April 5, 1932. G. M. PELTON 1,852,364

SAWMILL DOGGING MEANS

Filed May 19, 1927 3 Sheets-Sheet 1

Fig. 1.

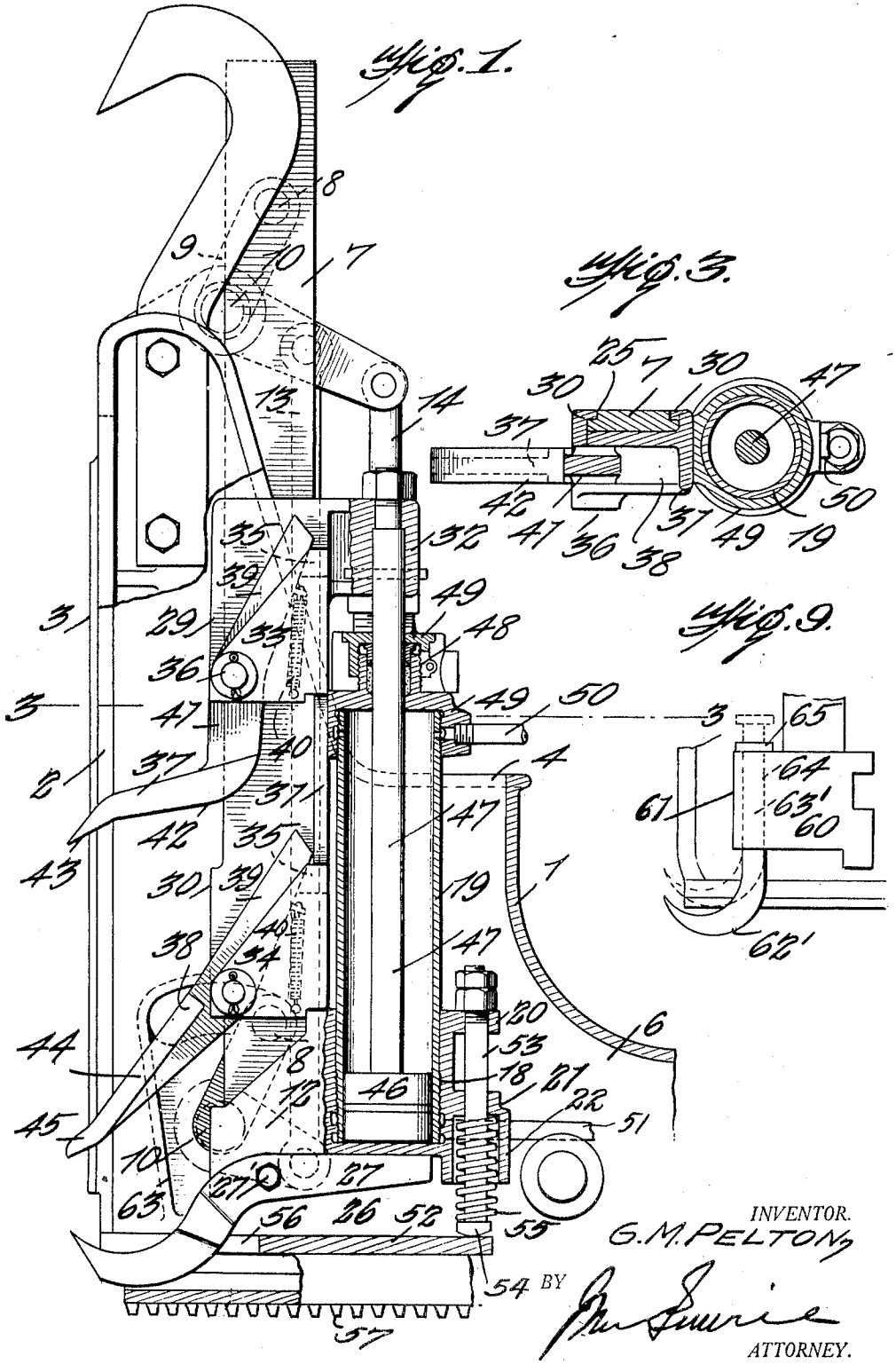

Fig. 3.

Fig. 9.

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Fig. 2.

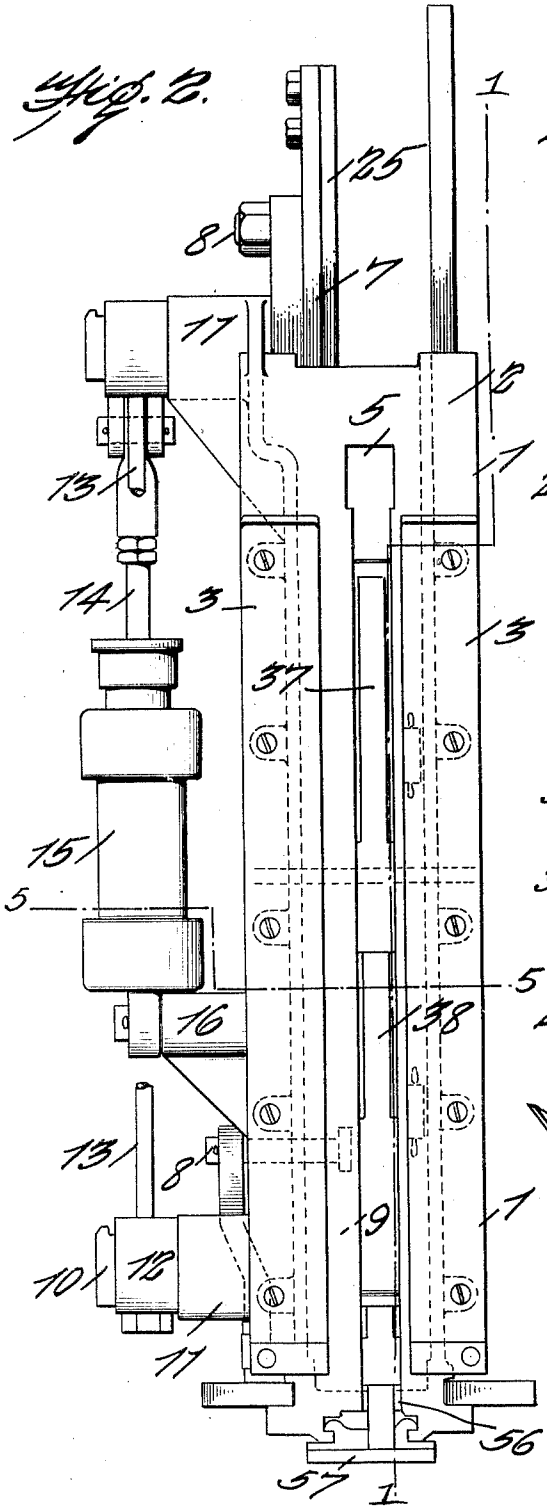

Fig. 4.

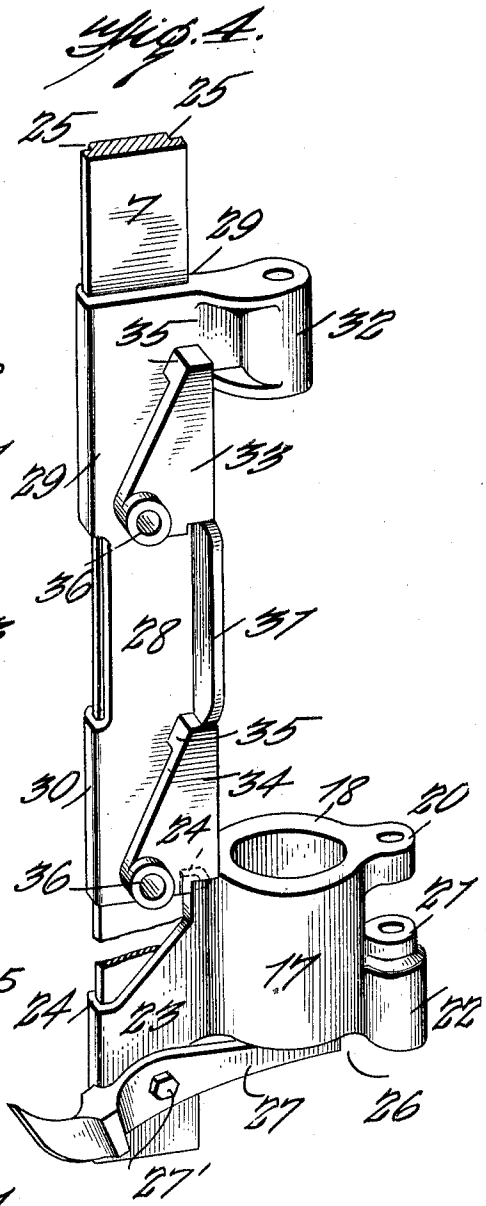

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Fig. 5.

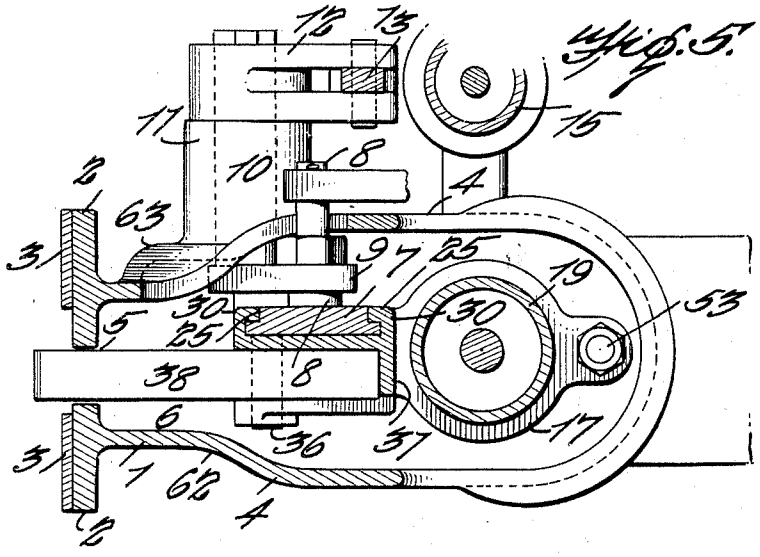

Fig. 7.

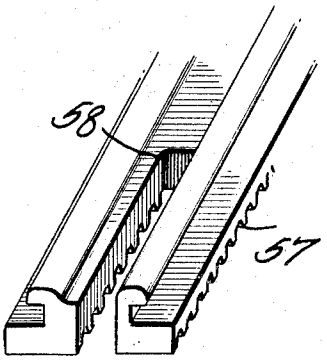

Fig. 6.

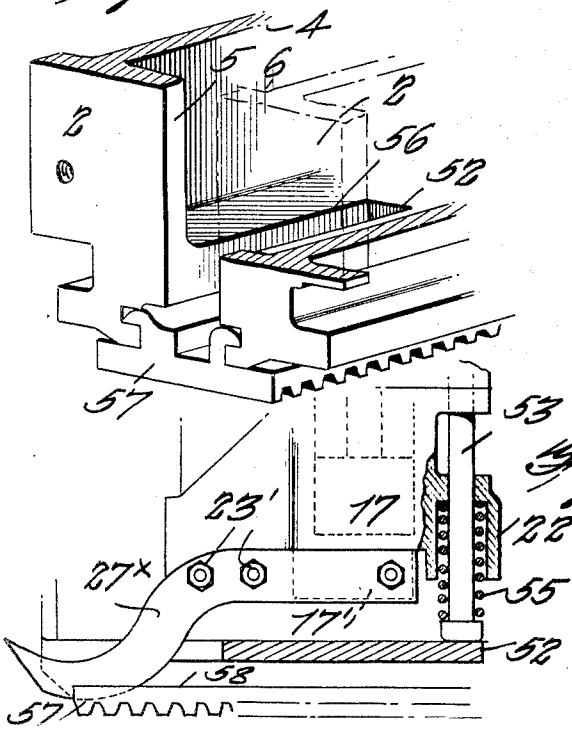

Fig. 8.

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UNITED STATES PATENT OFFICE

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SAWMILL DOGGING MEANS

Application filed May 19, 1927. Serial No. 192,723.

This invention relates to dogging mechanism for use in connection with the knees of a saw mill carriage and particularly to specific improvements in that type of such mechanism wherein the dogs may be adjusted relative to the face of the knee and such dogs are adapted for successive operative movement through the same power means.

Mechanism of this type is in actual practice necessarily of a more or less cumbersome nature to withstand the strains of the work in hand and such mechanism has been heretofore mounted on but wholly to one side of the knee, with a consequent tendency to unbalance the knee to some extent, and further involving the projection of the added parts beyond the side of the knee with the almost certain liability of providing an undesirable obstruction, and at best presenting a comparatively crude and unsightly appearance.

A characteristic and important feature of the present invention is the disposition of the dogs, and the direct means for positioning the dogs relative to the face of the knee and for operating the dogs in their engagement with the log, is arranged wholly within the normal outline of the knee, that is, between what may be termed the side walls thereof and substantially centrally of the knee to thereby eliminate the overbalancing tendency of such parts; and to place such parts in the most effective positions in connection with dogging a log and avoid the projection of such parts beyond the side of the knee.

A further object of the invention is to simplify the construction and arrangement of certain necessary parts of the apparatus in order to avoid complication in construction and operation, and permit the use of heavier appropriate wear and strain resisting material which, if arranged entirely beyond the knee, would be objectionable through its overbalancing influence and its obstructive arrangement.

The invention is illustrated in the accompanying drawings, in which:

Figure 1 is a view in vertical section approximately on the line 1—1 of Figure 2 through the knee, partly broken away, the upper dogs being shown at their downward limit, and both dogs at their inner position relative to the face of the knee.

Figure 2 is a front view of the same.

Figure 3 is a section on line 3—3 of Figure 1.

Figure 4 is a perspective view showing the dog supporting brackets and the guide bar on which they are mounted.

Figure 5 is a section on line 5—5 of Figure 2.

Figure 6 is a broken perspective showing the relation of the knee and rack bar, and illustrating particularly the opening in the knee bottom to receive the lower dog.

Figure 7 is a broken perspective of the rack bar showing the latter recessed to permit the necessary movement of the lower dog of modified form.

Figure 8 is a detail in elevation showing a modified mounting for the lower dog, designed particularly for use in connection with rack and pinion mechanism for the knee.

Figure 9 is a broken elevation illustrating a further type of movable lower dog.

The knee 1, aside from the specific details hereinafter specifically referred to, is of conventional form with its forward portion of greatest height, the forward wall 2 of which portion constitutes the face of the knee and is provided with the usual removable wear plates 3. The side walls 4 of the knee are, in the conventional form of knee, spaced apart and the face 2 is longitudinally divided to define a narrow space 5 of materially less width than the space between the side walls of the knee. The space between the side walls 4 of the knee forwardly of the rear reduced portion 6 of the knee, is utilized for the reception of the dog operating mechanism of this invention, from which it will be apparent that such mechanism is without overbalancing effect on the knee, and, except in the operating means for adjusting the dogs relative to the face of the knee, avoids any projection and therefore obstruction beyond the side wall of the knee.

The dog operating mechanism is mounted for movement on and relative to a guide bar 7 which extends vertically of the knee between the side walls 4, and is provided with lateral pins 8 secured to cranks 9 and ro-

tatably mounted in guide bar 7. Cranks 9 are welded to crank shafts 10, extending laterally through bearings 11 (Figure 2) integral with one side wall of the knee. The opposite ends of the shafts have relatively fixed arms 12, interconnected for simultaneous movement by a rod 13, the upper arm being of somewhat greater length than the lower arm and connected to the piston rod 14 of a piston operating in the cylinder 15, carried by a bracket 16 projecting from one side wall of the knee. The piston is adapted to be operated in either direction through any suitable pressure medium, to thereby simultaneously operate the crank shafts 10 and through the medium of the cranks 9 move the guide bar 7 toward and from the face of the knee, this movement of the guide bar, as will later appear, serving to position the dogs at different distances from the face of the knee as may be desired for cooperation with logs, cants or the like.

The dogging means proper is mounted in independent units, one including the upper dog or dogs and the other including the lower dog. These units are mounted for independent sliding movement on the guide bar 7, and are adapted to be operated in their log engaging stroke in succession through a single power means, said power means, dog mountings and connections being arranged wholly within the knee, that is, between the side walls 4 thereof.

The lower dog casting includes a cylindrical base 17 formed with an interiorly threaded opening 18, which does not extend entirely through the base, and which is designed for the removable reception of a cylinder 19. This base is provided with vertically spaced aligned ears 20 and 21, the latter of which has a depending spring housing skirt 22, such base being formed diametrically opposite the ears with a radially extending plate 23, having its vertical edges formed to present rabbeted guide flanges 24, cooperating with similarly formed edges 25 of the guide bar 7. The lower dog 27, otherwise of conventional form, is pivotally mounted at 27′ on the plate 23, said dog extending of course forwardly of the plate.

It is of course to be understood that the plate 23 may at appropriate points be suitably reinforced to properly support the lower dog. The dog rearwardly of the pivot 27′ rests beneath the cylindrical base 17, such base forming an abutment to prevent the downward movement of the pointed end of the dog in the use of the latter in the dogging operation while permitting the upward movement of the dog point to permit said dog to yield under contact with the rack bar or screw block in the shock absorbing movement of the parts as will later appear.

The upper dog unit comprises a guide plate 28, the vertical edges of which are provided for an appropriate length from the upper and lower ends of the plate with guide flanges 29 and 30, formed to slidably cooperate with the described edges of the guide bar 7. That portion of the guide plate between the flanged upper and lower ends is formed on its inner edge with a laterally directed flange 31, the outer or free surface of which is in alignment with the upper and lower flanges at such inner edge of the plate. This construction provides a square abutment throughout the length of the plate for a purpose which will later appear.

The plate 28 is provided at the upper inner edge with a laterally projecting ear 32 which, as evident from Figure 4, is in alignment with the circular base 17 of the lower dog unit casting. The surface of the plate 28, overlying the guide bar 7 is formed in that area provided with the guide flanges 29 and 30 with plate sections 33 and 34 of substantially identical construction. These plate sections are integral with the plate 28 and have a width at their lower ends somewhat less than that of the plate 28, and are gradually decreased in width toward their upper ends. These plate sections, except at their extreme upper ends, are in spaced parallel relation to the plate 28, and provide with that plate what may be termed a dog guiding means. The plate sections are connected to the plate 28 at their inner or rear walls, the latter extending laterally from the plate 28, and being coincident with the flange 31 to vertically extend the abutment formed by that flange.

The extreme upper ends of the plate sections 33 and 34 are of increased thickness, permitting an integral construction at this point as an additional support for the plate sections. These thickened portions provide dog limiting abutments 35. The space between the plate sections 33 and 34 and plate 28 is bridged at the lower ends of such sections by pivot pins 36 mounted at one end in reinforcements in the plate sections and at the opposite end in the plate 28, as clearly shown in Figure 3. Dogs 37 and 38 are movably supported on these pivot pins and it is to be understood in this connection that while but two such dogs are shown in the upper dog unit construction, it is contemplated that any appropriate number of dogs may be used by duplicating the formation described.

The dogs 37 and 38 are of slightly different form, so far as their portions in advance of the pivot pins are concerned, for a purpose which will be later explained. In rear of the pivot pins, however, the dogs are of bar-like form, as at 39, of a width to fit between the plate 28 and the plate sections 33 and 34 and of a length to overlie the limiting abutments 35, so as to prevent or limit movement of the dogs in one direction. The bar portions 39 of the dogs are connected by springs 40 to pins projected between the plate sections 33 and 34 and plate 28, the springs

acting to normally hold the dogs against the limit abutments 35, while permitting movement of the dogs in the opposite direction against the tension of the springs.

As the face plate opening 5 of the knee terminates short of the upper end of the knee, in order to provide the necessary rigidity of knee structure, and as it is desired that the uppermost dog of the upper dog unit be capable of moving to a position coincident with the upper end of this face plate opening, said upper dog 37 forwardly of the pivot is constructed with a portion 41 normally depending substantially in vertical line with the pivot, and with a dogging portion 42 extending forwardly of such depending portion and terminating in the usual point 43. By this construction, the upper dog unit is permitted an increased elevation compared with that possible if the dog extended in straight line with the bar portion 39. The remaining dog of this upper dog unit, as 38, preferably extends in straight line with the bar portion 39, as at 44, and is provided with an appropriate dogging point 45. Of course, it is understood that the points proper may be of any desired form and may be integral or removably connected as may be found expedient.

As previously stated, the cylindrical base 17 of the casting of the lower dog unit receives and supports and of course seals the lower end of a cylinder 19, which extends vertically in parallel relation to the plate 28. A piston 46 is operative in the cylinder 19, the piston rod 47 of which extends through a suitably packed opening 48 in the removable nut 49 of the cylinder, and is rigidly though removably connected to the ear 32 of the upper dog unit. The cylinder 19 is provided with means, such as pipe connections 50 and 51, whereby fluid under pressure may at will be directed to either side of the piston 46, whereby to move the piston and thereby the upper dog unit longitudinally of the guide bar 7.

The lower dog unit casting is resiliently supported upon a bed plate 52 bridging the space between the side walls 4 of the knee for an appropriate length rearwardly of the face plate 2 of the knee. This resilient support is provided through a rod 53, slidably mounted in ears 20 and 21, and having a lower head 54 to bear on the bottom plate 52 of the knee. A spring 55 encircles the rod between the head and the ear 21, this spring for the greater portion of its length being housed within the skirt 22 to thereby insure direct action of the spring and prevent lateral distortion thereof in operation. The plate 52 is formed in its forward portion with a slot 56 to permit the extension of the lower dog 27 therethrough.

As the motor mechanism and dogs are resiliently supported, and as in operation, particularly in setting the upper dog, the parts move down with considerable force, it is apparent that in this movement the lower dog will, if rigid, move below its normal position. If the dog were rigidly connected and in the resilient movement of the motor mechanism and dogs tended to move downwardly, there would be extreme liability of the dog engaging the rack of the rack and pinion type of set works mechanism or a screw rod in the screw and block type of set works mechanism with liability of damage to the dog or to these parts of the mechanism. It is to be noted, however, that the dog, that is, the forward portion thereof, can freely yield in the upward direction and that if, in this resilient shock absorbing movement of the parts, the dog tends to contact with the rack or screw rod, the dog will yield to avoid damage to the parts. That is to say, the dog automatically accommodates itself in this movement to permit a full shock absorbing resiliency of the motor parts without liability of damage to the mechanism.

It may be found desirable, however, to secure the lower dog rigidly in the lower dog unit assembly. Under these conditions, the dog 27^{x}, shown in Figure 8, is rigidly secured to the plate 23 at 23′ and to a web 17′ depending from the casting 17, the tail of the dog bearing directly beneath the casting and being by the connections described rigidly secured in place. Under the shock absorbing movement of the parts as described, with the dog rigidly secured in place, damaging contact between the dog and the set works mechanism for the knee would probably occur if not provided for. To avoid this interference, it is necessary to form the rack bar 57 with a slot or channel 58 ranging from the forward end of said rack bar for a distance sufficient to accommodate the lower dog, as more particularly illustrated in Figure 7. This arrangement permits the use of a lower dog of appropriate form and size in those rigs where the set works adjust the knees through the rack and pinion method of adjustment, without disturbing the conventional relation between the knee and rack, and therefore without in any way destroying the appropriate balance between the parts incident to the present commercial and accepted type of this particular operating means.

It will, therefore, be apparent that with the lower dog mounted for independent movement or resilient movement of the parts incident to the shock, free movement is permitted without liability of damage through contact of the dog with the set works mechanism for the knee; and that if the dog is rigidly secured against independent movement, the rack bar of such knee set works mechanism must be slotted to take care of the dog movement. The dog mounted for independent movement illustrates a preferred form of this detail and it is apparent that such mounting

to permit independent movement of the dog may be readily provided for in a variety of ways. For example, in Figure 9 a cylindrical casting or base similar to the casting 17 in the preferred form is indicated at 60 and is shown as provided with an enlargement 61 overlying and of course integral with plate 23 of the lower dog unit. The lower dog, here shown at 62, has the usual dog point and a shank 63 slidably mounted in a vertically extending bore 64 of the enlargement 61. The upper end of the shank 63 has a head 65 to limit the downward movement of the dog while the relation of the dog and bore in which it slides is such that the dog may yield upwardly independently of the lower dog unit to permit the full resilient shock absorbing movement of the parts without liability of damage through contact of the dog with the set works mechanism of the knee.

From the above description it will be apparent that, aside from the resilient support provided through the rod 53, the entire dog mechanism and dog operating means is carried by the guide bar 7, and that the latter is movable toward and from the face of the knee through the power mechanism included in the cylinder 15, which latter is arranged beyond and at one side of the knee. In order to accommodate the guide bar and dog carrying units, and particularly to permit the necessary play of the guide bar in its adjusting movement, it may be found necessary to slightly increase the distance between the side walls 4 of the knee as compared with the conventional spacing of these walls, and if desired such walls may be laterally deflected, as indicated at 62′ in Figure 5. Under these circumstances it will be found necessary to provide additional space for the play of the lower crank 9 in order to permit the guide bar to be moved to the desired limit toward the face of the knee, and if such is required, the wall 4 adjacent the crank will be offset, as at 63′, throughout an appropriate area to permit the desired throw of the crank.

In operation, the guide bar 7 and therefore the upper and lower dog units and connected parts may be adjusted relative to the face of the knee by appropriate control of the piston within the cylinder 15, this operation simultaneously shifting the cranks 9 about the crank shafts 10 as a center, and correspondingly moving the guide bar 7 bodily relative to the face of the knee. As the upper and lower dog units are carried by the guide bar, the dogs will be correspondingly projected relative to the face of the knee. This then provides for securing the desired projection of the dogs. In the normal positions of the respective dog units, the upper dog unit is at its maximum elevation, that is, the piston 46 will be substantially at the upper end of the cylinder 19. Assuming it desirable to engage a log, pressure is admitted through pipe 50 to force the piston 46 downwardly. This causes the upper dog unit to move downwardly on the guide bar 7 until such movement is interrupted by the appropriate dog of the upper dog unit engaging the log, cant or board, as the case may be. In this movement, it will be obvious that as the dog engages the material, movement of the dog in a direction resulting from such engagement is impossible, as the dog bears against the dog limiting abutment 35, hence for operative movement the dog may be said to be immovable. As the appropriate upper dog engages the material, movement of the piston is of course interrupted, and the continued admission of pressure to the cylinder 19 will at once result in causing the cylinder to become the movable element and the piston the fixed element. Thereupon the cylinder will move upwardly, and as the cylinder is in effect a fixed part of the lower dog unit, the lower dog will, in such movement of the cylinder, be moved upwardly to engage the lower surface of the log, cant or board. With the pressure maintained, the dogs are held in gripping relation in the material and the sawing or other operation may be proceeded with.

It is to be particularly noted that, as previously described, the free or outer surface of the flange 31 and the corresponding surfaces of the plate sections 33 and 34 form an abutment to resist play of the cylinder in a direction toward the guide bar 7. It is evident that as the parts are moved to operative position, they will of necessity engage the material with considerable force, causing a sudden interruption of the movement of the parts with a consequent tendency to force the cylinder toward the guide bar. If such movement of the cylinder was permitted, a distortion of the arrangement would eventually result with loss of efficiency, and hence the abutment described is provided as a substantially fixed wall to restrict any such play of the cylinder and insure a proper relative disposition of the parts under any ordinary working strains and stresses.

It will be noted that the dogs are preferably though not necessarily so constructed that at the maximum inward adjustment of the guide bar, the points of the dogs will still project to some extent beyond the face of the knee. This minimum projection has its advantages, in that when the guide bar has been adjusted to its inner position, there is still a dog projection which will serve to engage a board, whereas if the inner limit of adjustment of the guide bar was such as to withdraw the dogs wholly within the face of the knee, that disposition of the dogs necessary to engage a board would require an intermediate position of the guide bar, and thus necessitate more or less care in such adjustment which is entirely eliminated by having the inner limit of the guide bar ad-

justment position the dogs for board engagement. This normal projection of the dogs is without any disadvantage from the standpoint of possible damage to the dogs by being engaged by a log rolled against the knee, for it will be apparent that the dogs under such impact can readily yield against the tension of the springs 40 and thus any possible damage to the dog points is entirely avoided.

The subject-matter of this application, except the details expressed in claims 1, 2, 3, 4, 5 and 6 herein, forms the basis of a continuing application filed October 20, 1928, Serial #313,820, the said continuing application being directed to subject-matter common to that application and to the present application.

What I claim to be new is:

1. In a saw mill carriage, a hollow knee, upper and lower dog mechanisms mounted within said knee and including a guide bar movable toward and from the knee, an upper dog carrying unit slidable on the guide bar, a lower dog carrying unit slidable on the guide bar, said lower unit including a cylindrical base, a cylinder removably carried by said base, a piston operative within the cylinder and connected to the upper dog unit, and a spring resisted pin depending from the lower dog unit and adapted to engage the base of the knee to resiliently support the parts.

2. In a saw mill carriage, a knee, a guide bar arranged within the knee and movable relatively to the face of the knee, an upper dog unit slidable on the guide bar, a dog carried by said unit, a lower dog unit including a cylindrical base and a plate projecting therefrom and formed with flanges to slidably embrace the guide bar, a motor mechanism for the respective dog units including a cylinder supported in said cylindrical base, and a lower dog carried by the plate of the lower dog unit.

3. In a saw mill carriage, a knee, rack and pinion mechanism for operating the knee, a guide bar arranged within and operative relative to the face of the knee, an upper dog unit slidable on the guide bar, a lower dog unit slidable on the guide bar, motor mechanism for operating the dog units, and a resilient support to absorb the shock of operation of the motor mechanism, the lower dog being mounted for independent movement to prevent damaging contact with the underlying parts of the mechanism in the shock absorbing movement of the parts.

4. In a saw mill carriage, a knee, a means for operating the knee, a dogging mechanism arranged in the knee including a guide bar, an upper dog slidable on the guide bar, a lower dog slidable on the guide bar, a motor mechanism for operating the dogs, and a resilient support between the motor mechanism and knee to gradually absorb the shock of motor mechanism operation, said lower dog being mounted to yield in one direction on contact with said knee operating means to avoid injury to the parts in the play incident to the shock-absorbing function of the resilient support.

5. In combination, a knee for saw mill carriages including spaced hollow side walls and a divided face plate, a set works member cooperating with the knee for taper adjustment of the latter, and dogging mechanism supported wholly between the side walls of the knee and including dogs bodily adjustable toward and from the face of the knee and independently movable vertically of the knee, means for resiliently supporting the dogging mechanism to cushion its action, the set works member being longitudinally slotted in line with one of the dogs to permit the free non-interfering play of that dog in the movement of the dogging mechanism incident to its cushioned action.

6. In a saw mill carriage, a knee including a face plate, side walls extending rearwardly therefrom in relatively spaced relation, a guide bar movably supported on one of the side walls and operable toward and from the face plate, a guide plate overlying and bearing against one surface of the guide bar and connected to the guide bar for sliding cooperation therewith, independent dogs pivotally supported on said guide plate, a lower dog casting slidable on the guide bar and including a cylindrical base arranged in offset relation to the guide bar, a dog carried by the lower dog casting, a cylinder supported in said cylindrical base and extending in substantial parallelism to the guide bar and adjacent thereto, and a piston operative within the cylinder and connected to the guide plate above the dogs carried thereby.

7. In a saw mill carriage, a knee including a face plate, side walls extending rearwardly therefrom in relatively spaced relation, a guide bar movably supported on one of the side walls and operable toward and from the face plate, a guide plate overlying and bearing against one surface of the guide bar and connected to the guide bar for sliding cooperation therewith, independent dogs pivotally supported on said guide plate, means carried by the guide plate for pivotal movements of the dogs in one direction, a lower dog casting slidable on the guide bar and including a cylindrical base arranged in offset relation to the guide bar, a dog carried by the lower dog casting, a cylinder supported in said cylindrical base and extending in substantial parallelism to the guide bar and adjacent thereto, and a piston operative within the cylinder and connected to the guide plate above the dogs carried thereby.

In testimony whereof I affix my signature.

GEORGE M. PELTON.