Nov. 1, 1932. M. HUTCHINSON 1,885,520

WOODWORKING MACHINE

Filed Dec. 7, 1928 4 Sheets-Sheet 1

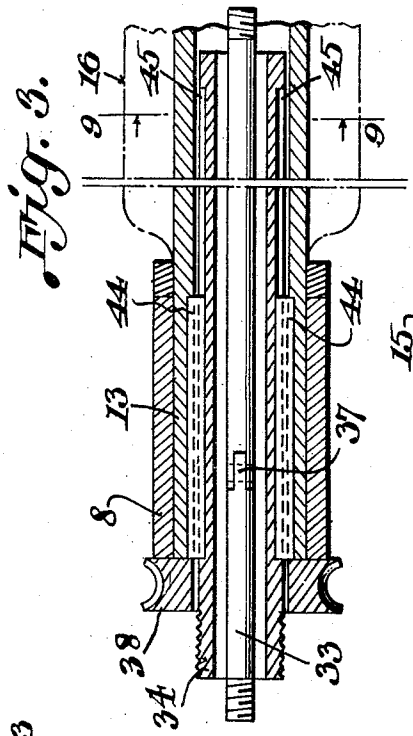



Fig. 3.

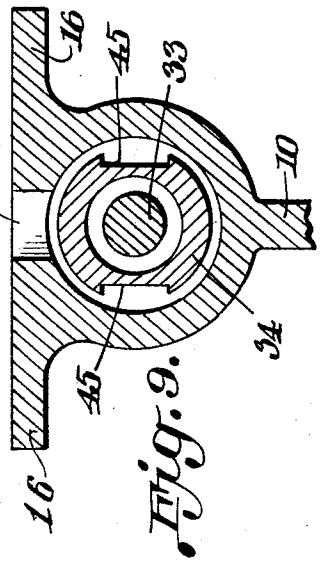



Fig. 9.

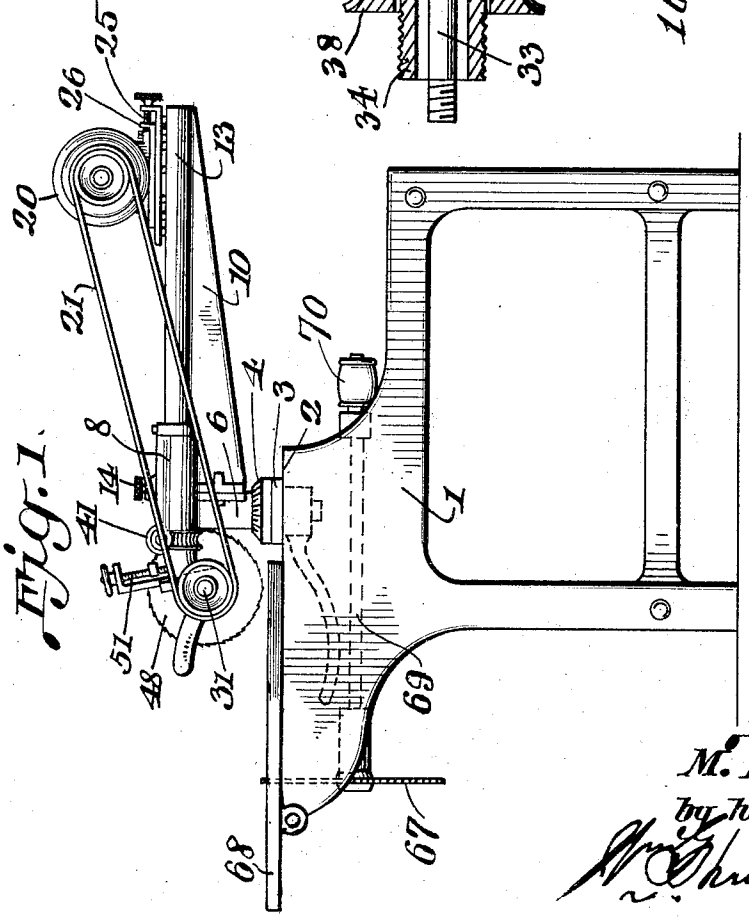



Fig. 1.

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WOODWORKING MACHINE

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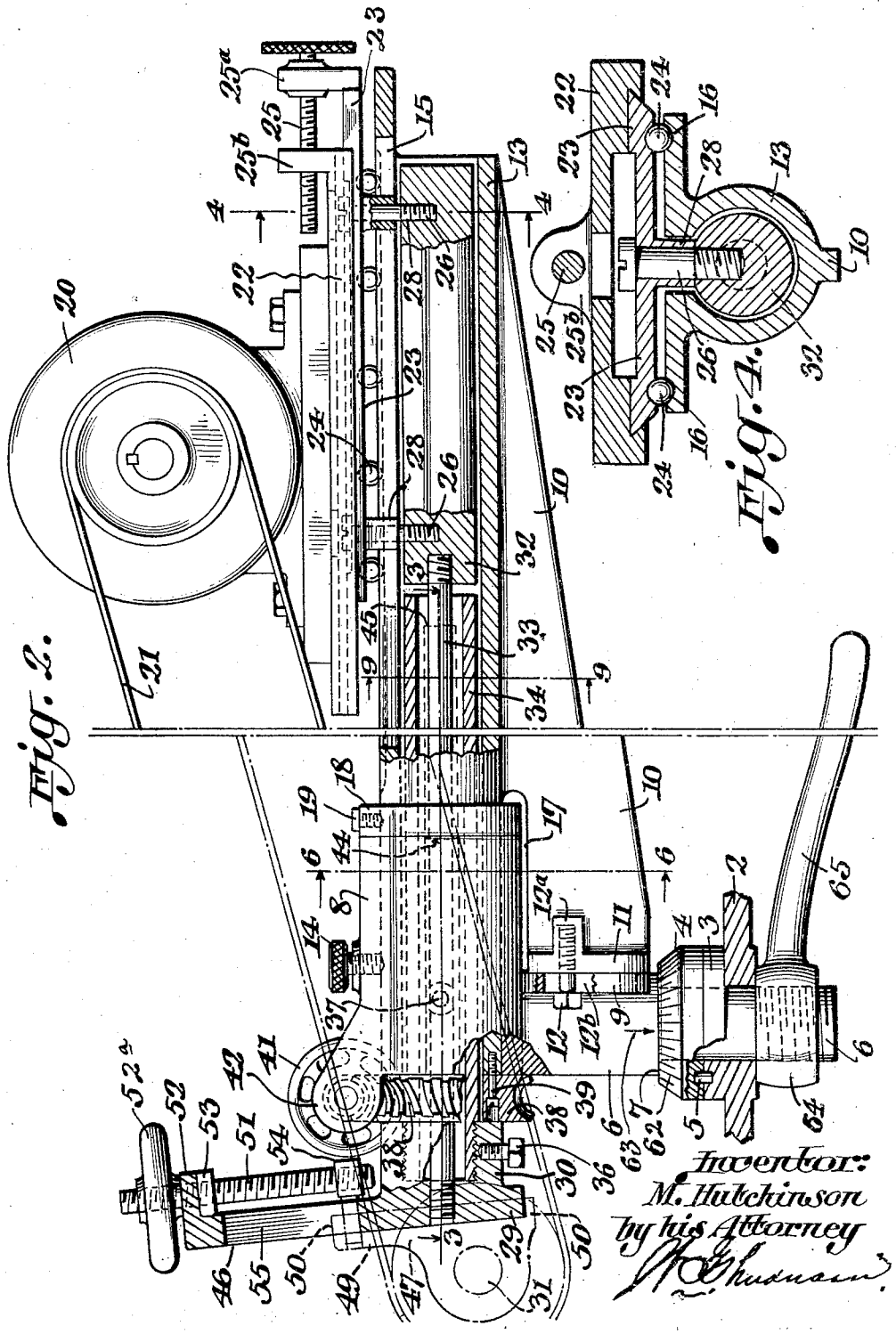


Fig. 2.



Fig. 4.

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WOODWORKING MACHINE

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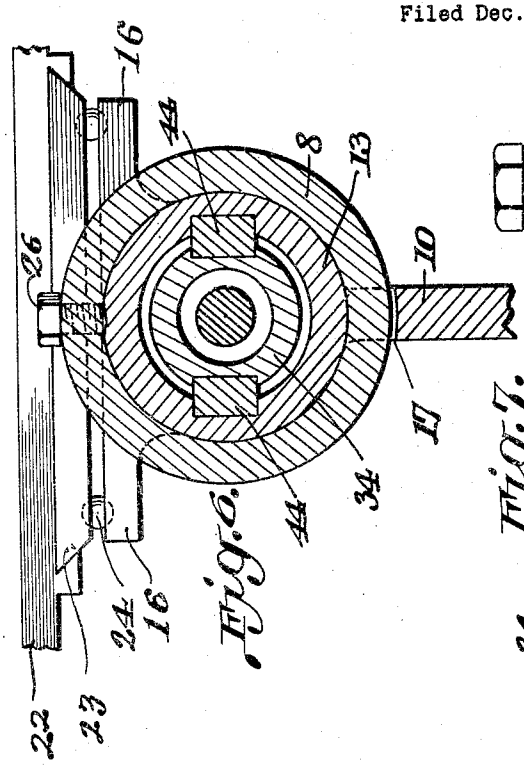



Fig. 6.

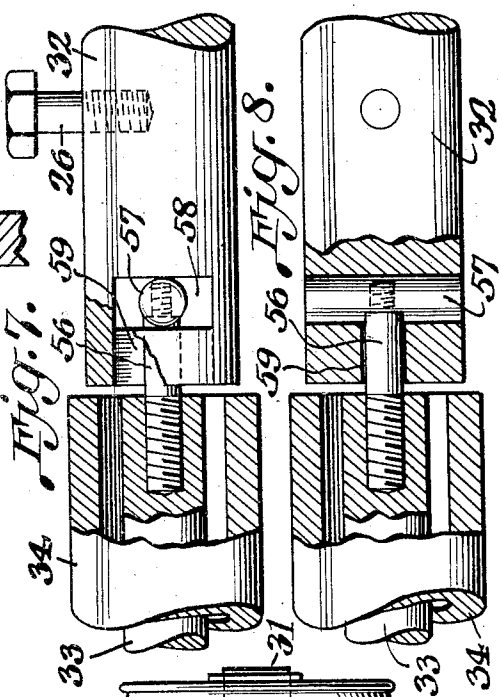



Fig. 7.




Fig. 8.

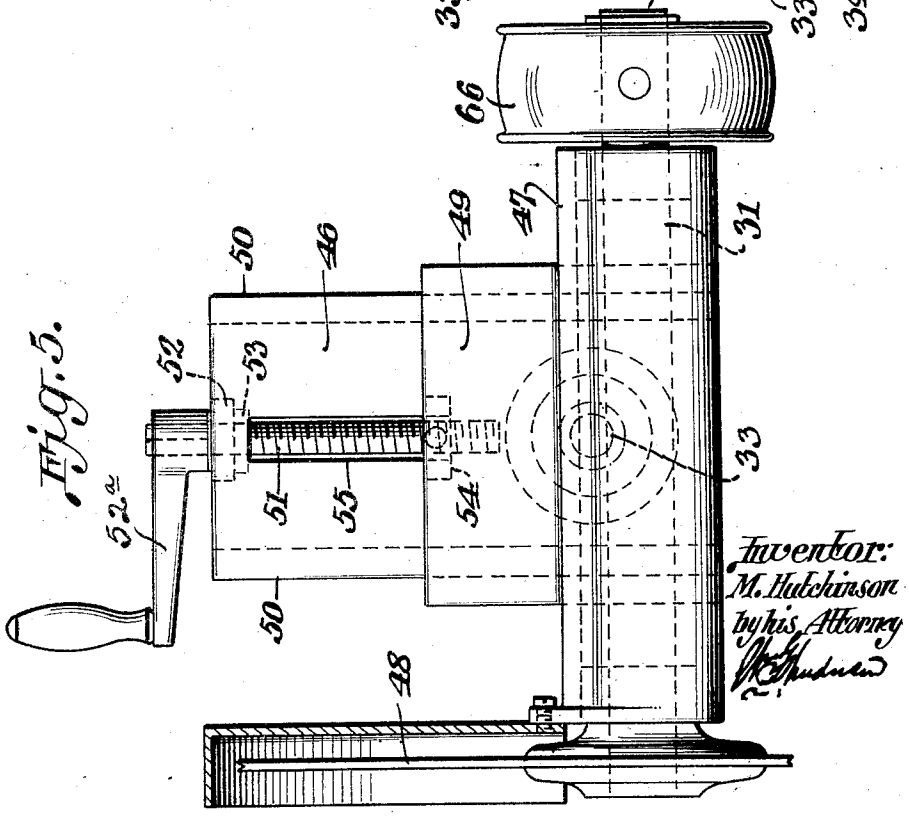



Fig. 5.

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WOODWORKING MACHINE

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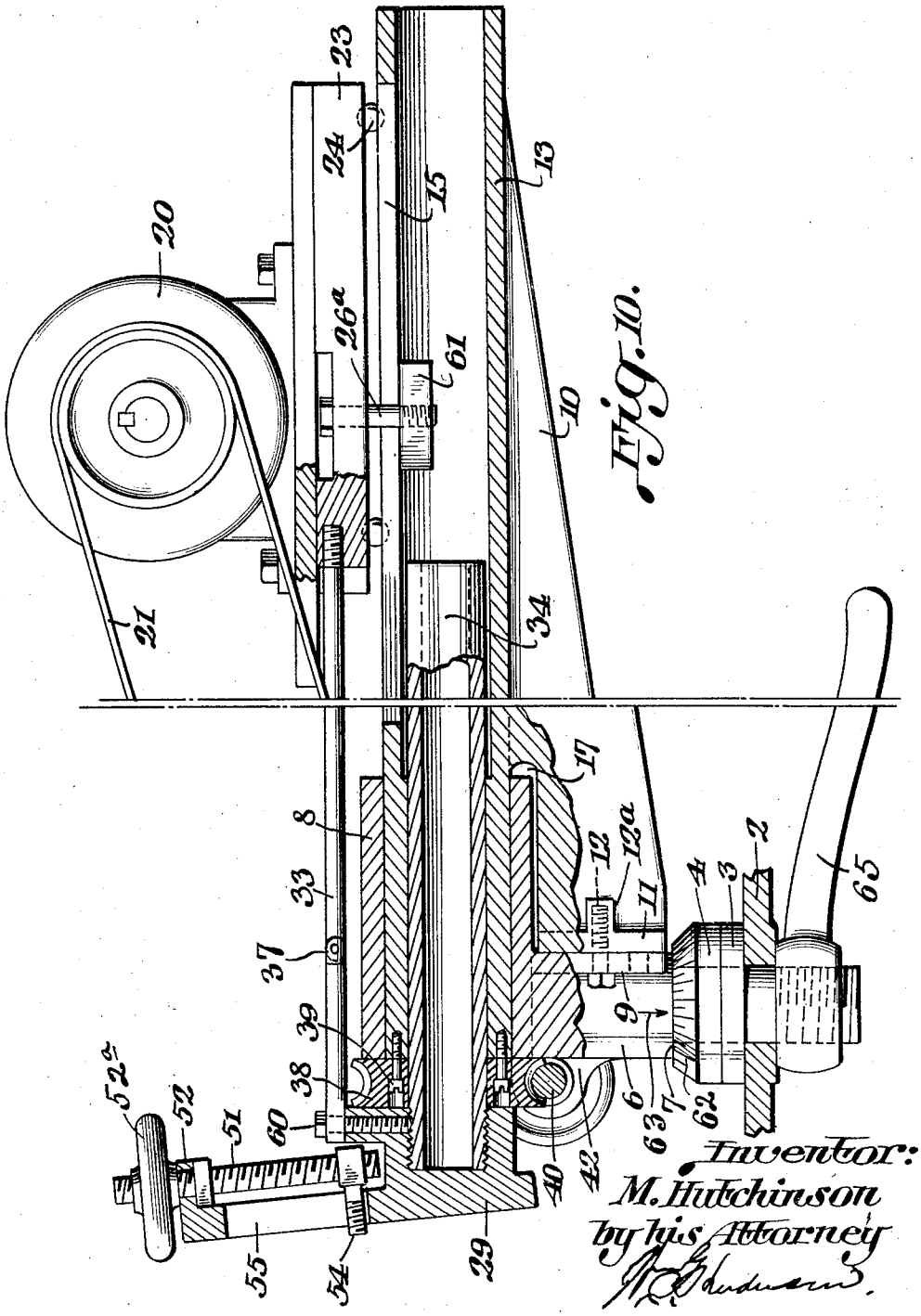



Fig. 10.

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Patented Nov. 1, 1932 1,885,520

# UNITED STATES PATENT OFFICE

MACKINTOSH HUTCHINSON, OF PHILADELPHIA, PENNSYLVANIA

## WOODWORKING MACHINE

Application filed December 7, 1928. Serial No. 324,490.

My invention relates to wood-working machines, and has for its objects to provide a construction in which the rod by which the cross-cut saw and its driving motor are reciprocated back and forth in operation of the saw, will be relieved of the weight of the motor and the base upon which it is mounted, whereby will be eliminated the twisting or torsional strains to which they are ordinarily subjected, and which when existing, cause exerting more power for movement of the parts and also tend to distort or impair the kerf cut by the saw; also to provide a construction in which the base member carrying the motor and constituting the traveling carriage will yield to obstructions frequently encountered in the path of travel and thus avoid or relieve the tension and binding caused by wedging of the obstructions between the carriage and its trackway which when occurring call for more power to slide the carriage and consequent stiffness and lack of smoothness in reciprocating the carriage and its motor and saw; also a construction in which the main frame for supporting the motor carriage will constitute a track-way for the carriage and which together with the motor and saw may be tilted for cutting a kerf at an angle or incline to a vertical plane; also in an improved construction for raising and lowering the cross-cut saw from and to the work or work-table; also to provide other features for the purpose of increasing the efficiency of the machine, as will be hereinafter fully described.

To the foregoing ends the invention consists in the features hereinafter particularly described and then sought to be clearly defined in the appended claims.

Figure 1 is a side elevation of the machine, reduced scale;

Figure 2 is a side elevation, partly in longitudinal section of the main frame and associated parts, with parts broken away;

Figure 3 is a longitudinal section on line 3—3 of Figure 2, with parts broken away;

Figure 4 is a cross section on the line 4—4 of Figure 2, looking in direction of the arrows;

Figure 5 is a front elevation, looking from the cross-cut saw end of the machine;

Figure 6 is a cross section on line 6—6 of Figure 2, enlarged scale;

Figure 7 is a side view, partly sectioned, of modified form of jointed rod connecting the cross-cut saw and motor carriage, enlarged;

Figure 8 is a plan view of Figure 7, with parts in section;

Figure 9 is a cross section on line 9—9 of Figure 3;

Figure 10 is a longitudinal section of a modification.

In the drawings the numeral 1 designates the frame of the machine of any suitable approved form and provided with a top plate 2 which may be bolted thereto or formed in one piece therewith. The frame top plate 2 is formed with a boss 3 upon which rests a collar 4 prevented from turning by studs or pins 5. Through the frame top-plate 2, the boss 3 and collar 4 passes the lower reduced end of a rotatable post 6, the shoulder 7 of which rests upon the collar 4. This post is provided or formed with a hub 8 extending laterally and rearwardly from its top, and is also formed with flanges 9 projecting from opposite sides of the post beneath the hub 8. The post and flanges support a longitudinally extending lateral bracket 10 formed with flanges 11 lying parallel with the flanges 9, and secured thereto by bolts 12 passed through one set of flanges and threaded into the other set so as to clamp the bracket arm 10 to the post, the bolt holes or slot $12^b$ in one set of flanges being arc-shaped and elongated transversely to the post 6 so as to permit the bracket arm 10 and parts supported therefrom to rock or swing to tilt a cross-cut saw to cut a kerf at an angle to a vertical plane, as will be hereinafter more particularly described.

In order to afford a relatively long bearing for the threaded ends of the clamping bolts 12 the flanges into which the bolts are threaded may be formed with bosses $12^a$, as illustrated. The bracket arm 10 has formed as a part thereof, preferably by being cast therewith, a tubular member 13, which for convenience will be designated the main frame. This

frame at one end fits in the hub 8 and may be locked thereto, say by a set-screw 14 which when loosened will permit the tubular frame to be turned or rocked in the hub 8, for instance, when the cross-cut saw is to be tilted. The tubular frame has formed in its top a longitudinally extending slot 15 for a purpose later stated, and from opposite sides of the tubular frame, at its top, for a distance of its length, are laterally extending flanges 16 which constitute a track or run-way for the carriage which supports the motor for driving the saw or saws.

The bracket arm 10 next to the hub 8, beneath that end of the tubular frame member 13, is formed with a cut away portion or recess 17 to receive the hub 8, and around the tubular frame member 13 next to the hub 8 may be placed a collar 18 secured to the tubular frame member by a set screw 19 so as to guard against longitudinal movement or play of the tubular frame member when rotated in the hub for tilting of the cross-cut saw but such collar may be omitted as non-essential and reliance placed on the flanges 9 and 11 to prevent such play or movement.

Above the tubular main frame 13 is mounted the electric or other type of motor 20 which drives the cross-cut saw or other tool with which it is connected by a belt 21, or other suitable drive. The motor is mounted upon and bolted to a base-plate 22 which has a dovetail tongue and groove slidable connection with a saddle 23 which constitutes a carriage by which the motor may be reciprocated back and forth on its track in reciprocation of the saw across its work. Between the saddle or carriage 23 and side tracks 16 are interposed roller bearings 24 disposed at intervals and which constitute anti-friction roller bearings for the saddle or carriage throughout its length of travel. The motor base-plate 23 may be slidably adjusted to tighten the drive belt by a screw threaded rod 25 journaled in an upright $25^a$ projecting from the saddle or carriage 23 and having threaded engagement in an upright $25^b$ projecting from the motor base-plate 22. The motor-base and carriage are held to the track 16 by threaded bolts 26 passed through the carriage and the longitudinally extending slot 15 of the tubular main frame 13 and through the studs 28 depending from the carriage and fitting in the slot 15 of the frame 13 as shown in Figures 2 and 4 of the drawings and connected with the head-block 29 which supports the journal box 30 of the cross-cut saw arbor 31, preferably as illustrated in Figure 2 of the drawing, that is, by the connecting rod 32, 33, so that as the saw is reciprocated back and forth the motor and its carriage will be likewise reciprocated. The portion 32 of the connecting rod has substantially the diameter of the internal diameter of the tubular main frame 13 so as to slide therein without lateral deflection that tend to bind the rod in its reciprocation, and the portion 33 of the rod of smaller diameter passes through a slidable tube 34 having substantially the internal diameter of the tubular frame 13 and connected at its forward end with the head block 29, which carries the saw arbor journal box, say by a threaded connection with the hub 35 of the head which may be held against disengagement by a set screw 36. The tube 34 reciprocates with the connecting rod 32, 33, and serves to prevent binding deflection of the connection rod in its reciprocation inside the tubular main frame.

In machines of this type in which the motor and its carriage reciprocate back and forth with the cross-cut saw, it frequently happens that particles of wood-shavings, sawdust, or other waste, accumulate on the trackway of the carriage, and form such obstructions as to wedge between the carriage and its track and thus cause a binding of the carriage and consequently calling for expenditure of more power to reciprocate the carriage and saw and a tendency to impair to some extent efficiency in operation of the parts and in the character of the work being performed. To eliminate or lessen the obstructions mentioned, provision is made for a slightly vertical movement or play of the motor carriage so as to ride over the obstructions in its pathway, thus preventing or overcoming the binding of the parts mentioned. To that end a suitable flexible joint is provided in the rod or connection between the carriage and cross-cut saw head. One form of joint is illustrated in Figs. 2 and 3 of the drawings, which may be a tongue and groove and pin connecting joint 37 which allows for the vertical play mentioned without affecting the easy, smooth gliding movement of the connecting rod within the tubular main frame.

For tilting the cross-cut saw to cut at an oblique angle to a vertical, a worm-gear 38 is secured to the end of the tubular main frame 13 by screw threaded bolts 39, or otherwise, and which abuts against the end of the hub 8 as shown in Figs. 2 and 8, and with it cooperates a worm shaft having a hand wheel 41 and journaled in boxings 42 extending from the hub 8. When the saw is to be set to cut obliquely, the set screw 14 is loosened and the clamp bolts 12 also are loosened so that the tubular main frame is free to turn in the hub 8, and by means of the worm wheel 38 and worm shaft 40 the tubular main frame is turned and carries with it the motor and its carriage and cross-cut saw and the rod connecting it to the motor carriage, and when the saw is adjusted or tilted to the angle desired the set screw 14 and bolts may be tightened to securely hold the several parts to their adjustment, unless the worm wheel and worm shaft are relied on for holding the parts to the adjustment given. To insure the sliding-

rod connection between the drive motor and the cross-cut saw turning with the tubular main frame and to insure the easy reciprocation of the connecting rod within the tubular frame, the tubular member 34 has a spline connection to the interior of the tubular main frame effected by splines 44 secured to the interior of the tubular main frame and fitting in grooves 45 formed in the tubular member 34.

The head-block 29 has an upwardly extending plate 46, the face of which, as well as the face of the head-block, is inclined as shown in Figs. 1 and 2, and against the face of the head-block fits a correspondingly inclined face of the journal boxing 47 in which is journaled the shaft or arbor 31 of the cross-cut saw 48, the boxing and upward extending plate 49 thereof having flanges 50 which lap across the opposite edges of the head-block and its upwardly extending plate 46 so as to guide the saw journal boxing 49 in vertical adjustment of the cross-cut saw as shown in Figs. 2 and 5. For vertical adjustment of the cross-cut saw boxing, there is provided a screw 51 threaded in an overhang 52 of the plate 46 and having a jamb-nut 53 and threaded at its lower end into an eye-bolt 54, the shank of which passes through a vertical slot 55 in the head-block plate 46, and has a threaded connection with the upward extension 49 of the saw arbor boxing so that by turning the screw 51, by a crank or a hand wheel $52^a$, the cross-cut saw may be raised and lowered. The inclined faces of the head-block and its extension and of the saw arbor boxing provide for maintaining the drive belt from the motor taut in vertical adjustment of the saw.

Figures 7 and 8 illustrates a modification in the flexible joint of the rod which connects the cross-cut saw with the motor carriage, the modification consisting in connecting the part 33 of the rod with the part 32 thereof by a stem 56 threaded into the part 33 and having a T or cross-head 57 fitting in a slot 58 of the part 32 so as to permit a vertical play of the part 32 relatively to the part 33 sufficient to permit a vertical play or movement of the motor carriage to prevent binding of the carriage as it rides over particles lodging on the trackway for the carriage, the opening 59 in the part 32 for the stem 56 being such as to prevent the stem binding therein.

Figure 10 of the drawings illustrates a modification in which the rod 33 that connects the cross-cut saw to the motor is positioned externally of the tubular main frame and is attached at one end to the saddle or carriage 23 and at the other end by a threaded bolt 60 to the hub 30 of the cross-head 29. In this modification, the tubular member 34 slides within the tubular main frame 13 and reciprocates in conjunction with the connecting rod and cross-head and with the saw arbor boxing, vertically adjustable by a screw as in the preferred form first described, and under which modification binding of parts will be prevented substantially as provided for in the preferred form. In the modified form the bolt $26^a$ which connects the carriage to the track of the tubular main frame and passes through the slot 15 in the tubular frame is provided with a nut 61 to prevent the carriage from sliding off the trackway in the event that provision is made for tilting the cross-cut saw. With the exceptions noted features embodied in the modification correspond to like features embodied in the preferred form.

The collar 4 of the rotatable post 6 is provided with a scale 62 and the post with an index finger, for instance an arrow 63, which together will serve to determine the extent or degree of rotative adjustment of the post for setting the cross-cut saw for the desired angle of cut to be made in the work, and when the adjustment has been made the parts will be held thereto by the clamp-nut 64 through which the reduced threaded end of the post passes and which is manipulated by a lever 65 so as to bind and hold the post to the top-plate 2 of the table upon which the parts are mounted. The drive belt 21 leading from the pulley of the motor 20 passes around the pulley 66 of the cross-cut saw arbor. If desired, a rip-saw 67 positioned normally below the work table 68 and carried by a shaft 69 which may be journaled in swinging arms (not shown) supported by the table frame beneath the work table and having a pulley 70 at one end, may be associated with the other parts, and will be driven by connecting the drive belt 21 with the pulley by rotating post 6 to bring the drive pulley of the motor into alinement with the pulley on the rip saw shaft. The work table will be stationary and the rip saw when operated will be swung to bring its teeth above the plane of the table and into contact with the work. The cross-cut saw is lowered to bring it into active relationship to the work on the table by lowering the cross-head 49 which carries the saw and is raised from active working position by lifting the cross-head, so that the lowering and raising of the cross-cut saw is effected by movement of the cross-head alone instead of raising and lowering the post which supports the carriage and motor, or by raising and lowering the work table, and thus is saved the expenditure of power necessary to raise and lower the carriage and motor, or the work table as under other constructions. By having the weight of the motor and its carriage sustained by the tubular main frame upon which they travel back and forth, and relieving the slidable tubular member and rod which form the connection between the mo-

tor and cross-cut saw from the weight of the motor and its carriage, the possibility of binding between the parts is reduced to the minimum and an easier and smoother reciprocation of the motor and carriage and more accurate and satisfactory working of the saw are effected. The bosses 28 depending from the motor carriage 23 and fitting in the slot 15 of the tubular main frame 13 serve to prevent the motor and its carriage from sliding sidewise from off the frame and its trackway when the cross-cut saw is tilted for sawing at an oblique cut to a vertical but such guiding and holding studs or bosses may be omitted if the tilting construction features be not embodied in the machine.

I have illustrated and described the features preferred to be embodied in the machine and also the preferred details of the various features but some may be omitted and the details varied without departing from features of the invention as sought to be defined in the appended claims.

Having described my invention, and set forth its merits, what I claim is:—

1. A woodworking machine comprising a motor supporting frame of tubular formation extending substantially throughout the length of travel of a motor carriage, a traveling carriage upon which the motor is mounted, a track for the motor carriage constituting part of the tubular frame, a member slidable within the tubular supporting frame and connected with the traveling carriage, a cross-cut saw driven from the motor and connected with the slidable member, the weight of the motor and its carriage being borne by the track of the tubular frame so as to relieve the slidable member from the weight.

2. A woodworking machine comprising a motor supporting frame of tubular formation extending substantially throughout the length of travel of a motor carriage, having a longitudinally extending slot and formed with a longitudinally extending track, a traveling carriage upon which the motor is mounted supported by said track, a member slidable within the tubular supporting frame and having connection with the motor carriage, a cross-cut saw driven from the motor and connected with the slidable member, and a slidable connection between the motor carriage and tubular supporting frame passing through the slot of the frame.

3. A woodworking machine comprising a motor supporting frame of tubular formation and formed with a longitudinally extending track, a traveling carriage upon which the motor is mounted supported by said track, a member slidable within the tubular supporting frame, a cross-cut saw driven from the motor and connected with said slidable member, and a flexible connection between the slidable member, the motor carriage, and cross-cut saw to permit deflection of the motor carriage in its reciprocation with the cross-cut saw, the weight of the carriage being borne by the track and relieving the slidable member of binding tension in reciprocation of the motor and cross-cut saw due to weight of the motor.

4. A woodworking machine comprising an upright support, a bracket-arm supported therefrom and formed with a tubular frame extending substantially throughout the length of travel of a motor carriage and provided with a longitudinally extending track, a traveling carriage having a motor mounted thereon and supported upon the frame track, a saw driven from the motor, and a member slidable within the tubular frame and connected with the cross-cut saw and motor carriage for moving the carriage and saw relatively to the tubular frame.

5. A woodworking machine comprising an upright support, a bracket-arm supported therefrom and formed with a longitudinally slotted tubular frame extending substantially throughout the length of travel of a motor carriage provided with a longitudinally extending track, a traveling carriage having a motor mounted thereon and supported upon the frame track, a saw driven from the motor, a member slidable within the tubular frame and connected with the cross-cut saw and motor carriage for moving the saw and carriage relatively to the tubular frame, and a member projecting from the carriage into the slot of the tubular frame and serving to guide the carriage in traveling over the frame track.

6. A woodworking machine comprising an upright support, a bracket arm supported therefrom and formed with a longitudinally slotted tubular frame provided with a longitudinally extending track, a traveling carriage having a motor mounted thereon and supported upon the frame track, a saw driven from the motor, a tubular member slidable within the tubular frame and connected with the saw, and a jointed or transversely yieldable rod connected with the saw and motor carriage and relieved of the weight of the motor for joint reciprocation of the saw and motor.

7. A woodworking machine comprising an upright support, provided with a laterally disposed hub, an adjustable bracket arm extending from said support and formed with a longitudinally extending tubular frame provided with a track and rotatably mounted in said hub, a traveling carriage having a motor mounted thereon and supported upon the frame-track, a saw driven from the motor, a member slidable within the tubular frame and connected with the saw and motor carriage for joint reciprocation of the carriage and saw, and means comprising a worm-shaft and a worm connected to the tubular frame for tilting the saw to cut at an oblique angle.

8. A woodworking machine comprising an upright support provided with a laterally disposed hub, an adjustable bracket arm extending from said support and provided with a longitudinally extending tubular frame provided with a track and rotatably mounted in said hub, a traveling carriage having a motor mounted thereon and supported upon the frame-track, a saw driven from the motor, a member slidable within the tubular frame and having a feathered connection therewith to rotate with the frame and connected with the saw and motor carriage for joint reciprocation of the carriage and saw, and means for turning the bracket arm, tubular frame motor carriage and saw in tilting the saw to cut at a different angle.

9. A woodworking machine comprising an upright support, an adjustable bracket arm formed with a tubular frame provided with a longitudinally extending track and rotatably mounted on said support, a traveling carriage supported on said track and having a motor mounted thereon, a member slidable within the tubular frame and connected with the carriage and having a head-block at one end, a journal boxing for a saw mandrel slidably mounted on the head-block and carrying a saw driven from the motor, means for adjusting the saw mandrel boxing toward and from the work, independently of the carriage, and means for rotatively adjusting the tubular frame, slidable member therein and motor carriage for tilting the saw to cut at an oblique angle to a vertical.

10. A woodworking machine comprising a bracket arm formed with a tubular frame extending substantially throughout the length of travel of a motor carriage and having side flanges to form a longitudinally extending track, a traveling carriage having a motor mounted thereon and supported on said track, a slidable member positioned within the tubular frame and connected with the carriage, a saw connected with said slidable member and driven from the motor and reciprocable with the motor carriage.

In testimony whereof I affix my signature.

MACKINTOSH HUTCHINSON.