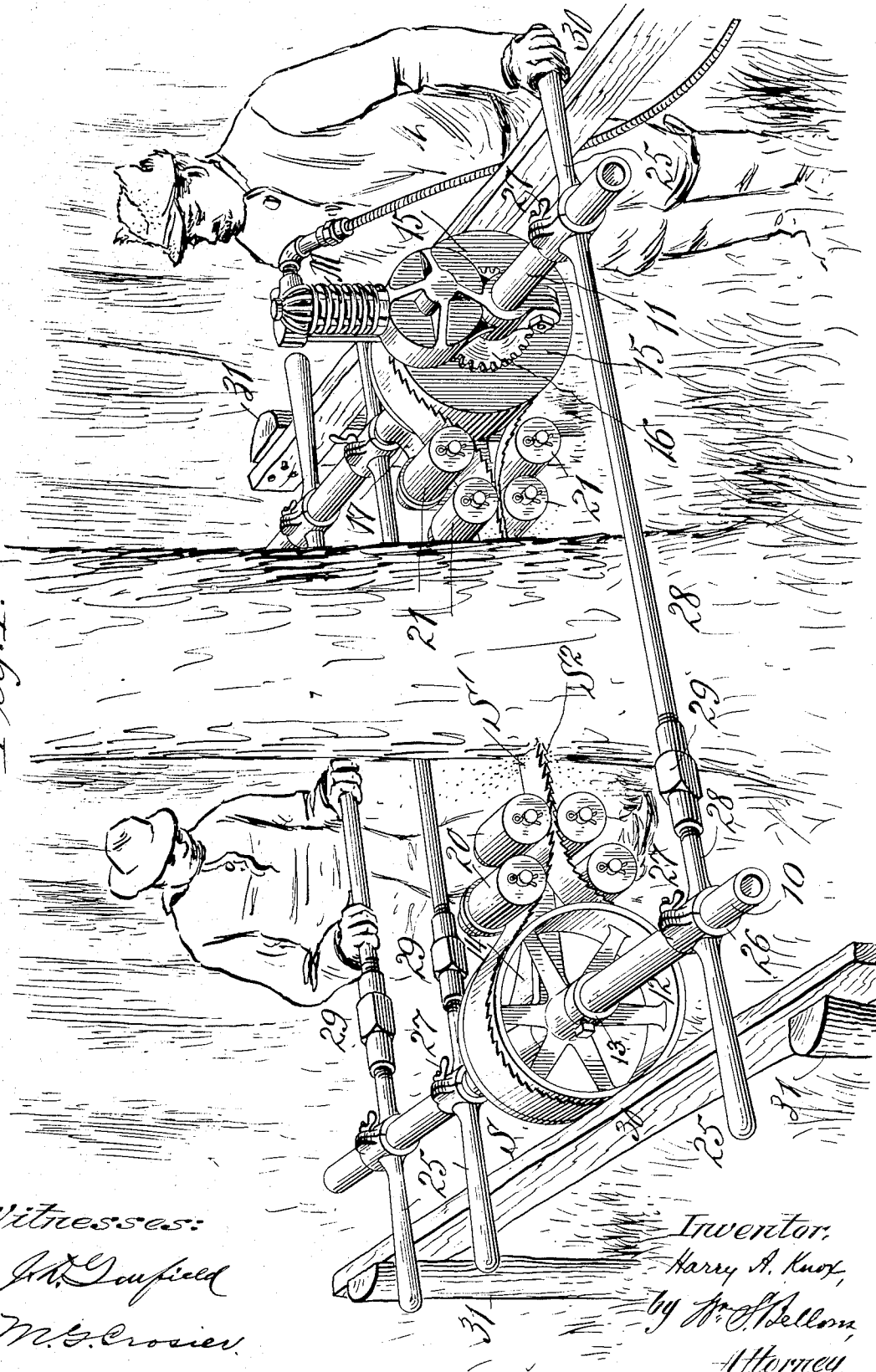


H. A. KNOX.
PORTABLE SAWING MACHINE.

APPLICATION FILED MAR. 1, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



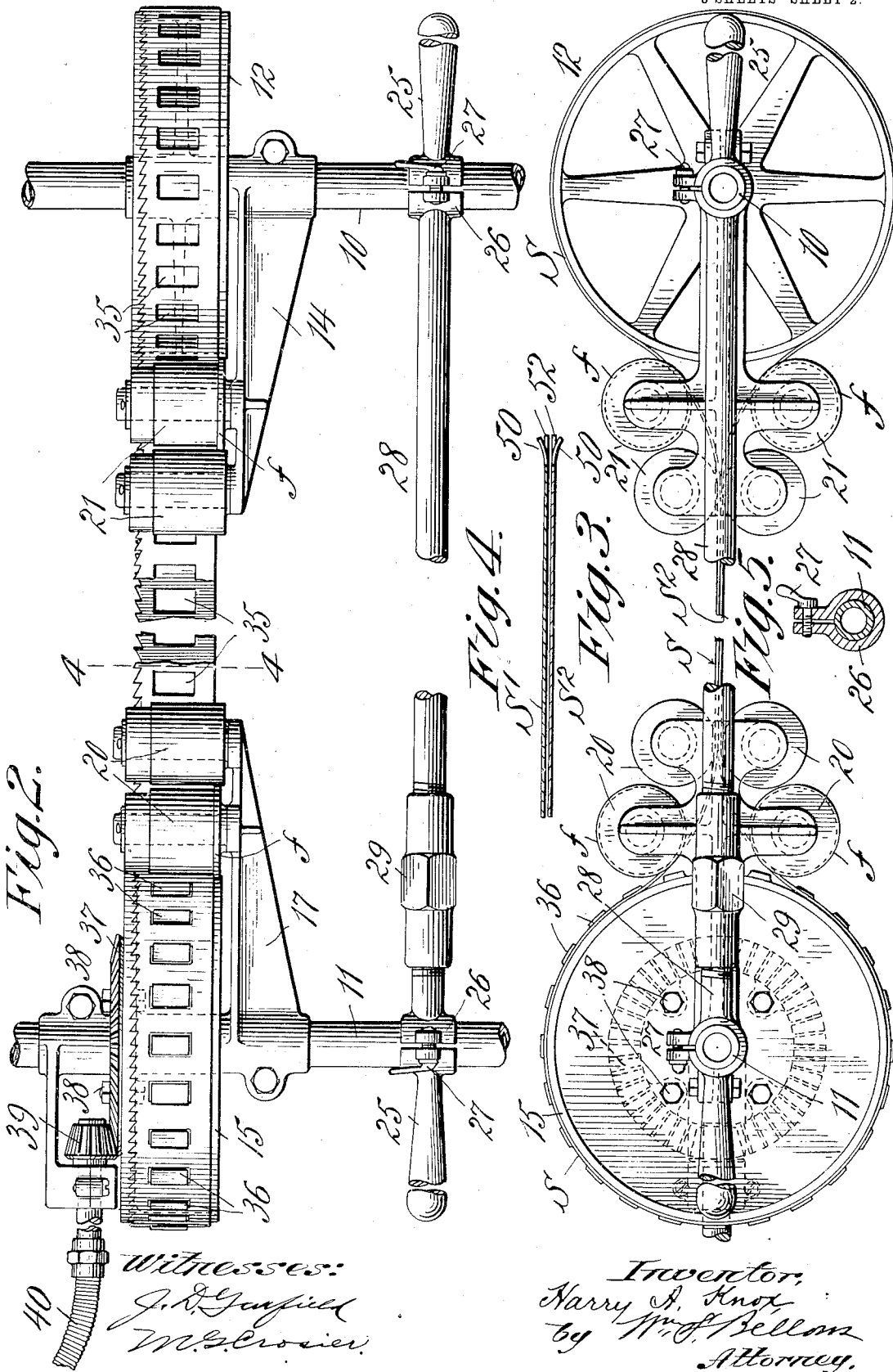
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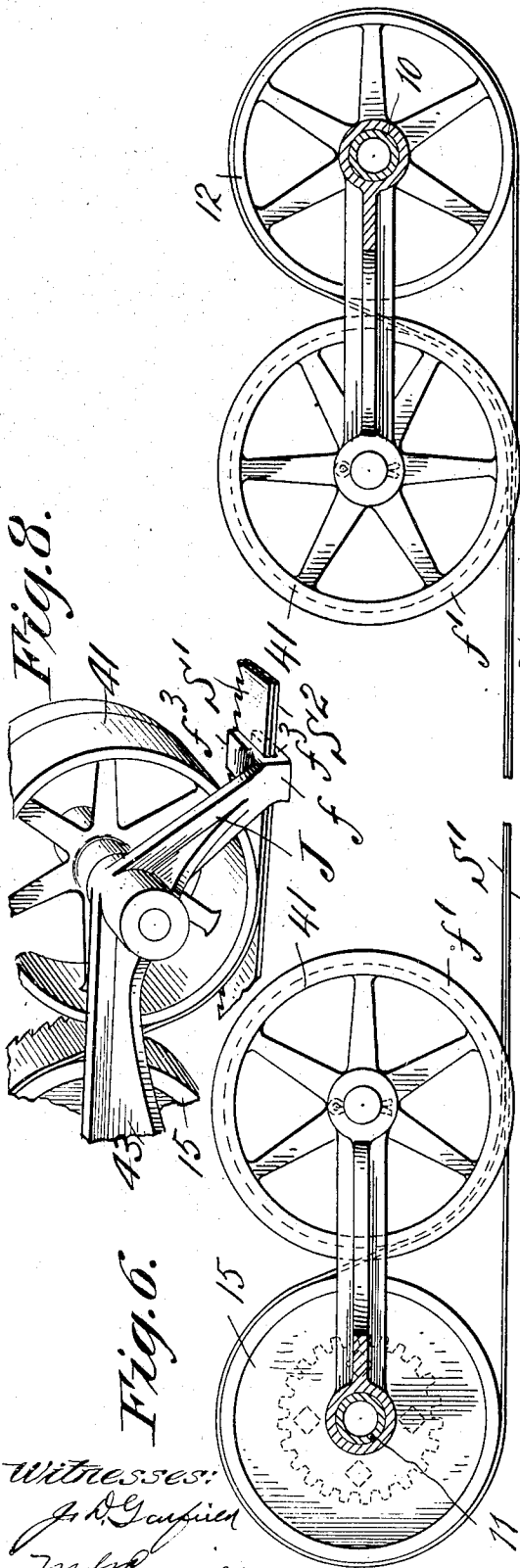
3 SHEETS—SHEET 2.



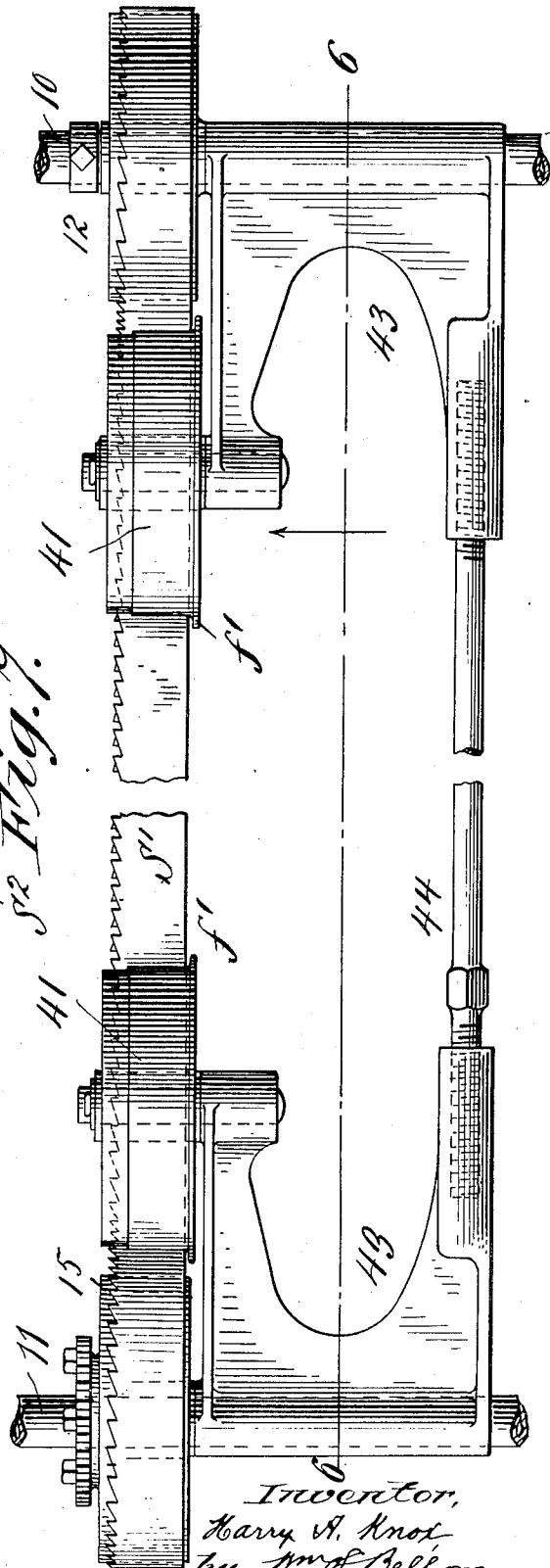
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UNITED STATES PATENT OFFICE.

HARRY A. KNOX, OF SPRINGFIELD, MASSACHUSETTS.

PORTABLE SAWING-MACHINE.

No. 822,056.

Specification of Letters Patent.

Patented May 29, 1906.

Application filed March 1, 1904. Serial No. 196,030.

To all whom it may concern:

Be it known that I, HARRY A. KNOX, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Portable Sawing-Machines, of which the following is a full, clear, and exact description.

This invention relates to sawing-machines, and more especially to that class thereof in which an endless saw-blade or band-saw is used in connection with pulleys and guides to maintain the saw-blade in proper working position; and it has for one of its objects the provision of a mechanism which may be supported on a portable frame and employed in a convenient and expeditious manner for felling trees, especially in lumber regions, where ordinarily a large number of men are engaged in this work.

My invention has, furthermore, for its object the combination, with the band-saw, of guides therefor whereby the running and cutting portions of the band-saw are brought together and constrained for the movements in proximate relations, so as to cut but a single kerf, and inasmuch as these portions are running in opposite directions the pull on the frame is equalized, thus obviating any tendency of shifting the same longitudinally of the saw cut.

Further objects and advantageous results under this invention will be found to be attained in and by the particular organization and construction of the mechanism, as hereinafter set forth, and as illustrated in the accompanying drawings, in which similar characters denote similar parts in all the views, and in which—

Figure 1 shows a sawing-machine embodying my invention as in use on a tree to be felled. Fig. 2 is a view of a modification of the saw and its operating mechanism actuated by a flexible shaft to which motion may be imparted from any convenient source. Fig. 3 is a front view of the mechanism shown in Fig. 2. Fig. 4 illustrates a cross-section of the band-saw on line 4 4, Fig. 2. Fig. 5 is a detail view in section of one of the frame-clamping devices. Fig. 6 is a section on line 6 6, Fig. 7. Fig. 7 represents a top view of a modified form of the saw-supporting frame. Fig. 8 shows a guard for the peculiarly-arranged band-saw.

As above stated, the machine forming the subject-matter of this invention is especially adapted for use in lumber regions where large numbers of trees are to be felled, so that portability and simplicity of construction constitute important requirements, and since the tree-cutting operations are spread out over a large territory I deem it preferable to provide each saw with its own power device, therefore making each mechanism self-contained and independent from any other. On the other hand, I wish it distinctly understood that I do not limit myself to such combination, since a general station may supply power to a number of different saws.

Referring to Fig. 1, a good understanding may be obtained of the adaptation of my invention to practical use, and here it will be seen that the framework comprises a pair of parallel tubular rigid side rods or bars 10 11, the former, 10, of which loosely supports a pulley or wheel 12, held against longitudinal movements on the rod 10 by a collar 13 and also by a bracket 14. Loosely mounted on the side rod or bar 11 is a band-wheel 15, having in the present instance a gear 16, to which movement may be imparted by a motor M, (shown as a gas-engine,) the casing of which is rigidly secured upon the rod 11, while another bracket 17, similar to the one designated by 14, is disposed at the other side of the pulley 15, and thus prevents longitudinal movement of the latter on the rod or bar 11. The pulley 15 constitutes the driving member for a band-saw S, which passes around the pulley 12, and the upper and lower runs S' and S², respectively, of which are maintained adjacent each other by guide-pulleys 20 21, journaled on studs projecting from the brackets 14 17, above mentioned, and one or more of the guide-pulleys 20 and 21 has near its rear edge, corresponding to the back of the saw-band, the flanges f, which resist any tendency of the working runs or courses of the saw to be transversely displaced or distorted.

It will be seen that two sets of rollers are employed at each end of the saw, there being one set to maintain the upper and lower runs of the saw in close facial contact and the second set or pair being disposed one on the outer side of each of the saw-runs, but between the first set and the pulley over which the band passes. These rollers, comprising the second set, are spaced apart from each

other in order to permit the saw courses to approach the first set of rollers in a gradual curve, the peripheries of said rollers at the point they engage the saw courses extending inwardly over a line tangent to the meeting faces of the first set of rollers and the carrying-pulley. The spaced rollers not only cause the saw courses to approach the first set of rollers in a gradual curve, but also tension the saw so as to hold the same in close frictional contact with the driving-pulleys. These spaced rollers preferably carry the flanges for resisting lateral thrust of the saw.

The side rods 10 and 11 are engaged by rods 25, having split hubs 26, provided with clamp-screws 27, while their inward extensions 28 are provided with right and left hand screw-threads to receive turnbuckles 29, whereby the distance between the rods 10 and 11, and hence the tension on the saw S, may be regulated, as described.

In order to facilitate the manipulation of the frame during the sawing operation and to guide the saw so as to cut the tree in a straight plane, a supporting-frame, such as shown in Fig. 1, may be built up, this frame comprising horizontal runners 30, supported by posts 31, driven into the ground.

By referring to Fig. 4 it will be seen that the teeth of the saw are slightly bent or "set" outwardly, as indicated at 50, so that only the smooth surfaces of the upper and lower runs may contact with and slide upon each other, and consequently all liability of interference, as far as the teeth are concerned, is avoided, and the necessary clearance-space for the escape of the sawdust is established. The saw-blade, in addition to the outwardly-set teeth, may have some of its teeth, as shown at 52 in Fig. 4, in the plane of the blade.

While under ordinary conditions the frictional contact between the saw S and the driving-pulley 15 may be sufficient to run the band-saw, the latter may be provided with a series of perforations 35, adapted to be engaged by projections 36, formed on the driving-pulley, and the saw may thus be driven in a positive manner. These perforations may have the double advantage of being a part of the saw-propelling means and of being measurably self-freeing of sawdust.

As above mentioned, I prefer to organize each sawing-machine with its own motor, as seen in Fig. 1: but the driving-pulley 15 may be driven in the manner shown in Fig. 2, in which a bevel-gear 37, attached to the pulley 15 by bolts 38, is engaged by a pinion 39, to which motion may be imparted from any convenient source through the medium of a flexible shaft 40.

In Figs. 6, 7, and 8 I have illustrated a modification of the saw supporting and tensioning device, the lower run of the saw being

tangent to the peripheries of the pulleys 15 and 12 and the upper run being correspondingly lowered by idlers 41, the flanges f' of which serve for the purpose of receiving the lateral thrust of both runs during the sawing operation. In this instance the brackets 43 are shown internally screw-threaded to engage the exterior threads of the distancing rod or brace 44.

From the above description it will be understood that my improved sawing-machine may be readily adjusted and assembled to form a rigid structure and that, furthermore, the device comprises a knockdown frame which may be taken apart for transportation, or it may be packed into a very compact form—a feature which is of the utmost importance in machinery of this kind on account of long distances to be traversed and the difficulty of handling bulky articles.

A considerable latitude of change may be permitted in the design and detailed construction of the several parts without departing from the spirit of my invention.

In Fig. 8 a rigid guard J is shown as extended from one of the side members of the supporting-frame and having an extension back of the superimposed courses of the band-saw, the same comprising a saw-back-bearing member f and upper and lower jaws or members f^2 , f^3 , which overlie and underlie the portions of the saw which are running in face-wise proximity, this appliance resisting the transverse thrust and keeping both courses of the saw in their desired closely-running relations.

While the described machine is largely used in the felling of trees, it is also available for sawing off limbs of the fallen tree and for cutting the trunk into suitable lengths, it being understood that the supporting-frame may be given a vertical instead of a horizontal position or any oblique position to accord with the particular situation or condition in which the sawing work is to be performed, and it is entirely practicable in order to provide the saw-frame which will be as light as possible, and yet sufficiently rigid and stable, to have the motor, which may be gasoline, steam, hydraulic, electric, compressed-air, or other type, mounted on a small truck, which may be hauled around in conjunction with the saw-frame and with the saw-driving roll on which such motor is connected by a flexible shaft, as hereinbefore mentioned.

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

1. The combination with a band-saw and pulleys supporting the same, of a frame comprising a pair of side rods each supporting one of the pulleys, distancing-rods connecting said side rods and provided with adjusting means whereby the side rods may be

moved with relation to each other, and means to permit a movement of the distancing-rods longitudinally of the side rods.

2. In combination with a band-saw and pulleys supporting the same, of a frame comprising a pair of side rods each supporting one of the pulleys, distancing-rods connecting said side rods and provided with adjusting means whereby the side rods may be moved with relation to each other, means to permit a movement of the distancing-rods longitudinally of the side rods, and a motor carried by one of the end rods and geared to the pulley mounted on said rod.

3. The combination with a band-saw and pulleys supporting the same, of a frame comprising a pair of side rods each supporting one of the pulleys, distancing-rods connecting said side rods and provided with adjusting means whereby the side rods may be moved with relation to each other, means to permit a movement of the distancing-rods longitudinally of the side rods, and means for clamping said side and distancing rods to each other.

4. The combination with a band-saw and pulleys supporting the same, of a frame comprising a pair of side rods each supporting one of the pulleys, distancing-rods connecting said side rods and provided with adjusting means whereby the side rods may be moved with relation to each other, means to permit a movement of the distancing-rods longitudinally of the side rods, means comprising a split hub carried by the distancing-rods and receiving the side rods, and means for clamping said hub to said side rods.

5. In a sawing-machine, a portable frame comprising a pair of side rods and a pair of end rods having laterally-adjustable connections with said side rods, a pulley journaled on each side rod, an endless band-saw supported by said pulleys and having different running portions in close proximity and a motor mounted on one of the side rods and having a gear connection with the pulley thereon.

6. In a sawing-machine, a portable frame comprising a pair of side rods, and a pair of end rods having laterally-adjustable connections with said side rods, a pulley journaled on each side rod, an endless band-saw supported by said pulleys and having different running portions in close proximity, a bracket-arm carried by each side rod and extending within the bounds of the frame, and spaced tensioning-rollers carried by each arm, and arranged on opposite sides of the saw-

runs, said rollers having peripheral flanges constituting abutments for the rear edge of the saw to prevent lateral thrust.

7. In a sawing-machine, a portable frame comprising a pair of side rods, and a pair of end rods having laterally-adjustable connections, a pulley journaled on each side rod, an endless band-saw supported by said pulleys and having different running portions in close proximity, a bracket-arm carried by each side rod and extending within the bounds of the frame, and an idler-pulley carried by each bracket-arm for maintaining the runs of the saw in facial contact, said idler-pulleys having peripheral flanges constituting abutments for the rear edge of the saw to prevent lateral thrust thereof.

8. The combination with a band-saw arranged with different running portions thereof in proximity, and pulleys supporting the same, of a knockdown frame comprising a pair of side rods for supporting said pulleys, distancing-rods having hubs to receive said side rods, and clamping members for securing said side rods and distancing-rods, together.

9. The combination with a band-saw, and pulleys supporting the same, of a knockdown frame, comprising a pair of side rods for supporting said pulleys, distancing-rods having hubs to receive said side rods, clamping members for securing said side rods and distancing-rods, together, and a motor mounted on one of said rods and connected with one of said pulleys.

10. In a portable sawing-machine, a portable frame comprising in part a pair of side rods, a pulley journaled on each rod, an endless band-saw supported by said pulleys, and a motor mounted on one of the side rods and having a gear connection with the pulley thereon.

11. In a portable sawing-machine, a portable supporting-frame therefor comprising a pair of side rods and a pair of end rods, a pulley supported by each side rod, an endless band-saw supported by said pulleys and having different running portions in close proximity, a motor supported by one of said side rods, and gearing connecting said motor with the pulley thereon.

Signed by me at Springfield, Massachusetts, in presence of two subscribing witnesses.

HARRY A. KNOX.

Witnesses:

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A. V. LEAHY.