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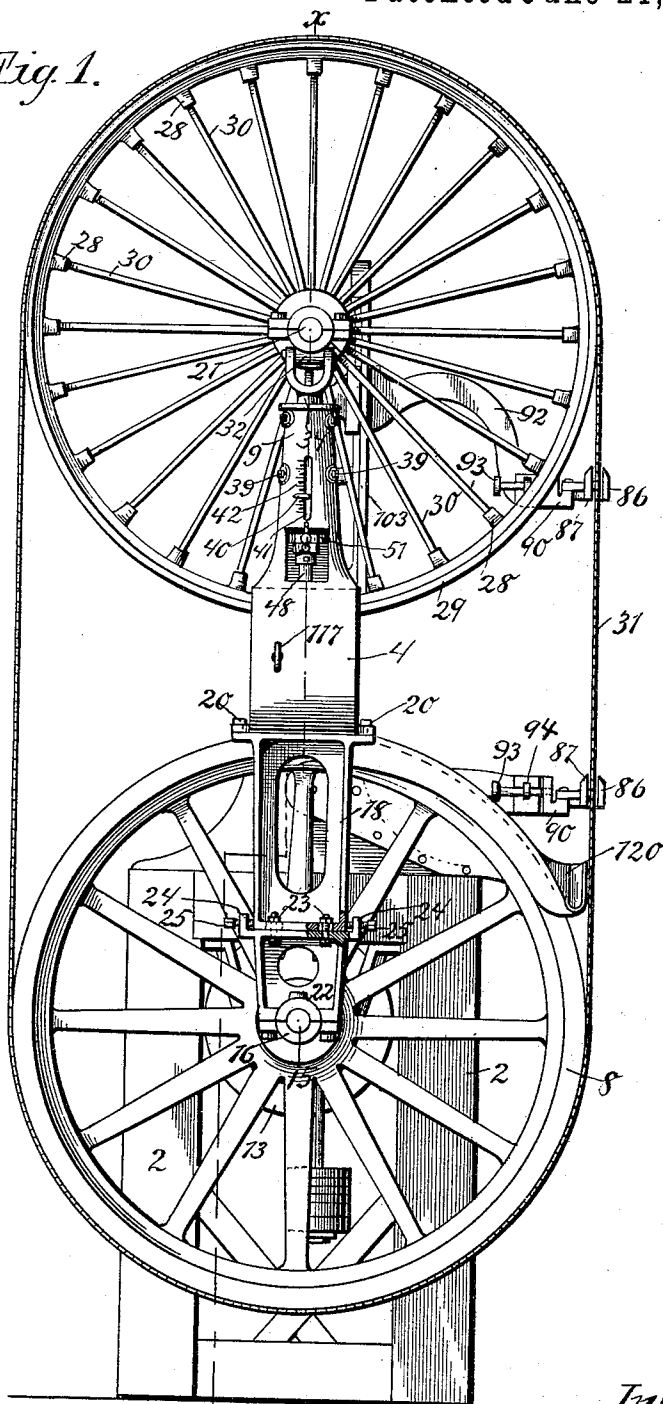
4 Sheets—Sheet 1.

C. M. EMERSON.
BAND SAW MILL.

No. 477,299.

Patented June 21, 1892.

Fig. 1.



Witnesses

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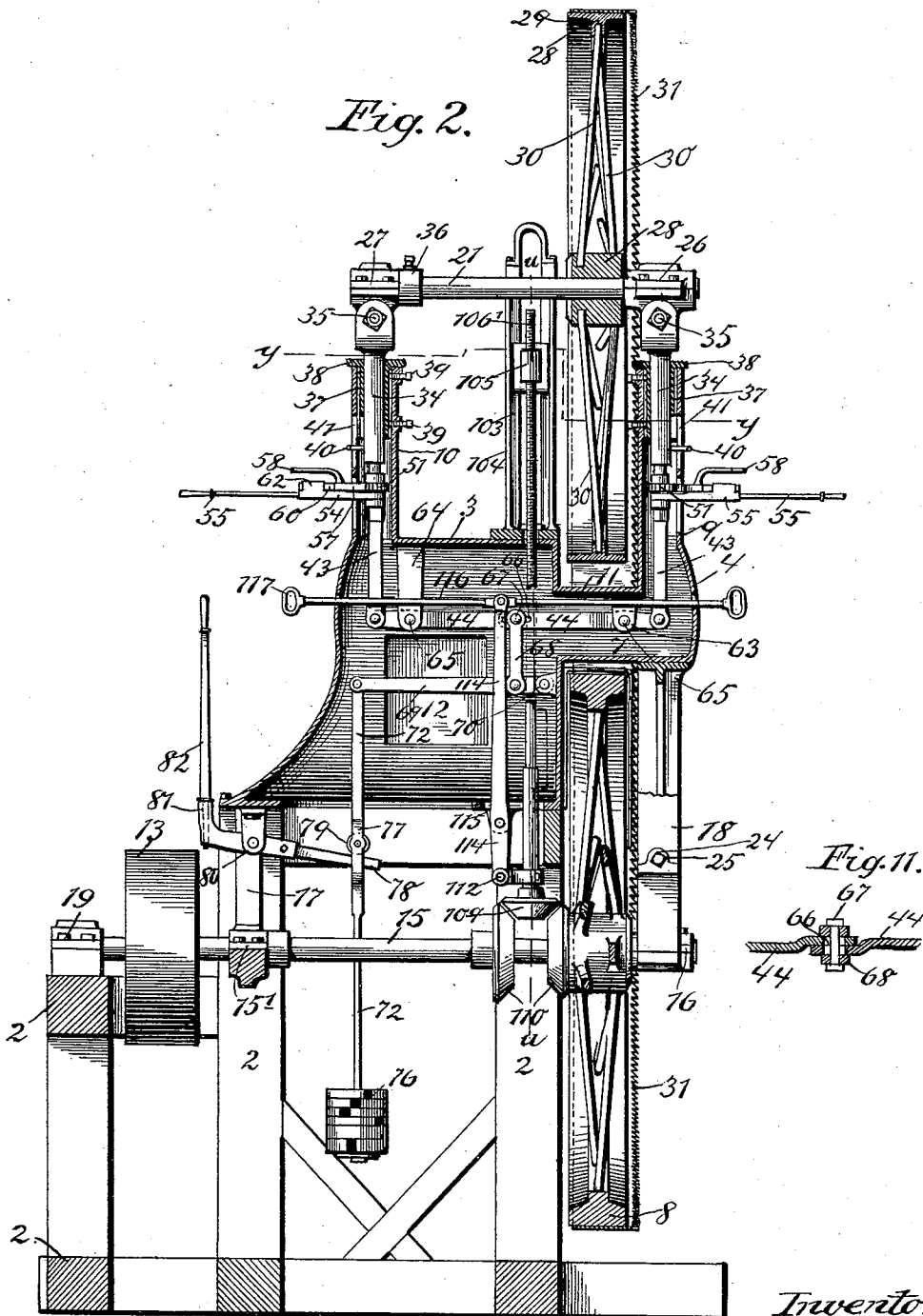
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Fig. 3.

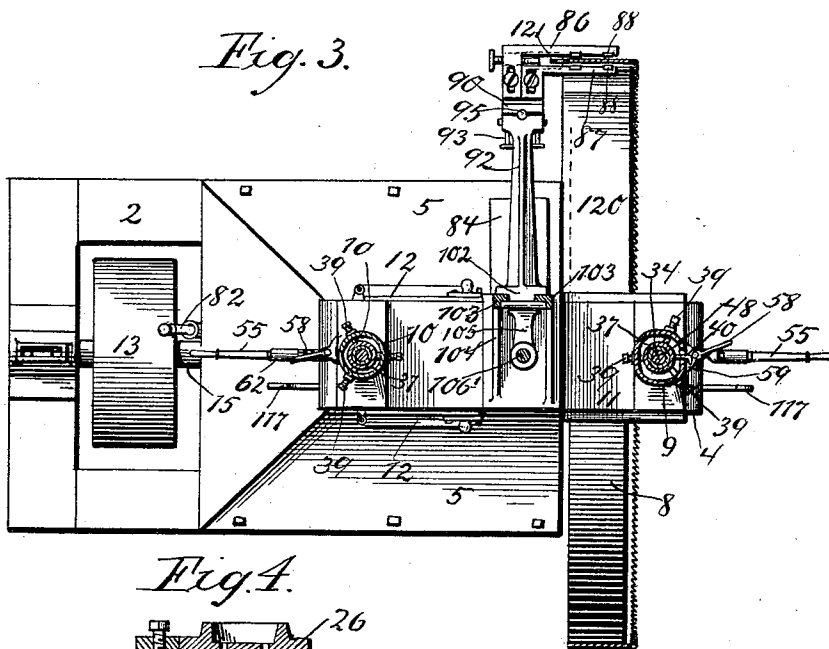


Fig. 4.

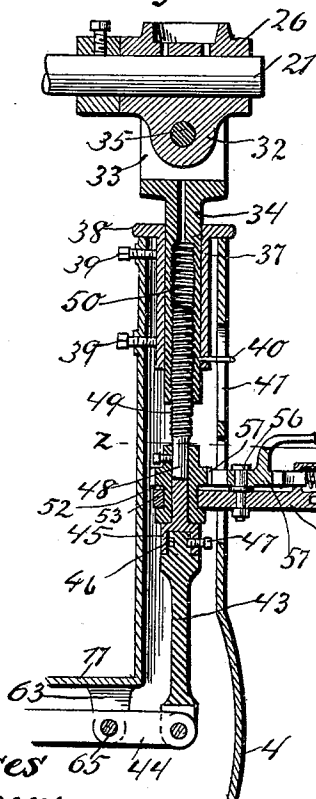
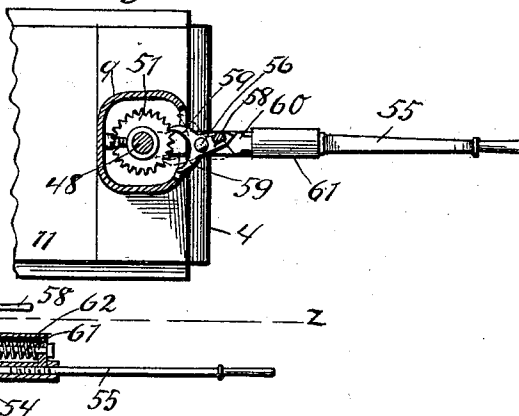


Fig. 5.



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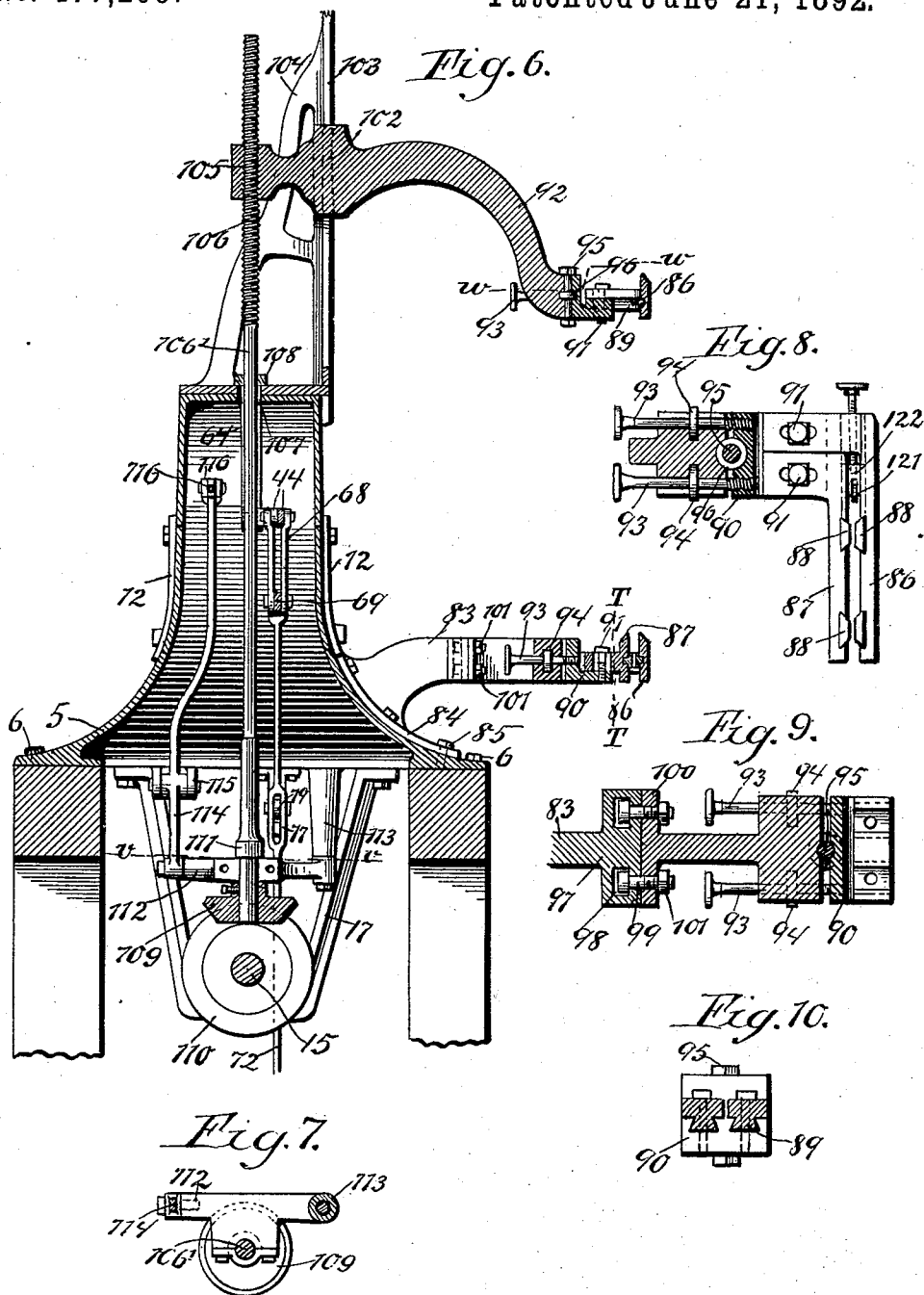
(No Model.)

4 Sheets—Sheet 4.

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UNITED STATES PATENT OFFICE.

CHARLES M. EMERSON, OF EAU CLAIRE, WISCONSIN.

BAND-SAW MILL.

SPECIFICATION forming part of Letters Patent No. 477,299, dated June 21, 1892.

Application filed August 21, 1891. Serial No. 403,269. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. EMERSON, of Eau Claire, in the county of Eau Claire and State of Wisconsin, have invented certain Improvements in Band-Saw Mills, of which the following is a specification.

My invention relates to band-saw mills of the class employed in sawing up large logs and in connection with a movable log-carriage, and further relates especially to particular means for supporting the saw-wheels and for raising or lowering or tilting the upper saw-wheel.

The object of the invention is to provide a band-saw mill of a construction at once economical and durable and a mill which may be operated with the greatest speed and ease and with the least expense.

To this end my invention consists in a band-saw mill having a base provided with columns for supporting the bearing of the movable-saw-wheel shaft, and in connection therewith a system of levers whereby said bearing and shaft and the movable wheel thereon may be moved simultaneously through equal distances to lower or raise said movable wheel.

My invention consists, further, in means whereby said bearings may be moved independently, in means for raising and lowering the saw-guide and for readily controlling the action thereof, in a special saw-guide, in a particular construction of the mill-base, in particular means for supporting the outer end of the lower-wheel shaft, in means for securing the upper movable shaft-bearings on said base, and, further, in various details of construction and in combinations hereinafter described, and pointed out in the claims.

My invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a front elevation of a machine embodying my invention. Fig. 2 is a vertical section of the same on the line *xx* of Fig. 1. Fig. 3 is a plan section on the line *yy* of Fig. 2, the upper movable wheel being removed. Fig. 4 is an enlarged detail vertical section of one of the columns and bearings for one end of the upper shaft. Fig. 5 is a sectional plan view on the line *zz* of Fig. 4. Fig. 6 is a vertical sectional view on the line *uu* of Fig. 2. Fig. 7 is a plan view on the line *vv* of Fig. 6.

Fig. 8 is a detail plan view of the upper saw-guide, the section being taken on the line *ww* of Fig. 6. Fig. 9 is a similar view of the lower saw-guide. Fig. 10 is an enlarged view taken on the line *TT* of Fig. 6. Fig. 11 is a detail.

As shown in the drawings, the mill is arranged on the frame-work of heavy timbers 2, the top of which is in practice about on a level with the floor over which the log-carriage operates. The sawmill-base has the narrow rectangular top 3 and the bulging sides 4 and the wide flaring bottom 5, adapted to be bolted down upon the foundation-timbers. The base-flange 6 is formed all the way around the base and is adapted to receive the lugs in which the several bearings for the levers are arranged. The bracket 7 is of the same width as the top of the base and extends clear out over and beyond the lower band-wheel 8. On the outer end of this bracket I provide the upright hollow column 9, and upon the rear end of the base I provide the other hollow column 10. As shown, the whole of the base, the hollow bracket extending out therefrom, and the two columns are all cast in one piece. The upper part 11 of the bracket is depressed, as shown, below the top 3 of the base to allow as low as possible a height for the upper band-wheel and also to allow the same to be drawn down when it is desired to remove the saw. It will be seen that the walls of the base and the column are comparatively thin, so that a large space is left within the same. The doors 12 are provided in one or both sides of the base, whereby access may be had to the interior. The free space is often used for storing the extra hand-tools of the workmen. The bottom of the base is boarded over when so used. The drive-pulley 13 is fastened on the shaft 15, which shaft is secured in the bearings 15' and 16 of the hangers 17 and 18, bolted to and extending down from the iron base of the mill. The shaft has an additional bearing 19 for the rear end to more firmly secure the drive-wheel.

The hanger 18 is shown plainly in Figs. 1 and 2. It is nearly as broad as the end of the base and is bolted up onto the same by the bolt 20, securing the hanger forward of the wheel 8. Thus it will be seen that an out-

side bearing is obtained for the lower shaft, thereby greatly increasing the durability of the same. This hanger may be made, if desired, in a single piece, with the exception, of course, of the lower part of the bearing-box 16; but as an aid to easy alignment of the lower shaft to the upper shaft 21 I preferably cut the bracket and secure the lower part 22 thereon by means of bolts 23, passing through slotted openings in the abutting ends of the two parts of the hanger. The lower part is provided with the two ears 24, through which the set-screws 25 extend into engagement with the two sides of the upper part of the hanger. By loosening one bolt and screwing up another it will be seen that the bearing 16 and the shaft 15 may be thrown to one side or the other quickly and easily.

The lower band-wheel is of the ordinary design and provided with the heavy rim, spokes, and hub, whereby the same is given the character of a fly-wheel to maintain a steady movement of the saw under varying loads. The upper shaft 21 is secured in the bearings 26 and 27 and carries the upper movable or tilting wheel 28. This wheel, as shown, I make as light as possible, providing it with a narrow thin rim 29 and the light spokes 30. The endless band-saw 31 passes over these two wheels 28 and 8, and, as hereinafter explained, the weight of the lower wheel is practically sustained by the saw hanging from the top of the upper band-wheel, and the upper wheel is driven by the band-saw 31 acting as a belt thereon. If the upper wheel was heavy, trouble would be experienced both in starting and in stopping the machine, as the saw would slip thereon, resulting in wear of the saw or breakage of the same.

Each bearing 26 and 27 is provided, as shown clearly in Fig. 4, with a lug 32, adapted to be inserted in the fork 33 of the vertical shank 34. The bolts 35 pass through these forks and lugs and are secured therein. Hence it will be seen that either shank may be raised or lowered without regard to the other. A collar 36 is provided on the shaft 21 to engage the end of the box 27 to prevent longitudinal movement of the shaft. The shanks 34 extend down through the sleeve 37, of considerable smaller diameter than the inside of the respective column. These shanks are prevented from falling into the columns by the flanges or rings 38, formed on the upper ends and resting on the tops of the same. Small set-screws 39 extend through the walls of the columns and engage the sleeve. There are preferably three sets of these set-screws for each column, each set consisting of two, disposed at regular distances around the same. By this means it will be seen that either bearing-sleeve 37 may be shifted laterally in the top of its column 9 or 10 to compensate for the approach of the bearings as the shaft 21 is tilted. A pointer 40 extends from corresponding points on each shank through slots 41 in the column and sleeve 37 to mark upon the

scale 42, provided upon the face of the column, the comparative height of the upper-shaft bearings. By bringing these pointers to similar marks on the two columns it will be seen that the upper shaft may be brought parallel with the lower one. Ordinarily the lower end of each shank 34 is set upon a jack-screw device, whereby it may be raised or lowered, no other means being provided therefor. I have also provided devices which in addition thereto make the same also movable.

The jack-screws (shown in detail in Figs. 4 and 5) are secured on the upper ends of the arms 43, which are pivoted on the ends of the levers 44. The lower part of the jack-screw consists in the cup 45, adapted to fit over the stud on the upper end of the arm 43, which is provided with the groove 46, into which the set-screw 47 is secured in the cup to hold the same together. The smooth shank 48 extends up from this cup and on a separate end is provided with the thread 49, engaging the thread 50, provided within the shank 34. The ratchet-wheel 51 is secured on the part 48 and is provided with the hub, having the annular groove 52, adapted to receive the collar or eye 53, provided on the end of the bar 54. The bar is thus upheld, while at the same time being movable on the ratchet-wheel hub. The lever 55 is adapted to be inserted into the end of the bar 54, whereby the same may be more readily thrown from side to side.

On top of the bar 54 and by means of the stud 56 I pivot the ratchet-escapement or double pawl 57, having the handle 58, by means of which its position may be changed. Either prong 59 of the double pawl is adapted to engage the ratchet-wheel 51, and the device is held in one position or the other by means of the V-shaped head 60, normally forced out by the spring 61, arranged in the box 62. The end of the piece 57 is beveled to correspond to the head 60. Hence when the opposite sides of the two engage one or the other of the pawls is held against the ratchet. When, however, the lever 55 is shifted back, the spring 61 yields to allow the prong 59 to ride over the teeth of the ratchet-wheel.

Referring to Fig. 2, it will be seen that the lugs 63 and 64 extend down from the top of the base and that the levers 44 are pivoted in the lower ends thereof by bolts 65. The long ends of these levers extend toward and past each other and are provided with slots 66, adapted to admit the bolt 67, by which the link 68 is secured to the same. The lower end of the link is pivoted on the lever 69, having its forward end secured in the lug or block 70. The free and long end of this lever supports the rods 72, on the lower end of which I suspend the weight 76, calculated to just overbalance the weight of the upper wheel and of the devices attached thereto, the band-saw, and the lower wheel, thereby at all times holding the band-saw taut. It will be seen that the leverages employed are increasing leverages, so that a comparatively small weight may be employed.

The rod 72 is provided with a yoke or loop 77, adapted to receive the end of the lever 78. The friction-roll 79 is secured in the yoke and is adapted to be engaged by the lever 78, pivoted on the lug 80, depending from the top of the base, which lever is provided with the socket 81, adapted to receive the end of the bar 82. The hole through the socket is continuous and open at both ends, so that saw-dust will not lodge therein. By throwing back and down the bar 82 it will be seen that the rod 72 may be moved upward, thereby raising the inner ends of the levers 44, and consequently simultaneously lowering the bearings 26 and 27. The levers 44 being of exactly the same length, the two bearings move equal distances when the bar 82 is operated. When the wheel 28 is thus lowered, the band-saw may be readily removed. It will be seen that the band-saw will be held at a constant tension when in place by the constant pull of the counter-weight 76, acting through the various levers. By raising the rear bearing 27, and therewith the end of the shaft, or by lowering the forward bearing 26 the top of the upper wheel may be tilted forward, thus running the band-saw out or forward on the wheels. The wheel is tilted by operating the jack-screws in the columns. The jack-screws are also used to adjust the height of the wheel to the length of the band-saw. Two guides are provided on the down-going side of the saw. The lower one is secured on the end of the arm 83, having the broad curved boot 84, fastened to the base of the mill by bolts 85. The saw-plates 86 and 87 are of the usual form and provided with the wooden blocks 88, adapted to engage the sides of the same. Each plate is provided with a slotted L portion having the dovetail rib 89 and movably secured to the swing-block 90 by bolts 91. By loosening the bolts 91 the plates may be adjusted with respect to the saw. The construction of the upper guide is the same in the above points. The swing-block of each guide is secured on the solid end of the arm 83 or 92 by the fixed hand-screws 93, secured therein by the collars 94 and having threaded ends extending into the swing-blocks 90. The block 90 is swung on a bolt 95, arranged between the swinging and solid part of each arm. A collar 96 on each bolt 95 prevents its block 90 from dropping out of line. The turning of the hand-screws 93 throws the guide-plates into the desired positions. The wheel or rolls 121, arranged in the sliding blocks 122, are adapted to engage the rear edge of the saw.

The relative height of the log-carriage and the mill varies somewhat in practice, and for the easy adjustment of the height of the lower guide, constructing the same as shown in Fig. 9, the arm is divided and its end 97 provided with the vertical T-slots 98, adapted to receive the heads of the bolts 99. These bolts extend through the plate 100 and are fixed therein by the nuts 101 after proper adjust-

ing of the forward end of the guide. The upper guide is arranged on the vertically-movable arm 92, having the grooved part or head 102 adapted to fit the upright guide-bars 103, formed in the same piece with the brackets or braces 104, and all fastened securely on the top of the base. The arm 105 projects from the head and is provided with the threaded opening, adapted to receive the screw 106 on the end of the rod 106', passing through the hole 107 in the top of the base. A loose washer 108 is provided to close the hole. On the lower end of this rod I provide the swinging friction-cone 109, adapted to be swung into contact with either of the fixed cones 110 on the shaft 15. The rod is provided with the shoulder 111, and just beneath this I arrange the cross-bar 112, adapted to support the rod. This bar is shown plainly in Figs. 6 and 7, and is pivoted on the depending post 113 and has its other end pivoted to the lower end of the lever 114. This lever is in turn pivoted on the lugs 115 of the base and extends upward into pivotal connection with the horizontal rod 116, Fig. 2, extending through each end of the base and having the ends provided with loop-handles 117. By moving these in or out the friction-cone 109 may be pressed into engagement with either cone 110 to turn the screw-rod and raise or lower the upper saw-guide, as desired. As shown, the cone 109 normally hangs midway between the cones 110. Hence the guide will only be moved while the one of the handles 117 is held forcibly in one of its extreme positions.

120 represents the ordinary dust-guard.

The advantages of my mill may be briefly stated as follows: The sawyer may stand either in front or back of the saw, in either of which positions he may be provided with the usual levers for controlling the log-carriage and the "steam-nigger" for throwing the logs thereon. From either position he may by means of the jack-screw lever and the rod and handles 117 control both the tilt of the upper wheel and the position of the upper saw-guide. If a heavy log passes into the saw and forces it back so far as to endanger the set of the same, the sawyer may correct it by tilting the wheel still farther forward by means of the jack-screw lever; second, saving in time consumed in replacing band-saw, only an instant being required in throwing down the bar 82 and thereby lowering the top wheel; third, constant tension of the saw; fourth, durability of base and columns, all being cast in one piece; fifth, outside bearing for shaft of heavy lower band-wheel; sixth, adjustability of hanger 18 therefor; seventh, the compound adjustability of saw-guide plates, and, lastly, the general simplicity and convenience of construction.

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

1. The combination, with the base provided with the hollow columns, of the bearing-sleeves 37, arranged in the upper portions of

said columns and provided with the flanges 38, adapted to rest upon the tops of the columns, means for laterally adjusting said sleeves in said columns, the upper shaft, the bearings thereof, and the shanks 34, upon which said bearings are supported and which are held in said bearing-sleeves 37, substantially as described.

2. The combination, with the base provided with the hollow columns, of the bearing-sleeves arranged in the upper portions of said columns, means for laterally adjusting said sleeves in said columns, the shanks arranged in said sleeves, the upper shaft supported upon said shanks, and means for simultaneously or independently moving said shanks in a vertical direction, substantially as described.

3. The combination, with the base and the hollow columns, of the bearing-sleeves arranged in the upper ends of said columns and laterally adjustable therein, the upper shaft, the shanks arranged in said bearing-sleeves, the shaft-bearings pivotally supported upon said shanks, the jack-screws connected with said shanks, means for operating said screws, and the weighted levers supporting said jack-screws, substantially as described.

4. The combination, with the base and the columns provided with scales arranged thereon, of the adjustable shanks arranged in said columns and supporting said shaft of the upper wheel and the pointers arranged upon said shanks and extending over said scales, substantially as described.

5. The combination, with the base provided with the columns, of the upper wheel, its shaft, shanks arranged in said columns and supporting said shaft, levers supporting said shanks, a weight connected with said levers and adapted to raise said shanks, and a hand-lever arranged to raise said weight and thereby to permit the upper wheel to be lowered.

6. The combination, with the base, of the integral columns 9 and 10 thereof, the narrow top of the base, the depression 11 therein between the main part of the base and the column 9, the hollow bracket portion 7, from which the column 9 springs, the depending hanger secured upon the outer end of said bracket by bolts 20, the lower end of said bracket provided with a laterally-adjustable bearing, the lower shaft, the lower wheel arranged on the said shaft between the hanger and the forward part of the base, the upper shaft, means for adjustably securing the same, the upper wheel on said shaft and arranged between said column and above said depression 11, jack-screws supporting the bearings of the upper shaft, openings in each column, and the jack-screw levers extending through said openings, the walls of said base being closed at all other points except said openings, substantially as described.

7. The combination, with the hollow base, of the upper band-wheel and the shaft thereof, with vertically-adjustable bearings for said shaft, levers 44, pivoted within said base, the

said bearings being supported upon the outer ends of said levers 44, the link 68, the lever 69, the rod 72, the weight 76 thereon, the lever 78, adapted to engage said rod 72 and lift the same, and means for operating said lever to lift said rod, and thereby permit the lowering of the band-wheel, substantially as described.

8. The combination, with the upper band-wheel and the shaft thereof, of the base, levers arranged within the said base, a weight in connection with said levers to normally support said band-wheels, a pivoted lever 78, adapted to engage the weight mechanism, and a bar 82, arranged in the socket of said lever 78, substantially as described.

9. The combination, with the base and the hollow columns thereof, of the upper shaft and the band-wheel thereon, bearings for said shaft, the shanks 34 thereof, the shank-sleeves 37, arranged in the tops of the columns and engaging said shanks 34, means for supporting said shanks, said sleeves being smaller than the inside of said columns, and set-screws 39 for adjusting said shank-sleeves laterally in said columns, substantially as described.

10. The combination of the column of the base with the upper band-wheel shaft, the bearing thereof, the shank 34 and the yoke 33, on which said bearing is trunnioned, guides for said shank in the top of the column, the supporting-lever 44, the weight depending from the inner end thereof, an arm 43, pivoted on the outer end of the lever 44, the threaded spindle 49, having the end 45 fitting upon the top of the arm 43 and revoluble thereon, the ratchet 51, secured upon the part 48 of said spindle, the lever 54, having its end loosely journaled on the hub of said ratchet, a double pawl 59, pivoted on the lever 54, said pawl 59 having the end 58, the similarly-pointed spring-rod 60, fixed upon the lever 54 and held in engagement with said pawl, means for throwing said pawl from one side or the other, and a slip-bar 55 to be inserted in the end of said lever 54, substantially as described.

11. The combination, with the saw-guide arm, of the pin 95, vertically arranged on the end thereof, a shoulder or ring on said pin, a block provided with the short groove to fit the forward side of said pin and its ring or shoulder, screw-bolts 93, extending through the end of the arm and into threaded openings provided in the swing-block, said swing-block being thereby held against said pin and thereby supported on said arm, and saw-guides arranged on said swinging block, substantially as described.

12. The combination, with the saw-guide arm, of the pin 95, vertically arranged on the end thereof, a shoulder or ring on said pin, a block provided with the short groove to fit the forward side of said pin and its shoulder or ring, screw-bolts 93, extending through the end of the arm and into threaded openings

provided in the swing-block, said swing-block being thereby held against said pin and supported on said arm, the L-shaped saw-guides 86 and 87, having the inwardly-projecting parts provided with dovetailed ribs, said swinging block provided with dovetailed grooves extending transversely with respect to the saw held between the guides, the L portions being provided with slots, and bolts 91 for securing the same upon said swinging blocks, all substantially as and for the purpose specified.

13. The combination, with the arm 83, of the base whereon the same is secured, the end 97 of said arm, the extension portion of said arm, said arm being provided with vertical T-slots, bolts 101, arranged in the extension portion and having their heads arranged in the T-slots of the arm, nuts on said bolts for securing the extension part firmly upon

the arm 83, horizontal openings arranged in the end of the extension part, blocks 94, arranged in said part, the screw-bolts 93, extending through the same, the swinging block 90, the vertical pin 95, arranged between said block and the end of the extension-arm, said parts being grooved to receive the same, as described, said bolts passing through the same and into said swinging block, whereby said block may be adjusted with respect to the arm, adjustable saw-guides arranged on the swinging block, and an adjustable stop arranged between said guides, substantially as described.

In testimony whereof I have hereunto set my hand this 17th day of August, 1891.

CHARLES M. EMERSON.

In presence of—

C. B. DANIELS,
GEO. H. BURNHAM.