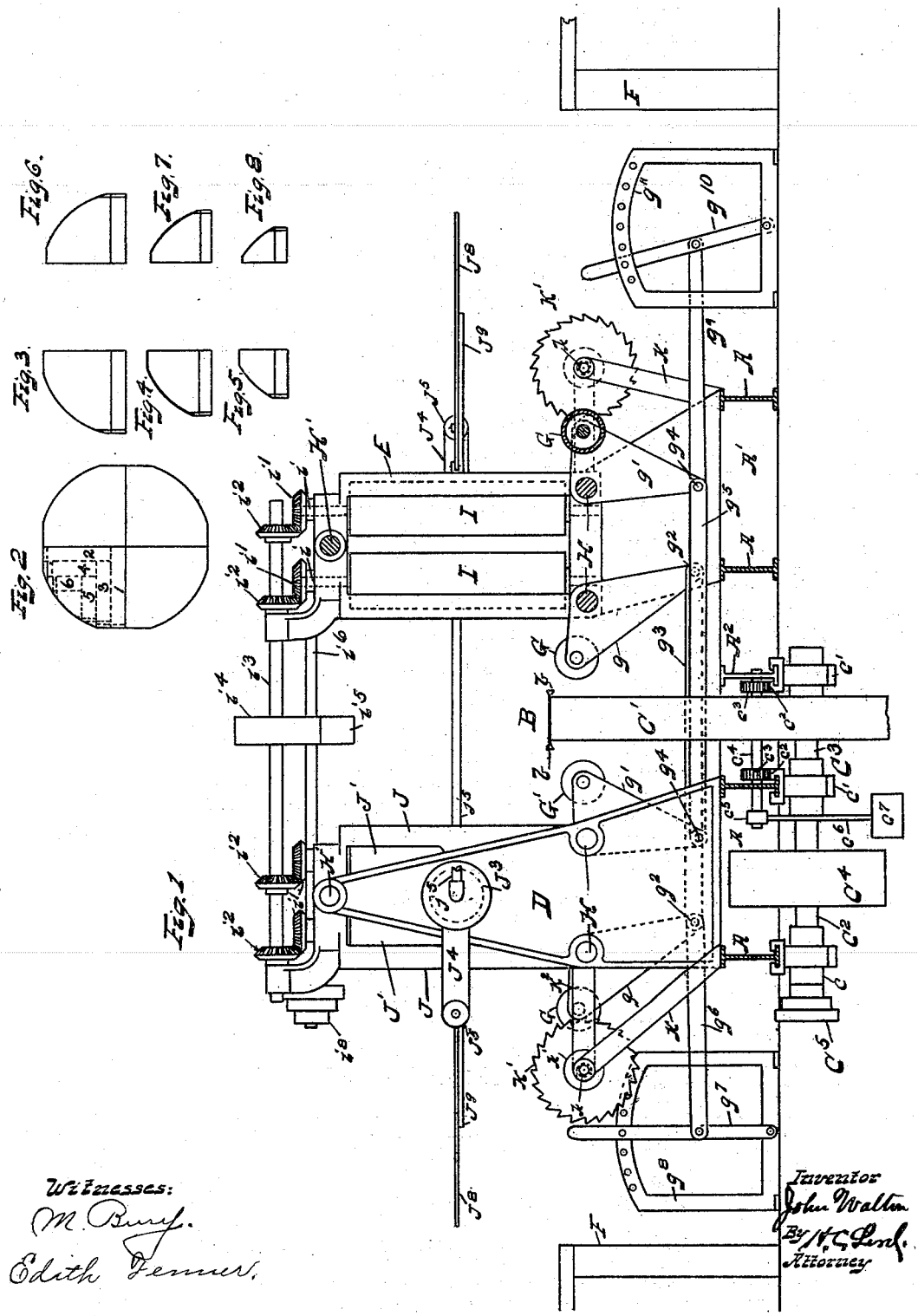
No. 648,473. Patented May 1, 1900.

J. WALTON.

SAWMILL.

(Application filed Nov. 14, 1899.)

(No Model.) 3 Sheets—Sheet 1.



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(No Model.) 3 Sheets—Sheet 2.

Fig. 9.

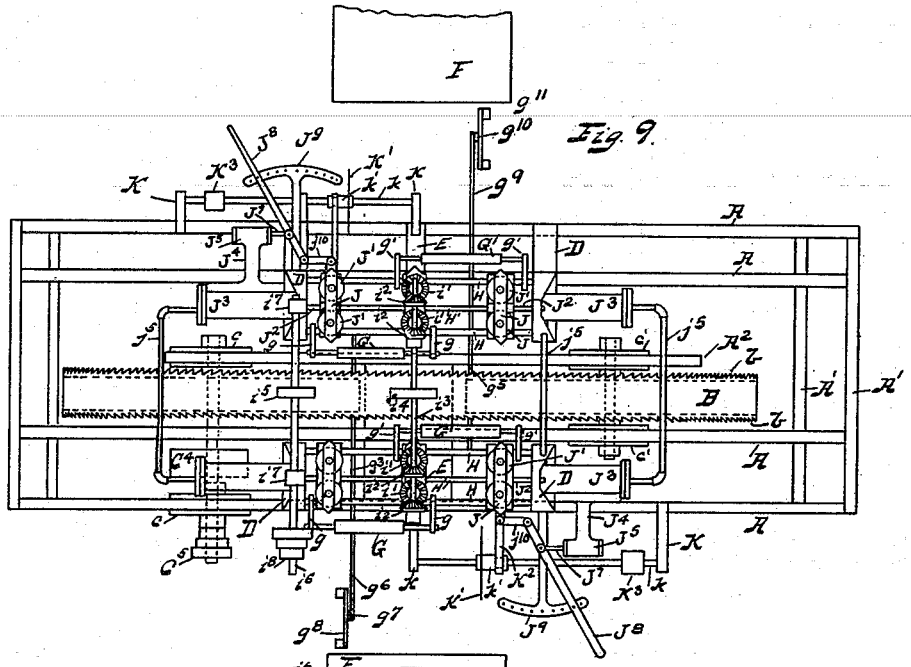
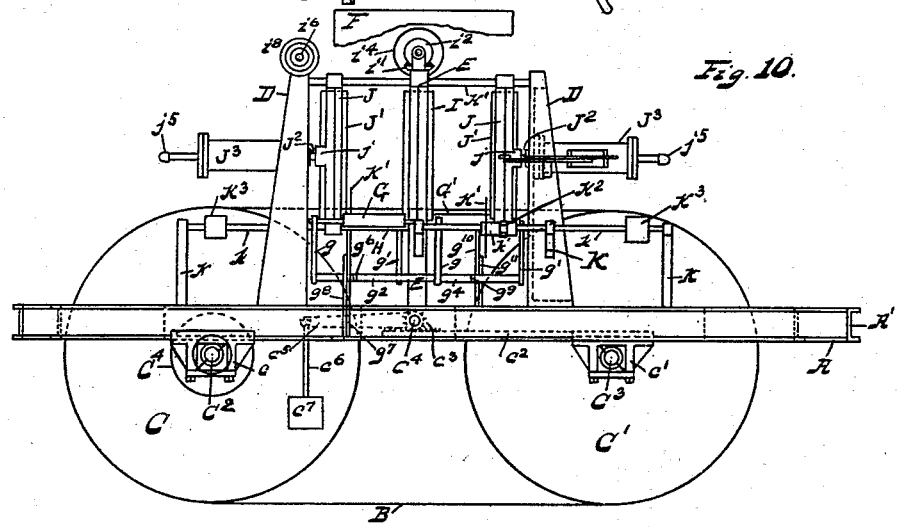


Fig. 10.



Witnesses:
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(No Model.) 3 Sheets—Sheet 3.

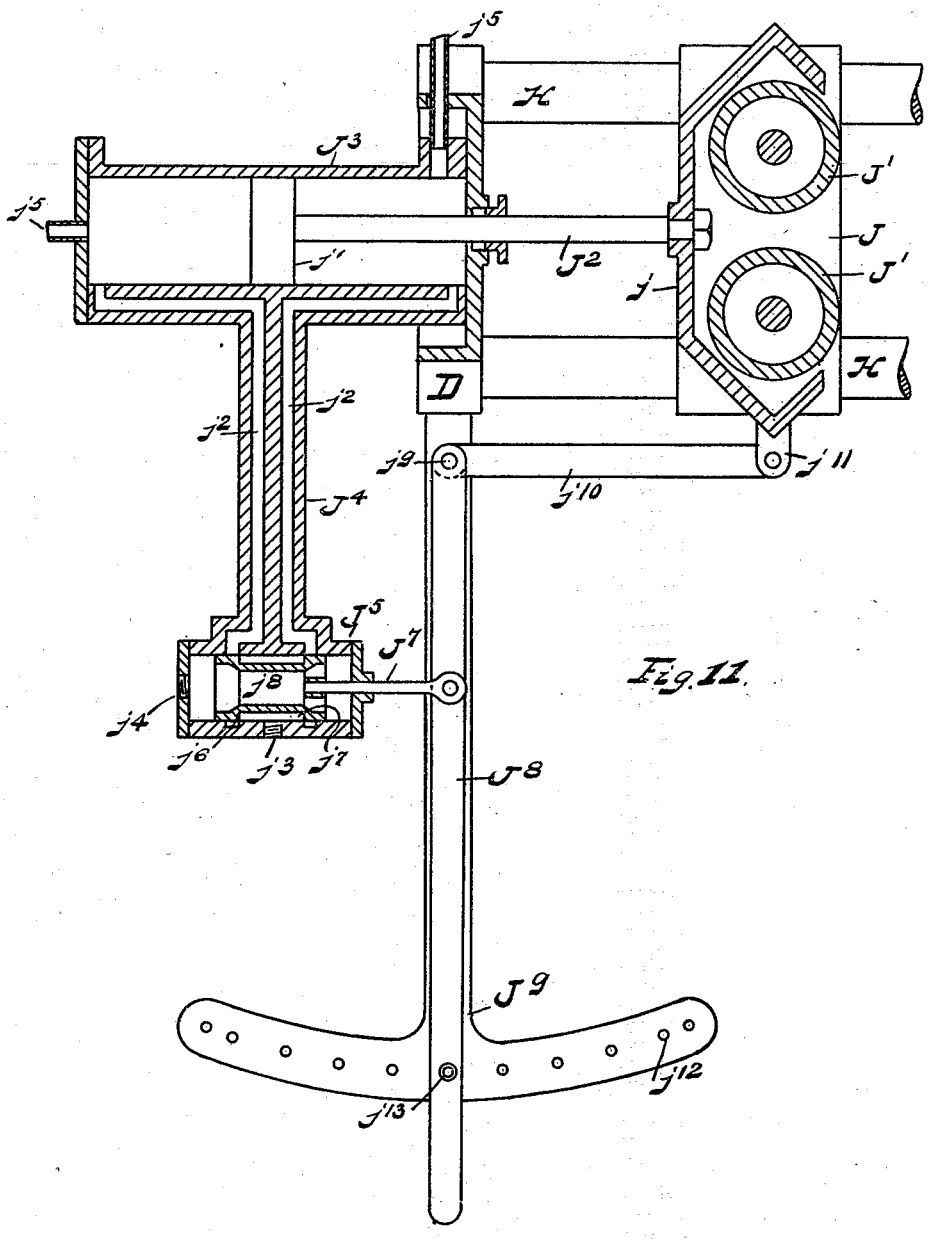

Fig. 11.

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UNITED STATES PATENT OFFICE.

JOHN WALTON, OF ERIE, PENNSYLVANIA.

SAWMILL.

SPECIFICATION forming part of Letters Patent No. 648,473, dated May 1, 1900.

Application filed November 14, 1899. Serial No. 736,943. (No model.)

To all whom it may concern:

Be it known that I, JOHN WALTON, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Sawmills; and I do hereby 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.

This invention relates to sawmills; and it consists in certain improvements in the construction thereof, as will be hereinafter fully described, and pointed out in the claims.

The mill comprising my invention is peculiarly adapted for quarter-sawing lumber and in the construction shown is arranged for this purpose.

The invention is illustrated in the accompanying drawings, as follows:

Figure 1 shows a side elevation of the machine. Figs. 2, 3, 4, 5, 6, 7, and 8 are outlines of an end view of a sawlog, showing the system of cutting the same. Fig. 9 is a plan view of the mill. Fig. 10 is a front elevation. Fig. 11 is a detail view of the press-roll mechanism.

The frame of the machine comprises beams A A A A, which are united by the cross-beams A′ A′. The saw B is of the band-saw type and has saw-teeth *b b* on both its edges. It is driven from a pulley C over a loose pulley C′ and has its spans in its preferred form arranged horizontally. The drive saw-pulley C is mounted on the shaft C^2, and the loose saw-pulley C′ is mounted on the shaft C^3. The shaft C^2 is journaled in the boxes *c*, and the shaft C^3 is journaled in the boxes *c′ c′*. Extending from the boxes *c′* are the racks c^2 c^2, which engage the gears c^3. The gears c^3 are fixed on the shaft c^4. The boxes *c′* are arranged to slide on the beams A and A^2, so that a movement of the gears c^3 will move the boxes *c′* and tension the saw. Extending from the shaft c^4 is an arm c^5, from which is suspended a weight c^7 by means of a link c^6. The purpose of this mechanism is to tension the saw. The saw-pulleys are slightly crowned, and this retains the saw in position upon them. Extending upwardly from the beams A are the four standards D, two at each side of the saw, and between each two at each side of the saw is a standard E, which is also secured to the beams A. At each end of the saw is arranged a table F, upon which and from which the log is received and passed on to the saw.

The mill is arranged to saw logs passing in opposite directions on opposite sides of the central standard E. On one side are arranged the rolls G G and on the opposite side rolls G′ G′. These rolls are so adjusted in height relatively to the upper span of the saw B as to give the desired thickness to the board. The rolls G are mounted on the bell-crank levers *g g*, and the rolls G′ are mounted on the bell-crank levers *g′ g′*. These bell-crank levers are journaled on the shafts H, which extend between the standards D. The lower ends of the bell-crank levers *g* are connected together by a rod g^2. The lower ends of the bell-crank levers *g′* are connected by rods g^4. A link g^3 connects the rods g^2, and a link g^5 connects the rods g^4, so that the rolls G G and G′ G′, respectively, are kept each pair, respectively, at the same height relatively to the saw B.

A link g^6 connects the rod g^2 with a hand-lever g^7. A quadrant g^8 is arranged to lock the lever g^7 in the different desired positions to give the rolls G G their proper elevation. A similar link, hand-lever, and quadrant, (lettered g^9 g^{10} g^{11}, respectively,) act through the rod g^4 upon the rolls G′ G′ in the same manner.

Two pairs of feed-rolls I I are arranged in the uprights E, one pair in each. These rolls extend through the uprights E, so that a surface is exposed at each side. The shafts *i* extend from the upper ends of the rolls I, and gears *i′* are fixed on these shafts. Gears i^2 are arranged to mesh the gears *i′* and are mounted on the shaft i^3. A drive-pulley i^4 is arranged on the shaft i^3 and is driven from the pulley i^5. The pulley i^5 is mounted on the shaft i^6, and the shaft i^6 is journaled in the boxes i^7 i^7 on the tops of the standards D. At the outer end of the shafts i^6 is arranged cone-pulley i^8. The cone-pulley i^8 is arranged to be driven from a cone-pulley c^5, which is mounted on the shaft C^2. The band-mill is driven, together with the feed, by the pulley C^4, mounted on the shaft C^2.

The operation of the mill so far as described

is as follows: A quarter of the log is placed upon the rollers G G and pressed against the feed-rollers I I with the sawed surfaces of the logs against the said rollers. The action of the rollers I carries the log by the saw B and cuts off a board from the under side. The log is then simply turned one-quarter and placed upon the rollers G′ G′ and pressed against the opposite side of the rollers I I. This returns the log and takes off a board from the opposite surface. The paths of the log through the mills I term the "passes," and it will be noted that the rollers G G′ and tables F form supports on which the log is carried through the pass with the body of the log above the saw and on which the log may be turned and shifted from one pass to the other. In Fig. 2 the boards are numbered as they are taken off. Board No. 1 is taken off by the first pass over the rolls G, board No. 2 by the first pass over the rolls G′, board No. 3 by the second pass over the rolls G, and so on. Of course but one side of the mill need be used, if desired; but it will readily be understood that the capacity of the mill is doubled by operating at both sides at once. Preferably the manner of operating is to have a plurality of logs operating upon both sides of the mill at once and to butt the ends of the logs in their passage, so that a continuous operation is effected at both sides. This balances the saw so as to take away any tendency there may be for it to move off the pulleys C C′, and this permits of crowding the mill, and at the same time the continuous operation of course also effects a great capacity.

I prefer to supplement the feed-rolls I I with press-rolls, arranged to press the log against said feed-rolls. The mechanism for accomplishing this is as follows: Connecting the upper ends of the standards D are the rods H′. Frames J are arranged to slide on the rods H H and H′. The rolls J′ J′ are journaled in the frames so as to contact a log placed upon the rollers G G′ and to press the same against the feed-rollers I if moved in the direction of said rollers I. A bridge j extends from the frames J by the center of the rolls J′, and a piston-rod J^3 extends from said bridge to a piston j'. The piston j' is arranged in a cylinder J^3, which is secured on the standard D. A port-arm J^4 extends from the cylinder and a valve-chest J^5 is secured on this port-arm. The ports j^2 extend through the port-arm from the valve-chest to the opposite ends of the cylinder. One cylinder J^3 is connected with the ends of this cylinder by the pipes j^5 j^5. By this means both cylinders are operated by the one valve j^6. The valve j^6 is arranged in the valve-chest J^5 and is preferably of the cylindrical-valve variety. It has the central opening j^8 extending through it and the annular port-opening j^7 around it. The steam-pipe is connected with the valve-chest at j^3 and the exhaust-pipe at j^4. The valve-stem J^7 extends out through the end of the valve-chest and is connected with a hand-lever J^8. The hand-lever J^8 is fulcrumed at j^9 on a link j^{10}. The link j^{10} is secured to a lug j^{11}, extending from the frame J. Extending from the upright D is a quadrant J^9, having the stops j^{12}, on which the catch mechanism j^{13} may operate. The valve-port opening j^7 is of just sufficient length to barely open the two ports j^2 j^2 to the steam-supply when the valve is exactly in its central position. In practice the opening to the ports j^2 j^2 is accomplished by giving to the opening j^7 a length that will just register with the edges of the ports j^2 j^2, as shown in the drawings, or giving to the valve so little lap that steam will leak through to the ports j^2 j^2. A slight leakage will accomplish the purpose. As the valve is moved in either direction steam is cut off from one side of the cylinder and admitted to the other, and when the valve is moved a sufficient distance to overcome the lap the side of the cylinder cut off is open to the exhaust. The operation of this part of the mechanism is as follows: The position to which the rolls J′ are to be moved is determined and the hand-lever J^8 moved to a position on the quadrant to correspond to this position. This movement of the lever moves the valve j^6 and opens the port at the side of the cylinder to which the steam should be admitted to move the rolls in the direction desired. Steam acting on the piston j' moves the rolls J′. This movement of the rolls moves the links j^{10}, and consequently moves the lever J^8, which, acting on the quadrant as a fulcrum, moves the valve-stem J^7. As soon as the valve has reached the central position by reason of this movement incident to the movement of the frame J steam is admitted to both sides of the cylinder J^3, thus neutralizing the effect of the steam upon the piston j' and stopping the movement of the rolls J′. Describing the movement specifically in relation to the mechanism shown in Fig. 11, assuming that the lever J^8 is moved to the stop at which the designating-letter j^{12} is placed on the drawings, this movement would move the valve j^6 toward the right a greater or less distance, according to the distance the stop j^{12} may be from the normal. This allows the steam to enter the port j^2 at the right and cuts off the port j^2 at the left and ordinarily opens this port to the exhaust. The action of the steam then immediately moves the piston j' toward the left, carrying with it the frame J and the link j^{10}. The link j^{10}, acting upon the lever J^8, which is fulcrumed at the stop j^{12}, moves the valve j^6 toward the left until the valve is brought to a central position, when the action of the steam in the cylinder J^3 is neutralized. One of the advantages of this construction is that while pressure can be created upon the rolls J′ this pressure will not follow any great distance, so that there will be no slamming of the rolls J′ after the passage of the log, as a very slight forward movement of the rolls past the

desired point brings the valve to the central position. On the other hand, should the rolls be pressed back by any unevenness in the log the valve j^6 is opened to the back side of the cylinder J^3, so as to immediately return the rolls J′ to their position.

In the operation of the machine as a quarter-sawing mill it is desirable that the log should not only be quartered, as shown in Fig. 2, but should have the portions of the log just adjacent to the cuts trimmed, as shown in Fig. 2, so that the edges of the quartered log present straight surfaces to the presser-rolls J′. As the boards are cut off the quartered log the untrimmed surface of the log of course would be presented to the rolls J′, unless means were provided to continue the trimming of the edges as the sawing goes on. I have provided such a means, which is constructed as follows: Extending from one of the beams A and uprights D are the brackets K, in which is journaled a shaft *k*. One of these, each similar in construction, is arranged at each end of the mill, one for each side of the mill. An edging or cutter-head saw K′ is arranged on the shaft *k*, with a spline and groove mechanism. A collar *k*′ extends from the saw, and an arm K^2, extending from the frame J, engages this collar, so as to carry the saw K′ with the frame J. The saw is arranged just in advance of the rollers J′, so that at each cut of a board from the log the edge of the log is trimmed, so as to make a surface on which the rolls J′ may act on the succeeding cut. The saw K′ is driven by a pulley K^3, arranged on the shaft *k*. The pulley K^3 is driven by any convenient power mechanism.

It will be noted that a portion of the log above the saw is secured by means of the feed-rolls and presser-rolls as the log passes by the saw. This is desirable, as the saw operates upon the bottom of the log. It will also be noted that by utilizing the top span of the saw the journals of the saw-pulleys C and C′ are brought to the plane of the beams A, so that a very rigid construction may be effected with a very light frame.

What I claim as new is—

1. In a sawmill, the combination of a band-saw mechanism arranged to cut in substantially-horizontal plane logs passed by said saw mechanism in both directions; and means for passing logs against and by said saw mechanism continuously in both directions with the body of the log above the saw.

2. In a sawmill, the combination of a sawing mechanism arranged to cut in substantially a horizontal plane logs passed by said sawing mechanism in both directions; means for passing logs against and by said saw continuously in both directions; and means on which said log is supported in the pass with the body of the log above the saw, and is supported at the ends of the pass for turning and shifting from one pass to the other.

3. In a sawmill, the combination of a band-saw mechanism arranged to cut in substantially a horizontal plane logs passed by said sawing mechanism in both directions; means for passing logs against and by said saw continuously in both directions; and means on which said log is supported in the pass with the body of the log above the saw, and is supported at the ends of the pass for turning and shifting from one pass to the other.

4. In a sawmill, the combination of a double-edged band-saw; and means for passing logs against and by said saw simultaneously in both directions.

5. In a sawmill, the combination of a double-edged band-saw; and means for passing logs against and by the same span of said saw simultaneously in both directions.

6. In a sawmill, the combination of a double-edged band-saw; and means for passing logs against and by said saw continuously in both directions.

7. In a sawmill, the combination of a double-edged band-saw; and means for passing logs continuously against and by the same span of said saw in both directions.

8. In a sawmill, the combination of a double-edged band-saw arranged with a span in a substantially-horizontal plane; and means for passing logs against and by said saw simultaneously in both directions.

9. In a sawmill, the combination of a double-edged band-saw arranged with a span in a substantially-horizontal plane; and means for passing logs against and by the same span of said saw simultaneously in both directions.

10. In a sawmill, the combination of a double-edged band-saw; a roll-feed arranged to feed logs against and by said saw simultaneously in both directions.

11. In a sawmill, the combination of a double-edged band-saw; and a roll-feed arranged to feed logs against and by the same span of said saw simultaneously in both directions.

12. In a sawmill arranged for quarter-sawing lumber; the combination of a sawing mechanism for sawing the log; an edger arranged to cut the edge of the log with the same pass; and a roll arranged in line with the edger and to operate upon the trimmed edges of the log.

13. In a sawmill arranged for quarter-sawing lumber, the combination of a sawing mechanism; a roll-feed for passing the log by said mechanism, comprising a press-roll operating upon the edge of the log; an edger arranged for edging the log with the same pass as the quarter-sawing pass; and means for adjusting said saw with the press-roll mechanism.

14. In a sawmill, the combination with a feed device; of a press-roll; a piston connected with said roll; a cylinder in which said piston operates; a valve for controlling the entrance of fluid to said cylinder; a hand-lever for initially operating said valve; and a connection between said valve and the press-roll where-

by the valve is moved with the press-roll and brought to normal at a predetermined point.

15. In a sawmill, the combination with a feed device; of a press-roll; a piston connected with said roll; a cylinder in which said piston operates; a valve-chest connected with said cylinder having ports leading therefrom to said cylinder; a valve in said chest having steam-passages therein which with the valve at normal permit the entrance of steam to both ports of the cylinder; a hand-lever for initially operating said valve; and a connection between said valve and the press-roll whereby the valve is moved with the press-roll and brought to normal at a predetermined point.

16. In a sawmill, the combination of a sawing device arranged to make a cut in a substantially-horizontal plane, and adapted to cut logs passed in either direction by said sawing device; supporting-rolls for carrying the logs passed by said sawing mechanism, one system of rolls for each way; and means for adjusting the rolls of each system independently of the other system in a vertical direction.

17. In a sawmill, the combination of a double-edged band-saw B having its spans arranged horizontally; means for driving said saw; the supporting-rolls, G G′ arranged beneath the working span of the saw; means for adjusting said rolls; feed-rolls, I; means for driving said rolls; the press-rolls, J′ arranged opposite the rolls I and at both sides of said rolls I; and means for moving said press-rolls against the log.

18. In a sawmill, the combination of the double-edged band-saw, B; means for driving said saw; the supporting-rolls, G G′; means for adjusting said rolls; feed-rolls, I; means for driving said rolls; the press-rolls, J′; means for moving said press-rolls against the log; and the edger, K′, carried with the press-rolls.

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

JOHN WALTON.

Witnesses:
ERNEST MARTIN,
HOMER M. HILL.