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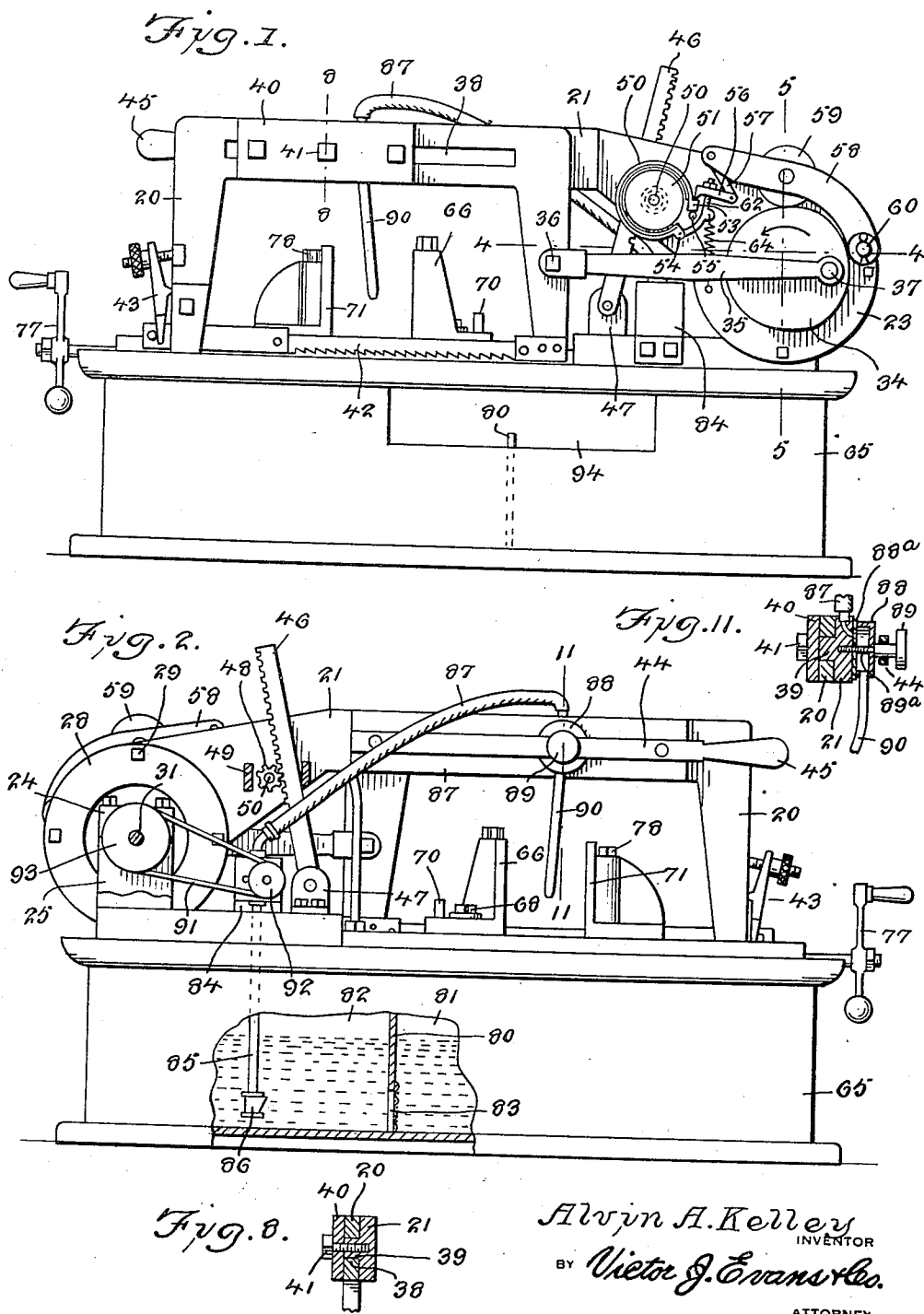
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POWER HACKSAW

Filed June 22, 1936

2 Sheets-Sheet 1



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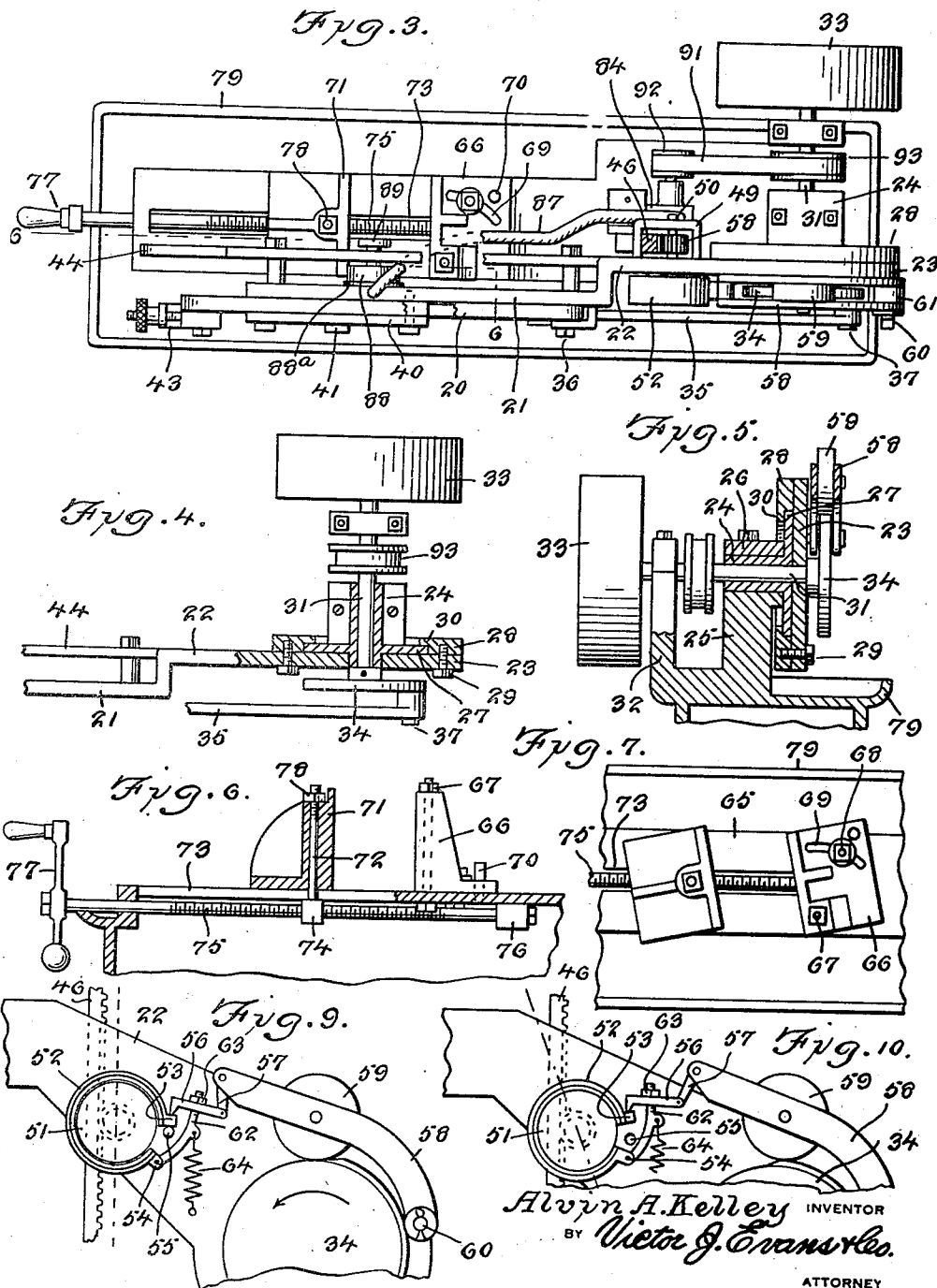
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POWER HACKSAW

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7 Claims. (Cl. 29—73)

The object of the invention is to provide a power hacksaw in which the relief and cutting strokes will be uniform despite the thickness of the work within the range for which the particular machine is designed; to provide a machine of the kind indicated in which the extent to which the saw is raised in the relief stroke may be varied and this when the machine is in operation; to provide a power hacksaw in which the frame may be raised preparatory to clamping the work in position and will retain its elevated position until the apparatus is started; to provide a power saw in which water is automatically delivered to the work to keep it cool and returned to a suitable reservoir in the machine and reused with the chips from the work excluded in such reuse; and generally to provide a power hacksaw which is of simple form for the character of work which it is designed to perform and is therefore susceptible of comparatively cheap manufacture.

With this object in view, the invention consists in a construction and combination of parts of which a preferred embodiment is illustrated in the accompanying drawings, wherein:

Figure 1 is a front elevational view of a construction embodying the invention.

Figure 2 is a rear elevational view, partly broken away.

Figure 3 is a top plan view.

Figures 4 and 5 are sectional views on the planes indicated by the lines 4—4 and 5—5 respectively of Figure 1.

Figure 6 is a sectional view on the plane indicated by the line 6—6 of Figure 3.

Figure 7 is a top plan view of the vise and adjacent parts of the machine base.

Figure 8 is a sectional view on the plane indicated by the line 8—8 of Figure 1.

Figure 9 is a detail elevational view of the heel end of the saw frame arm and concomitant parts designed for effecting the feeding operation, this figure illustrating the positions of the parts in the cutting stroke of the saw.

Figure 10 is a view similar to Figure 9 but shows the positions of the parts during the relief stroke.

Figure 11 is a sectional view on the plane indicated by the line 11—11 of Figure 2.

The saw frame 20 which is of the customary yoke like formation, has a slide mounting on the arm 21 the heel end 22 of which is offset from the arm and terminates in a disk like head 23. The arm is mounted for rocking movement by means of the head so as to provide the necessary

oscillatory movement to accomplish the cutting and relief strokes of the saw. To this end, there is provided a bearing 24 which is mounted on the pillow block 25 and held in place thereon by means of the clamp plate 26, the bearing being formed with a comparatively wide flange 27 against which the head 23 lies in lateral contact, so that the ring 28 which is secured to the head by means of the cap screws 29, may embrace the flange, the ring being undercut to form an annular lip 30 which lies against the rear face of the flange. By means of this construction, rocking movement of the saw frame arm with the axis of the bearing as a center of such rocking movement is possible.

The shaft 31 is rotatably mounted in the bearing 24 and is also journaled in a supplemental bearing carried at the upper end of a leg 32 formed as an upstanding extension of the base. At one end the shaft carries the drive pulley 33 and at the other end carries the cam disk 34, extending through a clearance hole formed at the center of the head 23, so that the cam will be disposed on the opposite side of the head from the ring 28.

The cam is an element in the mechanism effecting the cutting and relief strokes and is likewise an element in imparting movement to the saw frame, being operatively connected with the latter through the instrumentality of a link 35 one end of which has a pivotal connection with the saw frame, as at 36, and the other end of which is engaged with a wrist pin 37 mounted eccentrically of the disk.

The saw frame is slotted, as at 38, this slot extending substantially the full length of the frame and a rib 39 on the face of the arm enters this slot, the length of the rib being materially less than the length of the slot, so that reciprocatory movement of the frame is possible, the frame being retained in position on the arm by means of a clamp plate 40 secured by cap screws 41.

The saw blade 42 is tensioned between the extremities of the arms of the frame 20 with a suitable adjusting means 43 carried by one arm to apply the tension. While the forward stroke of the saw may be made the cutting stroke, it is preferable with the present construction that the return stroke be the cutting stroke.

On the rear or opposite face of the arm 21 from the saw frame there is secured a bar 44 terminating in a handle 45 which is spaced from the arm and provides a means for manually elevating the arm and frame when it is desired

to do so, as when clamping work in the machine for the purpose of being cut.

The feeding and relieving means consists of a set of elements operated from the cam 34, this set of elements comprising a rack bar 46 pivotally mounted at its lower end on a bracket 47 secured to the base. The pivotal mounting of the rack bar provides for its being retained in mesh with the pinion 48, a yoke loop 49 straddling the rack bar and the pinion and being secured to the heel portion 22 of the arm providing against the rack bar swinging out of mesh with the pinion. The pinion is mounted on one end of the shaft 50 which is journaled in and extends through the heel portion 22 and carries on the opposite side of the heel portion the drum 51 which is peripherally embraced by a spring band 52 in the nature of a brake band. The band 52 is split and its extremities are out-turned at 53 and 54, the former constituting a foot portion which at certain periods during the operation bears on the pin 55 secured to the heel portion 22 but always, on its upper face, acts as a bearing foot for the nose of a short lever 56, the latter having a link connection 57 with the cam roller lever 58, the latter being in the form of identical spaced parallel levers with the cam roller 59 mounted between them and traversing the periphery of the cam 54 as the latter rotates. The cam lever 58 has a pivotal mounting at 60 on the disk like head 23 of the saw frame arm 21 and the two elements constituting this lever have interposed between them a spacer 61 at the pivotal mounting.

Intermediate between the nose bearing upon the foot 53 and its point of connection with the link 57, the lever 56 is formed with an eye or hole through which a link 62 extends, this link having a pivotal connection with the ear 54 constituting one of the out-turned extremities of the band 52. The link 62 is threaded at its free end and receives thereon the nut 63 which bears on the upper face of the lever 56, while the spring 64 is tensioned between an intermediate point of the link and an anchor pin secured to the offset portion 22 of the saw frame arm.

The movement of the cam roll from the fall to the rise of the cam or vice versa effects either gripping action of the band 52 with the drum 51 or its release from the drum and by this means movement is imparted to the pinion to have it climb or drop down the rack bar, so as to raise the saw for the relief stroke or drop it for the cutting stroke.

The means for holding the work to be cut consists of a vise composed of two cooperating jaws independently supported on the top of the base 65 which constitutes the base for the whole apparatus and is made hollow so that it may constitute a water reservoir, hereinafter described.

Of the two vise jaws, the jaw 66 is a normally stationary jaw but it is adjustable for angularity, this jaw being connected to the base by means of a bolt 67 passed through one corner of the jaw and through the top wall of the base and a bolt 68 which also passes through the top wall of the base but through an arcuate slot 69 formed in the jaw, the slot 69 being generated on an arc having its center at the axis of the bolt 67. Loosening the bolts 67 and 68 will permit angular adjustment of the jaw 66 which may then be retained by tightening the bolts. A pin 70 passed through the jaw and entering a hole in the top face of the base insures the square position of the jaw, or the position in which the work cut

will be cut square with its axis. The pin 70 is employed to reset the jaw to the square position after change from an angular adjustment.

The movable jaw 71 is slidably mounted on the top face of the base and is carried by a clamp bolt 72 the shank of which passes through a slot 73 in the top face of the base, this bolt, below the slot, having a ring head 74 which is internally threaded to engage the threads of an adjusting screw 75, the latter at one end being mounted in a bearing 76 and the other end extending beyond the base for the reception of the crank 77. When the nut 78 is loosened, rotation of the screw 75 by means of its crank will advance the jaw 71 toward the jaw 66 to clamp between the two any desired work. The jaw 66 being fixed, the jaw 71 will then adjust itself to the work, after which the nut 78 may be tightened, so that any pivotal movement thereafter of the jaw on the bolt will be precluded.

The base, throughout its perimeter, at the top, is bounded with an upturned flange 79 constituting a gutter to catch chips, water and the like.

Interiorly, the base is divided by a partition 80 to define two water compartments of which the compartment 81 is for the waste water chips and the compartment 82 for the clear water, the two compartments being placed in communication at the bottom through a screen 83 covering an opening in the partition. Water for cooling purposes is taken from the compartment 82 by means of a pump 84 from the intake of which depends a pipe 85 having a strainer fitting 86 at its lower end. The discharge of the pump is connected with a hose 87 which has a nipple connection with a duct opening on the top and rear face of the arm 21, this duct placing the hose in communication with an angularly adjustable cup 88 which is secured to the arm by means of a knurled nut 89 passing through a clearance opening in the bar 44. A compressible gasket 88a is interposed between the arm 21 and the peripheral edge of the cup and the nut 89 is threadingly engaged with a stud 89a set in the arm and passing through the closed wall of the cup at the center. On its periphery the cup is provided with a discharge pipe 90, the extremity of which is terminated short of the pipe but is generally in the region of the vise. By reason of the cup mounting, the position of the discharge pipe 90 may be varied to secure the most effective position for the discharge of water therefrom.

The pump is driven from the shaft 31 by means of a belt 91 trained over a pulley 92 carried by the pump shaft and a pulley 93 carried by the shaft 31 between the pillow block 25 and leg 32.

In the operation of the invention, the saw frame arm is elevated to permit placing of the work in the vise below the saw, the work being clamped in the vise either to cut it at right angles or at an angle to its axis, the jaw adjustments of the vise being made to satisfy the character of the cut to be effected. When the saw is reciprocated, as it will be by imparting motion to the cam disk by power applied to the pulley 33 from a suitable source, the cam roll will traverse successively the rise and fall of the cam. When the cam roll is on the fall or low part of the cam, the spring 64 will be effective to slide the band 52 around the drum until the foot 53 abuts the pin 55, since there will then be no pull on the lever 56 and link 62 tending to contract the band. The saw will then be on its cutting stroke which will obtain throughout the interval of traverse of the cam roll around the

low part or fall of the cam. At the completion of the cutting stroke, when the return stroke is about to begin, the cam roll will be at the beginning of the rise. Immediately it begins the ascent, the lever 58 will be raised, applying a pull on the link 57 and rocking the lever 66 with its point of engagement with the foot 53 as a fulcrum. This will apply a pull to the link 62, so that the band 52 will be circumferentially contracted into engagement with the drum 51 and the continued movement of the lever 58 thereafter until the roll 59 reaches the uppermost part of the rise, a slight angular or turning movement will be imparted to the drum 51 which will be reflected in a corresponding movement of the pinion 50, with the result that the latter will climb the rack bar 46. Since the extent of the rise is the same angular distance as the fall of the cam, the saw will thus be held elevated during the return stroke, when the cam roller 59 passing onto the fall or low part of the cam will result in the release of the band 52, when the saw frame and arm may drop by gravity to effect the cutting operation in the next succeeding stroke. And this action is the same whatever the position of the saw frame arm 21 angularly with respect to the base. The height to which the saw may be raised in the return stroke is governed by the adjustment of the nut 63, tightening up on the nut to reduce the effective length of the link 62 resulting in quicker contraction of the band 52 and consequently a greater angular movement of the drum while the cam roll is mounting the rise than if the nut adjustment were the reverse. The greater the angular movement given to the drum 51, the greater distance the saw will be raised in the release stroke.

The water used to cool the work in the cutting operation while taken from the compartment 82, is returned to the compartment 81 but any chips are excluded from entry into the compartment 82 by means of the screen 83. Thus, while the water may be continuously reused, the pump is precluded from damage by the entry of chips into it.

An access opening 94 is provided in the front wall of the base 65 for the addition of water when necessary or for clean-out purposes.

When the machine is at rest, if the roll 59 be on the rise of the cam, the band 52 will be contracted into engagement with the drum 51 but the saw frame may then be elevated along with the arm 21 and the saw will retain any position to which it has been elevated for the lifting operation tends to release the band from the drum and move the foot away from the pin 55 as is the effect of drum movement from the elevation of the lever 58. Dropping of the saw frame arm is positively precluded because such movement would tend to turn the drum in the opposite direction providing for increasing the contractile force on the band by increasing the pull on the link 87 with its tendency to rock the lever 56 in band contracting direction.

The invention having been described, what is claimed as new and useful is:

1. A power hacksaw comprising a saw frame, an arm on which the frame has a slide mounting, a pivotal mounting for the arm remote from the frame, a cam disk having its axis of rotation coincident with the pivotal mounting of the arm, operative connections between the cam disk and the saw frame to reciprocate the latter, a lever pivoted on the arm adjacent the pivotal

mounting of the latter and having a roller traversing the cam surface, a rack bar, a pinion in mesh with the rack bar and rotatably mounted on the arm, and operative connections between the lever and the pinion to impart turning movement to the latter to rotate it to climb the rack bar during one stroke of the saw frame and release it to permit the arm to drop by gravity during the other stroke.

2. A power hacksaw comprising a saw frame, an arm on which the frame has a slide mounting, a pivotal mounting for the arm remote from the frame, a cam disk having its axis of rotation coincident with the pivotal mounting of the arm, operative connections between the cam disk and the saw frame to reciprocate the latter, a lever pivoted on the arm adjacent the pivotal mounting of the latter and having a roller traversing the cam surface, a rack bar, a pinion in mesh with the rack bar and rotatably mounted on the arm, and operative connections between the lever and the pinion to impart turning movement to the latter to rotate it to climb the rack bar during one stroke of the saw frame and release it to permit the arm to drop by gravity during the other stroke, the rack bar having a pivotal mounting at its lower end to incline and engage the pinion in all angular positions of the arm.

3. A power hacksaw comprising a saw frame, an arm on which the frame has a slide mounting, a pivotal mounting for the arm remote from the frame, a cam disk having its axis of rotation coincident with the pivotal mounting of the arm, operative connections between the cam disk and the saw frame to reciprocate the latter, a lever pivoted on the arm adjacent the pivotal mounting of the latter and having a roller traversing the cam surface, a rack bar, a pinion rotatably mounted on the arm and in mesh with the rack bar, a drum fixed with respect to the pinion, a band encircling the drum, and operative connections between the lever and the band to contract the latter and rotate the drum and pinion to have the pinion climb the rack bar during one stroke of the saw frame and release it to allow the arm to drop by gravity during the other stroke.

4. A power hacksaw comprising a hollow base, a saw frame, a mounting for the saw frame, means for reciprocating the saw frame on said mounting, automatic means for successively elevating and releasing said mounting respectively during the release and cutting strokes of the saw, an angularly adjustable cup carried by the mounting and having a pendent discharge pipe, and a water pump having its discharge in communication with said cup.

5. A power hacksaw comprising a saw frame, a vertically movable slide mounting for the same, driving means for the saw frame to impart reciprocating movement to the same on its slide mounting, a rack bar, a pinion in mesh with the rack bar and rotatably mounted on the slide mounting, a pivotally mounted lever, a cam actuated by the driving means in timed relation with the movement of the saw frame to rock the lever at prescribed intervals, and operative connections between the lever and the pinion to impart turning movement to the latter to rotate it to climb the rack bar during the turn stroke of the saw frame and release it to permit the mounting to drop by gravity for the cutting stroke of said frame.

6. A power hacksaw comprising a saw frame, a vertically movable slide mounting for the same,

driving means for the saw frame to impart reciprocating movement to the same on its slide mounting, a rack bar, a pinion in mesh with the rack bar and rotatably mounted on the slide mounting, a pivotally mounted lever, a cam actuated by the driving means in timed relation with the movement of the saw frame to rock the lever at prescribed intervals, a drum fixed with respect to the pinion, a clutch band encircling the drum, means actuated by the lever for contracting the band during the return stroke of the saw frame, so that movement to the pinion is imparted to elevate the slide mounting, and band releasing means rendered operative during part of the revolution of the cam, whereby the slide mounting is permitted to drop by gravity during the cutting stroke of the saw frame.

7. A power hacksaw comprising a saw frame, a vertically movable slide mounting for the same, driving means for the saw frame to impart reciprocating movement to the same on its slide

mounting, a rack bar, a pinion in mesh with the rack bar and rotatably mounted on the slide mounting, a pivotally mounted lever, a cam actuated by the driving means in timed relation with the movement of the saw frame to rock the lever at prescribed intervals, a drum fixed with respect to the pinion, a clutch band encircling the drum, means actuated by the lever for contracting the band during the return stroke of the saw frame, so that movement to the pinion is imparted to elevate the slide mounting, and band releasing means rendered operative during part of the revolution of the cam, whereby the slide mounting is permitted to drop by gravity during the cutting stroke of the saw frame, the operative connections between the lever and the band being provided with adjustable means to govern the height to which the slide mounting is elevated in the return stroke of the saw frame.

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