and the means for positioning the valve will be set forth in detail in connection with the valve mechanism employed in conjunction with the pusher-arm and hook-arm cylinders.

In most of the saw-mills heretofore constructed, in which power cylinders are employed for actuating the pusher-arm and hook-arm, the valve mechanism for controlling the admission and exhaust of steam to and from said cylinders has been placed in the trunnions of said cylinders, and as said parts are usually floored over or covered by the log-deck, they are more or less inaccessible. Further, being placed directly in the trunnions, the wear incident to the movement of the cylinders upon the trunnions caused the same to leak more or less quickly after the plant had been put into operation. With the present construction, however, the valve mechanism is all arranged at a point below the framing, where it is readily accessible.

The power cylinder 38, for actuating the push-arm 39, and power cylinder 40, for actuating the hook-arm 41, and its hook 42, are mounted in the same manner.

Each of the cylinder supporting bed plates 3 and 4 is alike in form, being a broad, straight casting provided at its outer end with a bearing 43 which embraces the shaft 7, and with bearings 44 and 45 for the trunnions of the cylinder. As will be seen upon reference to Fig. 3, the lower or outer end of each of the arms 39 and 41 is forked or bifurcated, the members or bearings 43 making a close fit against the boxes or bearings 8. Thus said arms get a relatively wide bearing upon the shaft and the parts all serve to mutually support and sustain each other, the straight and relatively broad bed-plate standing the strains to which it may be subjected much better than the usual crooked plates now in use. The arm 39 is made fast to shaft 7 and serves to rotate the same. Arm 41, however, is swiv-

eled on the shaft, being provided with jaws 41^a which function with clutch collars 46, keyed to shaft 7. Said collars assist in maintaining the arm in place, and likewise, when the arm is thrown upwardly, cause the shaft 7 to rotate and thus cause all of the arms (39 and certain helper arms herein-after referred to) to move up against the log and prevent the same from skidding when the hook pulls the log over.

The piston-rod 47 of the power cylinder 40 is pivotally connected at 48 to the hook 42, Fig. 2, which latter in turn is fulcrumed at 49 upon the arm 41. As will be seen upon reference to Fig. 3, the hook arm is bifurcated, and is provided with outwardly-extending wings 50, which when the piston-rod is moved outwardly and the hook consequently thrown upward, pass about the end of the arm 41 until they enter the depressions 51 (Fig. 2) formed in the under side of the arm 41. Further outward movement of the piston-rod actuates the arm 41 directly, as the hook and arm are at such time locked together and move as one.

Each of the power cylinders 38 and 40 is provided with a controlling valve 52 and 53, respectively, Figs. 2 and 3, the valves being the same in form, one of which is shown in detail in Fig. 4. Said valve comprises a shell or casing 54 provided with a steam inlet 55, exhaust port 56 and steam ports 57 and 58, which are connected, respectively, to the pipes 59 and 60 (Figs. 2 and 3), which pipes pass through packing glands 61, secured in the outer ends of the trunnions of the power cylinders. Thus a steam-tight joint is effected between the cylinders and the pipes, which serve to convey steam to and exhaust the same from the power cylinders, the pipes, of course, being connected to the passages leading to the opposite ends of the cylinders, as is usual. A double-piston valve, having pistons 62 and 63 and an intermediate cut-off ring 64, is employed to control the passage of the steam to the inlet port 55 and one or the other of the ports 57 and 58, and to throw the exhaust port 56 into operative relation with the port through which live steam is not passed, said pistons being connected to a piston-rod or valve-stem 65, which in turn is pivotally connected by a link or rod 66 to a rocker arm 67 secured to a rocker-shaft 68. This shaft, as will be noted upon reference to Fig. 3, is located at one end of the apparatus and has secured to it a second rocker-arm 69, which in turn is connected by a link 70 and elbow-lever 71 to the valve-stem 72 of a double-piston valve 73, mounted in a valve-shell or casing 74, which valve controls the admission of the steam to and exhaust from the power cylinder 37 which actuates the movable skid arms 18.

As will be seen upon reference to Fig. 4,

the arm 69 is slightly longer than the arm 67; consequently, the piston valve 73 will be moved faster than the piston of the valve 52. Furthermore, as will be seen upon reference to Fig. 4, the valve 73 is given but a slight lap, and consequently a slight movement thereof will admit steam to one end of the cylinder 37 and exhaust it from the other. On the other hand, the piston of the valve 52 is given considerable lap, and it requires a relatively greater movement to effect an opening of the ports in said valve, and as a consequence the lifter arm 18 may be actuated either to raise or lower the same, independent of any movement of the push-arm, the operation of which is controlled by the valve 52.

The rocking of the shaft 68 is effected through the agency of a handle or lever 75 through which the shaft passes, said handle being provided with an opening 76, see Fig. 5, the opening being sufficiently large to permit the lever to be rocked independently of the shaft in line with the axis of the shaft upon a pin 77 which secures the lever to the shaft. When, however, the lever is moved at right angles to the axis of the shaft 68, said shaft will be rocked and as a consequence the piston-valve 73 will be moved in one or the other direction, and if the lever is swung far enough, the piston of the valve 52 will likewise be actuated.

The lever 75 is provided with a downward extension 78, to which a link or rod 79 is universally connected. Said link or rod in turn is connected to one end of an elbow-lever 80, the opposite end of which is connected to a piston-rod 81, to which is secured a double piston 82, that controls the valve 53, which as before noted, controls the operation of the piston of the power cylinder which operates the hook arm. A flat plate spring 83 (Figs. 4 and 5) will be employed in conjunction with the flat face formed upon the rocker-arm 67 to throw the rocker-shaft 68 back to its medial position and thus hold the valves in their central or inoperative position. It will thus be seen that the handle 75 may be rocked in line with the axis of the shaft 68, thereby positioning the piston 82 of the valve 53 and causing the hook arm to be actuated independently of any movement of the skid arm 18 or the push arm 39. On the other hand, all three of the members may be actuated together if so desired, or brought into action successively. The lever having a universal movement, permits this operation and leaves the attendant free to control the log-stop and the feed mechanism through levers or a foot pedal.

Under the usual installation, the sawyer or operator stands with one hand on the lever controlling the steam feed and the other hand on the lever controlling the log-loader, with one foot on the independent

skid-lifter controlling pedal and the other foot on the log-stop pedal. This arrangement is obviously unsatisfactory. By connecting up the parts as herein specified, so that a single lever will control the operation of the log-turning arm, the skid-lifter and the hook-arm, the operator is relatively free and he may readily use one hand to actuate the pedal employed for controlling the log-stop. The other hand, of course, may be readily used to operate the lever which controls the steam feed. Thus the operator is left at least one foot upon which to stand.

From the foregoing description it is thought that the operation of the mechanism will be understood by those skilled in the art.

The apparatus permits the hook arm to be operated to catch the log to turn it down onto the deck and thereafter to raise the skid arms 18 independently of any movement of the push arm 39, so that the log is slightly raised above the head block before the push arm comes into play. This prevents the log from catching on the nose of the block as it would otherwise do were the arms 18 not lifted prior to the actuation of the push arm 39, and the coacting helper arms 84 which are secured to the shaft 7 and move therewith when the same is operated through the push arm 39.

Having thus described my invention, what I claim is:

1. In a log-handling mechanism, the combination of a skidway; a push-arm; a hook-arm; independent skid arms located to one side of the skidway; a power cylinder for each of said members; and a single operating lever connected to the valve mechanisms of said power cylinders for securing independent operation of said cylinders.

2. In a log-handling mechanism, the combination of a skidway; a push-arm; a power cylinder therefor; a hook-arm; a power cylinder therefor; independent skid-lifting arms arranged at one side of the skidway; a power cylinder for actuating said arms; a controlling lever; connections between said controlling lever and the valve mechanisms of the push-arm cylinder and the independent skid-lifter cylinder for bringing the skid-lifter cylinder into operation prior to the operation of the push-arm; and connections between said lever and the valve mechanism of the hook arm cylinder, said connections being such that said valve may be operated independently of the operation of the other power cylinders.

3. In a log-handling mechanism, the combination of a skidway; a push-arm; an actuating cylinder therefor; a hook-arm; an actuating cylinder therefor; an independent skid-lifter arm; a power cylinder for actuating the same; a rocker-shaft; connections between said shaft, the valve for the cylinder of the push-arm and the valve for the cyl-

inder for the independent skid-lifter arm; a lever secured to said rocker-shaft to rotate therewith but capable of being swung in line with the axis of said rocker-shaft; and connections between said lever and the valve which controls the power cylinder of the hook-arm, whereby said hook-arm may be actuated by a movement of the lever independent of the actuation of the push-arm or the skid-lifter arm.

4. In a log-handling mechanism, the combination of a skidway; a push-arm; a power cylinder therefor; an independently movable skid-arm; a power cylinder therefor; a hook arm; a power cylinder therefor; a rocker-shaft; connections between said rocker shaft and the valve for controlling the power cylinder of the push-arm and the valve controlling the operation of the cylinder for the independent skid-arm, said connections being such that the last-named cylinder will come into operation prior to the operation of the push-arm cylinder; a lever secured to the rocker-shaft, the connection being such that the lever may be moved in line with the axis of the shaft without moving the same; and connections between said lever and the valve for controlling the hook-arm power cylinder, whereby the hook-arm cylinder may be actuated independently of the other parts.

5. In a log-handling mechanism, the combination of a skidway; a push-arm; a power cylinder therefor; an independent skid-lifter; a power cylinder therefor; a hook-arm; a power cylinder therefor; a valve for controlling the admission of steam to and exhaust from the power cylinder of the push-arm; a valve for controlling the admission of steam to and exhaust from the power cylinder of the independent skid-lifter, the last-named valve being given a lap less than that of the first-named valve; a lever for moving said valves simultaneously; and connections between said lever and the valve for controlling the admission of steam to and exhaust from the power cylinder of the hook arm.

6. In a log-handling mechanism, the combination of a skidway; an independent skid-lifting arm pivotally connected at one end thereto; and a toggle mechanism for raising and lowering the outer end of said skid-lifting arm.

7. In a log-handling mechanism, the combination of a skidway; an independent skid-arm pivotally connected thereto; a link arranged below the free end of said arm; and means for throwing the link into and out of vertical position, whereby the arm may be raised and lowered.

8. In a log-handling mechanism, the combination of a skidway; an independent skid-lifter pivotally connected at one end thereof; a link arranged beneath the free end of

said skid-lifter; a fixed bearing; and means interposed between said fixed bearing and the lower end of the link for throwing the link into and out of vertical position, whereby the skid-lifter may be raised and lowered.

9. In a log-handling mechanism, the combination of a skidway; an independent skid-lifter pivotally connected thereto; a link mounted below the free end of said lifter; a fixed bearing; and a combined rocker and lever-arm arranged between said bearing and the lower end of the link, whereby when said member is actuated the link will be thrown into and out of vertical position and the skid-lifter thereby raised and lowered.

10. In a log-handling mechanism, the combination of a skid-way; an independent skid-arm pivoted thereto; a link arranged beneath the free end of said skid-arm; a pillow-block having a seat or recess formed in the upper face thereof; and a combined lever and rocker-arm, the lower end of which rests in the seat and is provided in its upper face with a socket or recess for the reception of the lower end of the link.

11. In a log-handling mechanism, the combination of a skid-way; an independent skid-arm pivotally secured thereto; a casting secured adjacent to the outer end of said arm, the casting having flanges on its lower end; a link, bearing at its upper end in a seat or socket formed in the casting; a pillow-block provided with upstanding lugs, said block having a seat or recess formed therein intermediate said lugs; and a combined lever and rocker-arm, the lower end of which is seated in the recess in the pillow-block, said arm being likewise provided with

a recess in its upper face to receive the lower end of the link.

12. In a log-handling mechanism, the combination of a bed-plate provided at its outer end with a shaft-bearing; a shaft extending through said bearing; an arm in operative relation with the shaft, said arm being bifurcated and straddling the bearing formed upon the outer end of the bed-plate; a power cylinder pivotally mounted upon the bed-plate; and a piston-rod working in the cylinder and connected at its outer end to the adjacent end of the arm.

13. In a log-handling mechanism, the combination of a bed-plate provided at its outer end with a shaft-bearing; a shaft extending through said bearing; an arm the lower end of which is bifurcated and straddles the bearing formed upon the bed-plate and is in operative relation with the shaft; a bearing formed upon each side of the bed-plate adjacent to its rear end; a cylinder having trunnions resting in said bearings; a piston-rod connected to the adjacent end of the arm; pipes for conveying fluid under pressure to and permitting pressure to pass from said cylinder, the pipes passing through the trunnions; and valves located beneath the bed-plate for controlling the admission of fluid to and the exhaust thereof from said cylinder.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES E. CLEVELAND.

Witnesses:

FRANK J. WOLFF,
EARL J. LOHMILLER.