June 22, 1926. 1,590,105

F. E. MARTIN

SAWMILL MACHINERY

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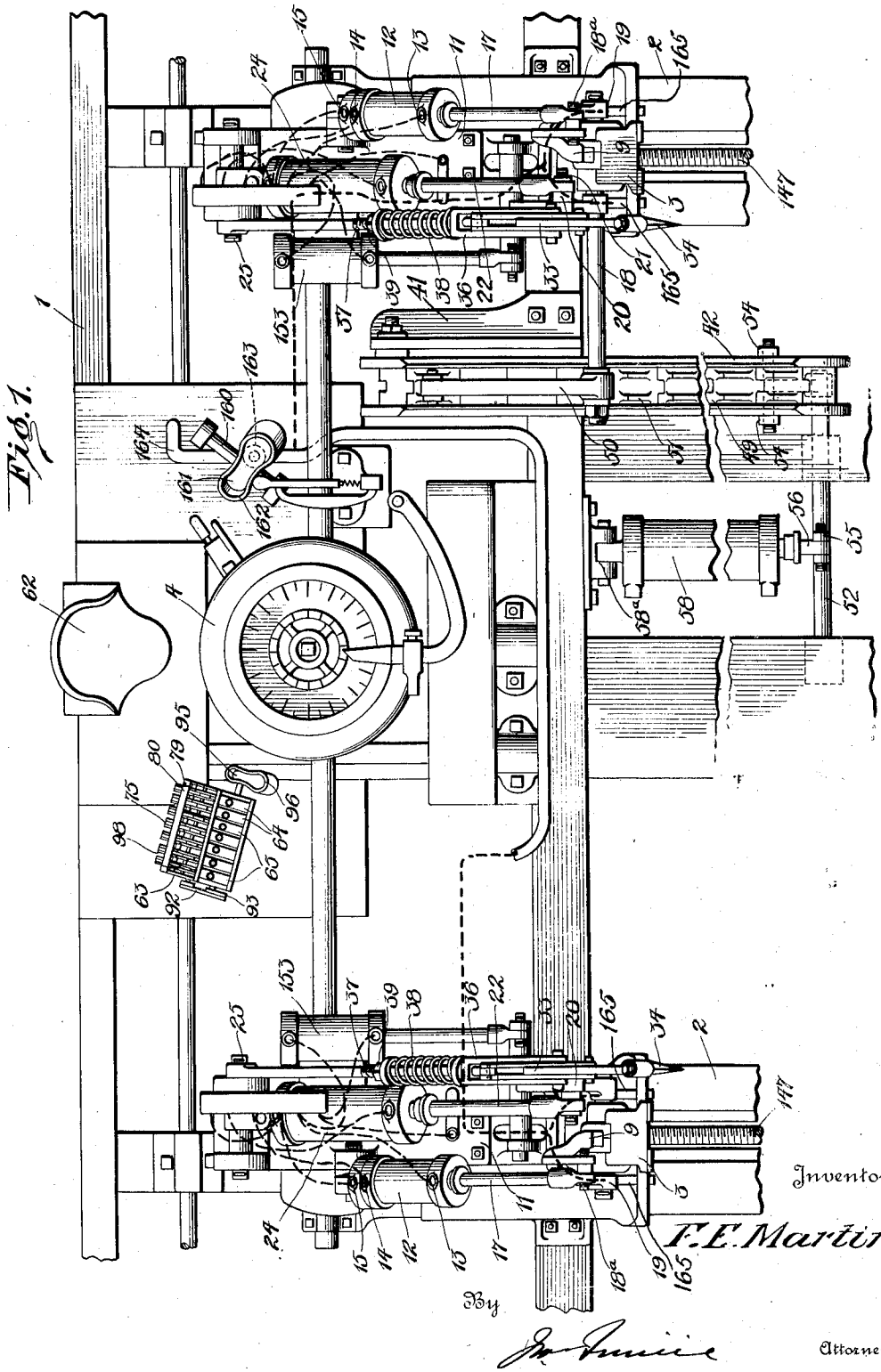


Fig. 1.

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By
Attorney

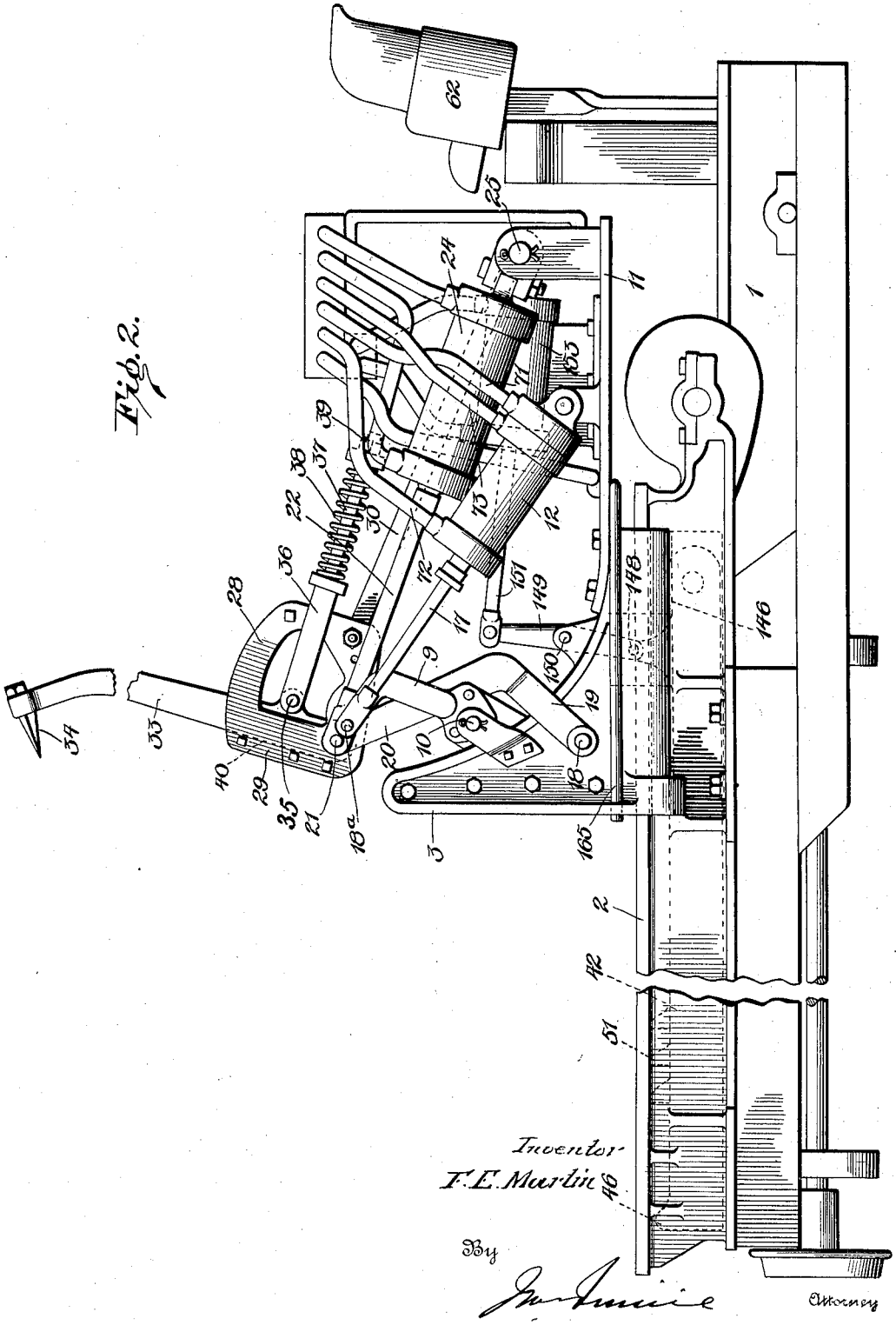
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Fig. 2.



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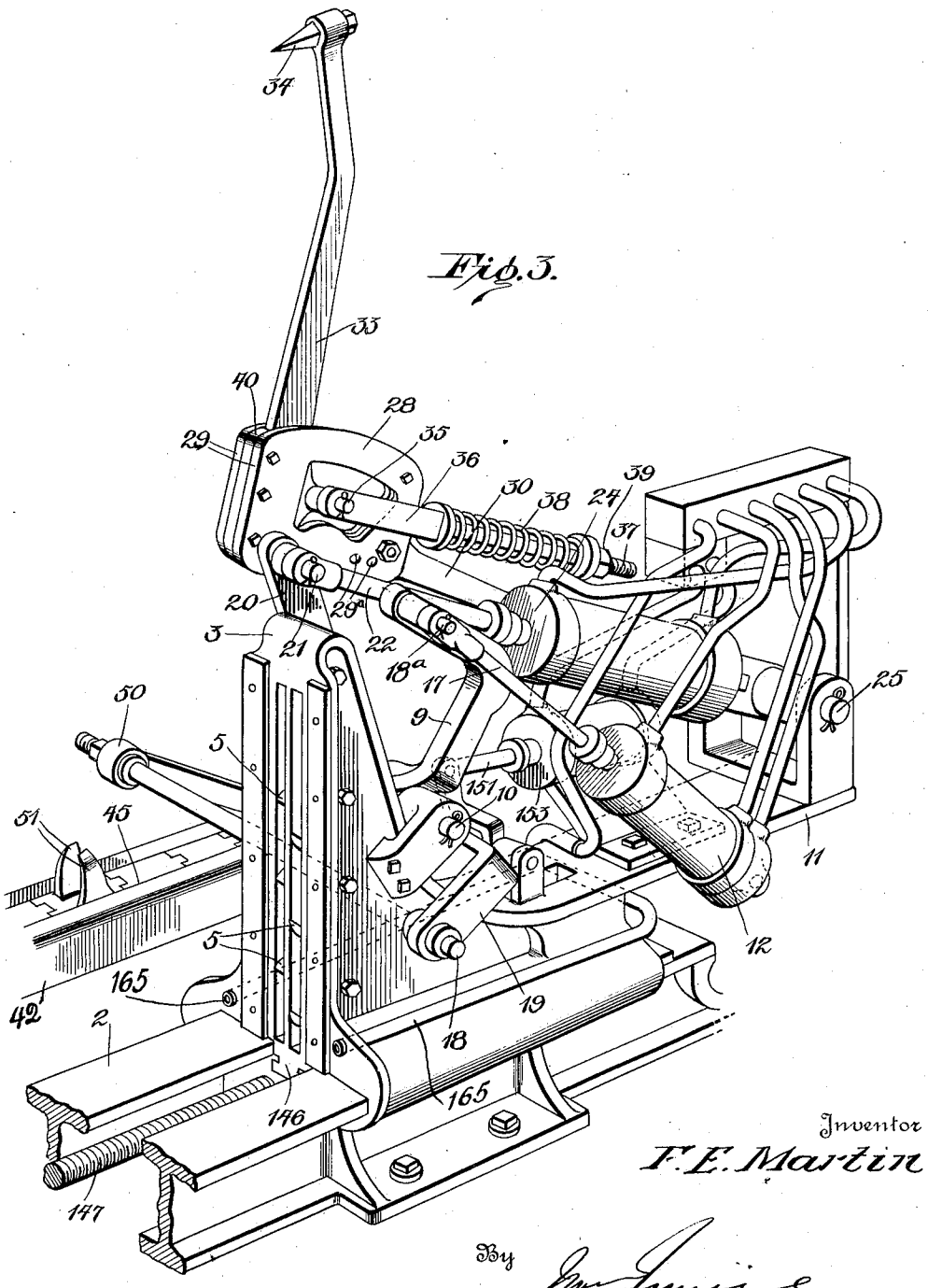
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Fig. 3.



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Fig. 4.

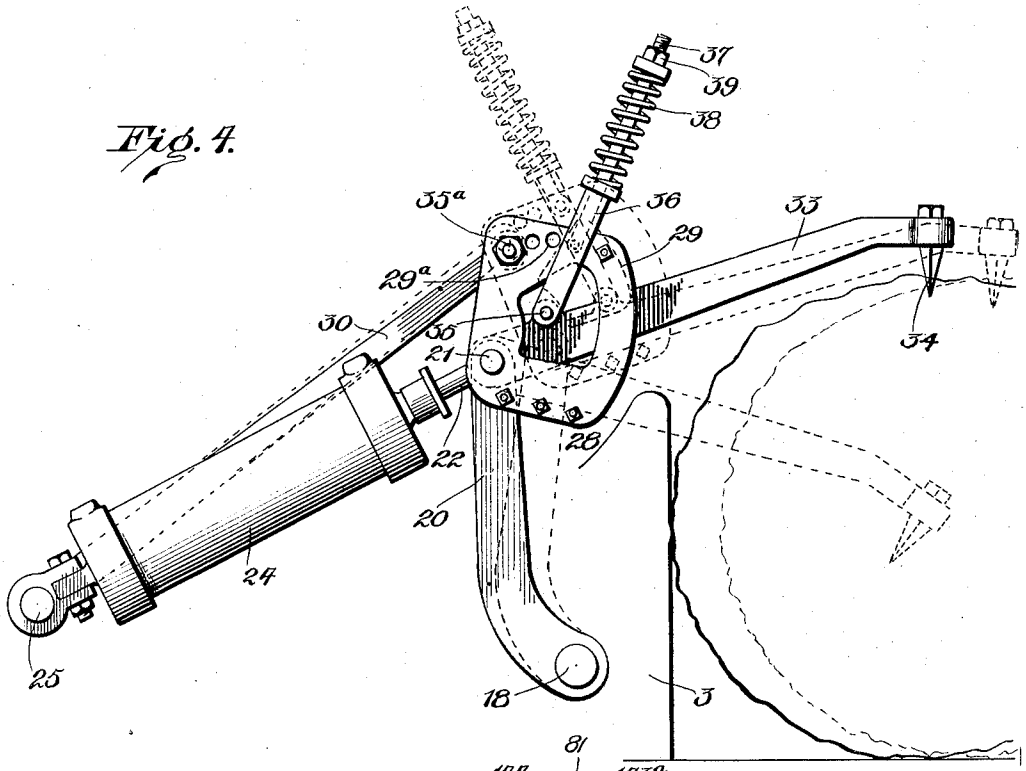


Fig. 14.

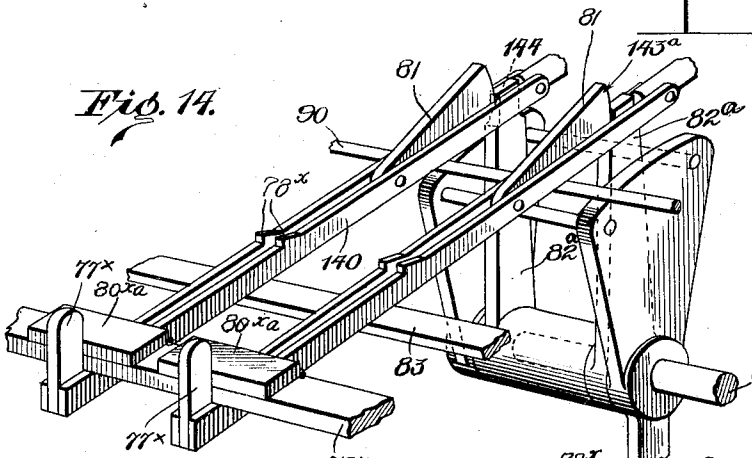


Fig. 15.

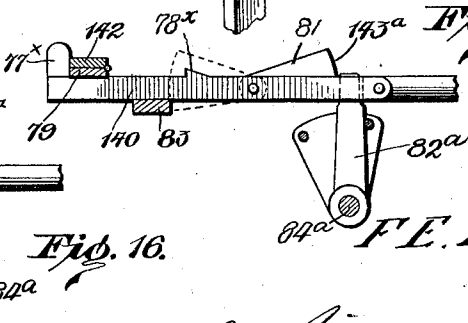
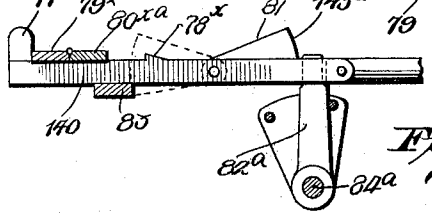


Fig. 16.



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Fig. 5.

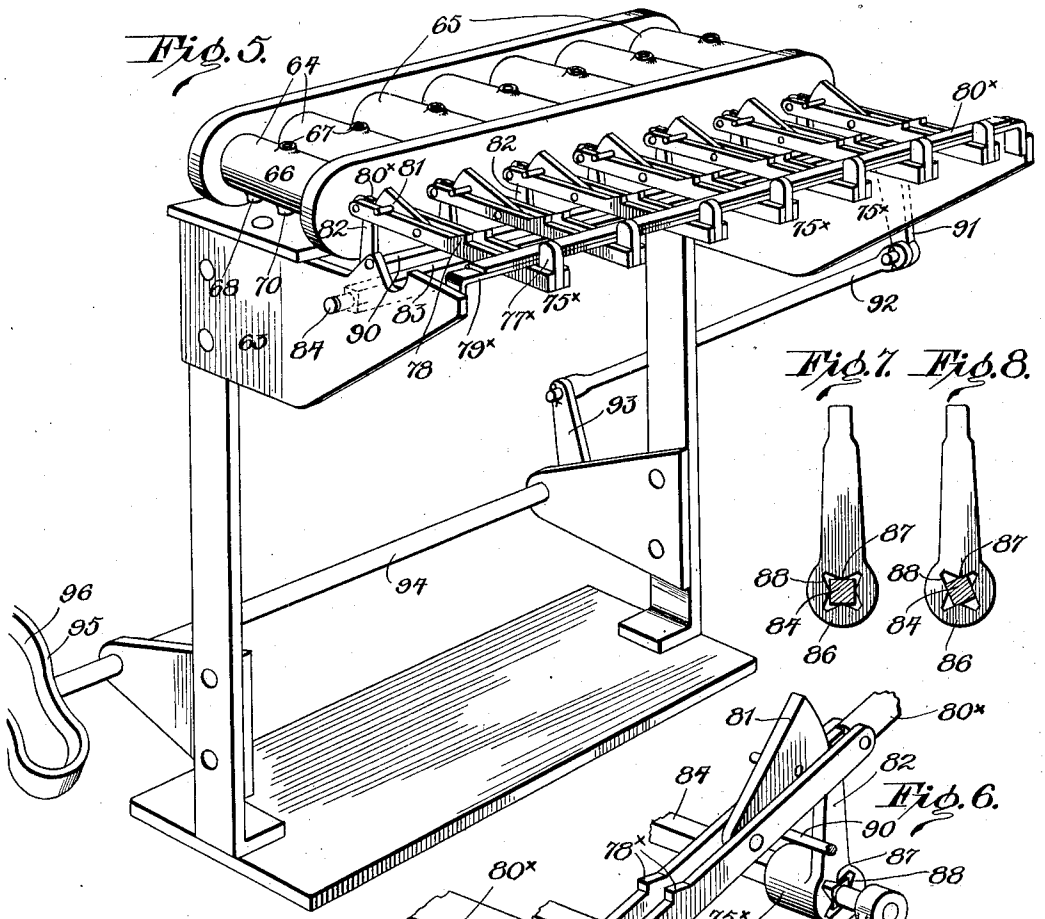


Fig. 7. Fig. 8.

Fig. 6.

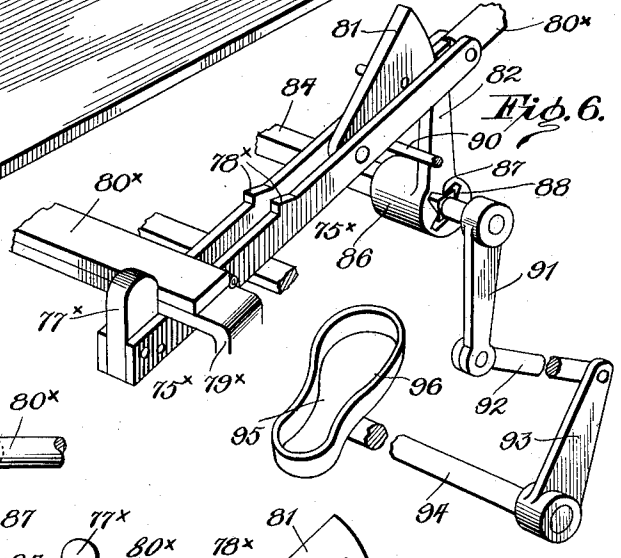


Fig. 9.

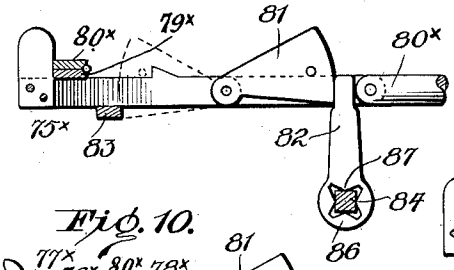
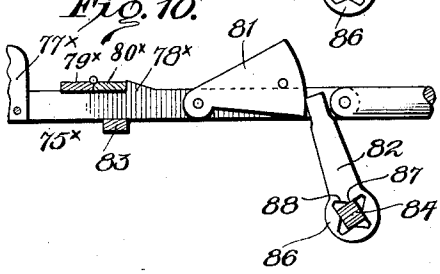


Fig. 10.



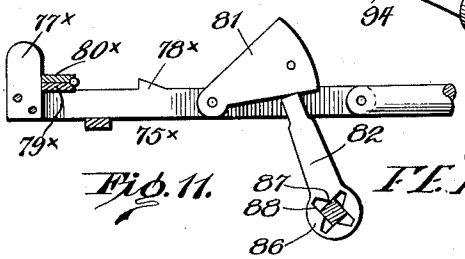


Fig. 11.

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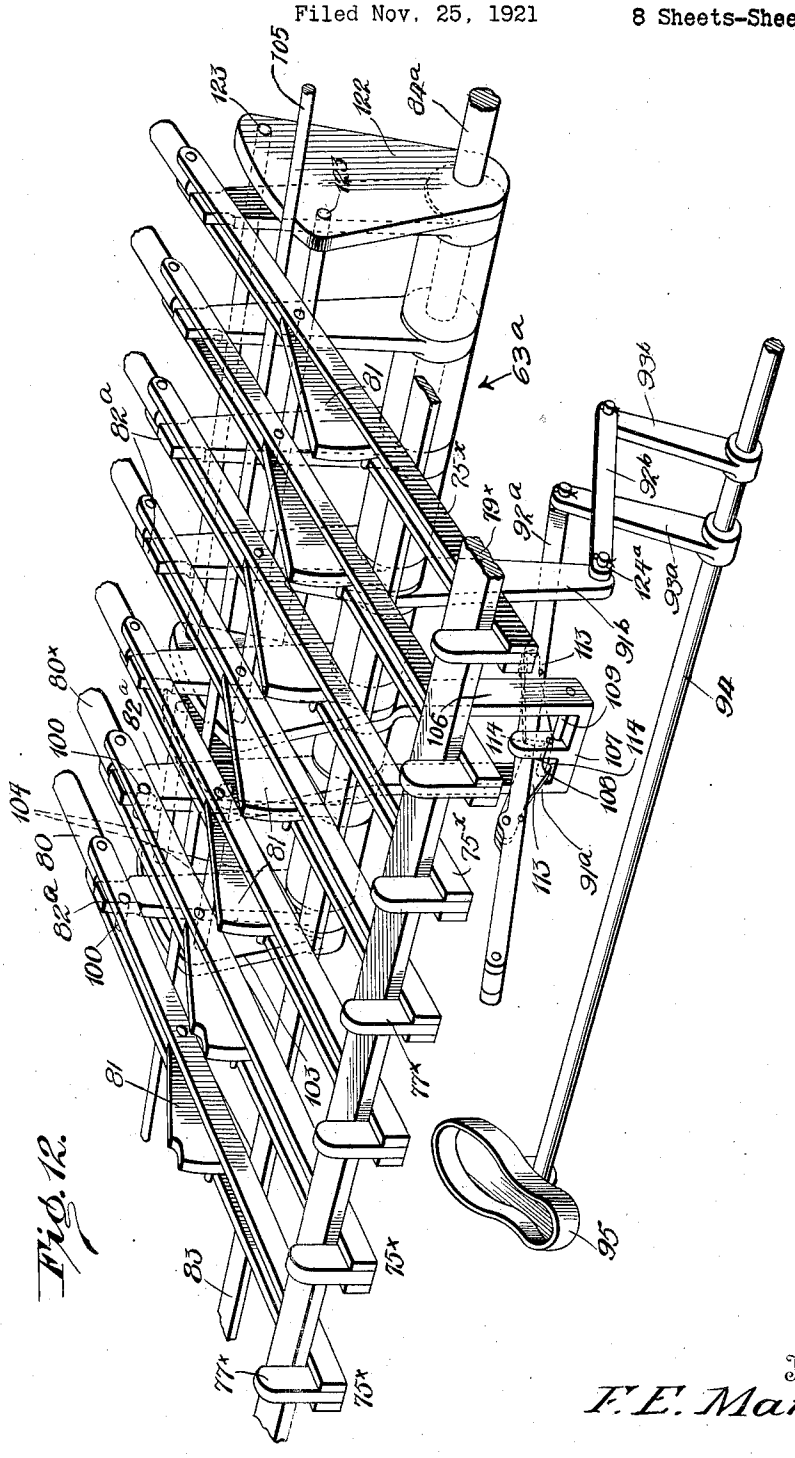


Fig. 12.

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SAWMILL MACHINERY

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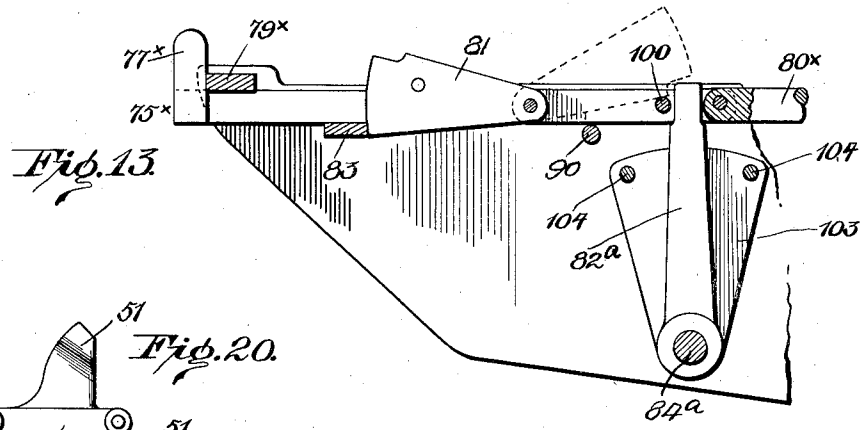


Fig. 13.

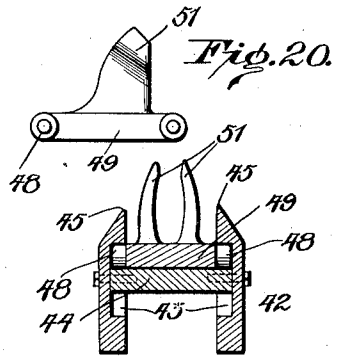


Fig. 20.

Fig. 18.

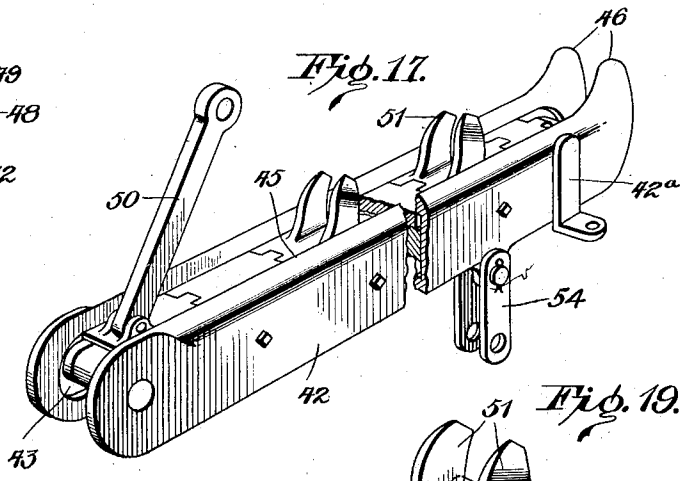


Fig. 17.

Fig. 19.

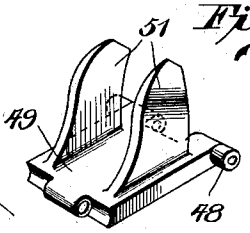


Fig. 28.

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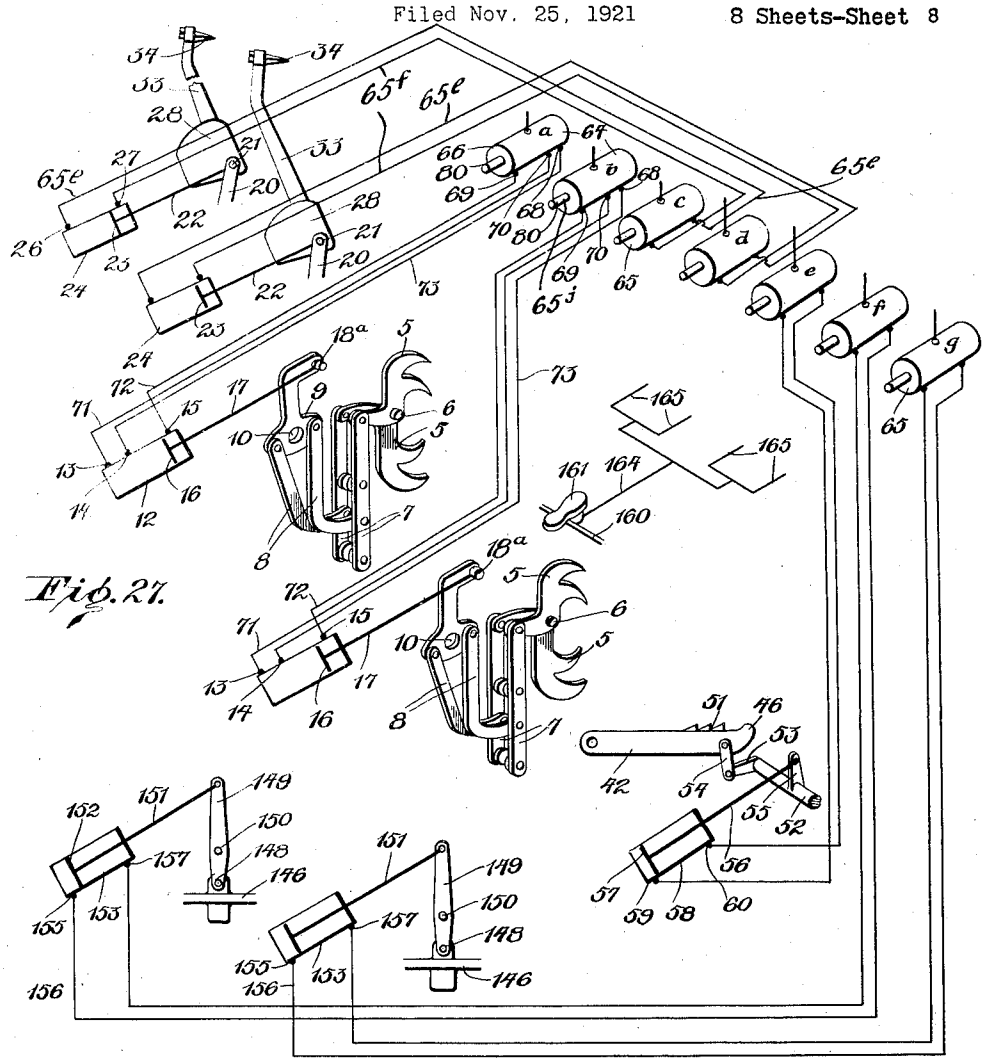


Fig. 27.

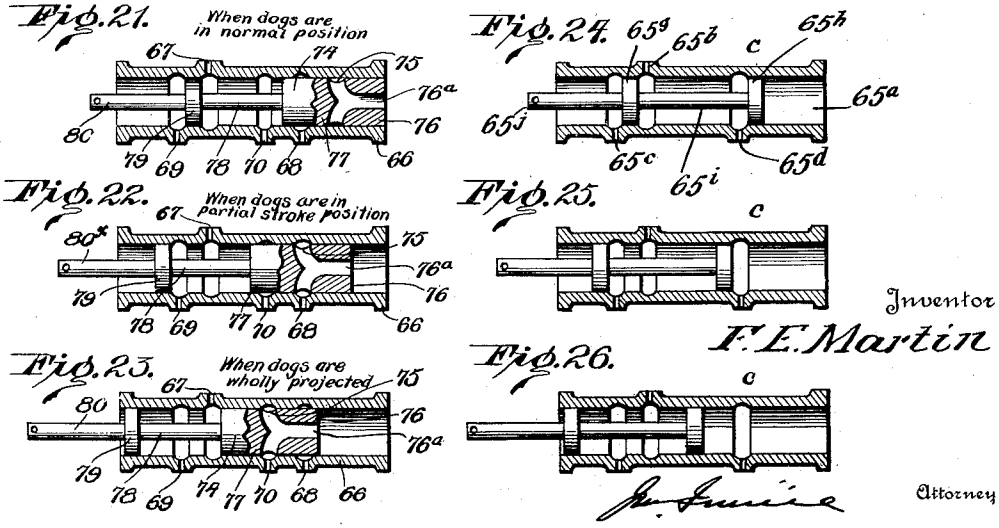


Fig. 21.

Fig. 24.

Fig. 22.

Fig. 25.

Fig. 23.

Fig. 26.

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Patented June 22, 1926.
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UNITED STATES PATENT OFFICE.

FREDERICK EDWARD MARTIN, OF WEED, CALIFORNIA, ASSIGNOR TO MARTIN AIR-DOG COMPANY, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

SAWMILL MACHINERY.

Application filed November 25, 1921. Serial No. 517,647.

This invention relates to saw-mill machinery, particularly to the means employed for conveniently and effectively dogging a log and securely holding same on the carriage.

In common practice in operating a saw-mill, a dogger is stationed adjacent each knee to manipulate the dogs, and a setter on the carriage operates the setting mechanism, thus the combined efforts of the doggers and setter are required to properly set and dog a log. In practice it has not been heretofore feasible to dispense with the doggers, and arrange the mechanism so that a single operator could actuate the setting mechanism and throw the dogs into and out of action, as no means has been devised to control the dogs to permit of the selection of any group and at the same time allow the attendant to individually operate the dogs before or after their selection.

One of the principal objects of my invention is to provide what will be hereinafter termed a "unit control" for a saw-mill carriage, so arranged and disposed that one operator on the carriage can accurately and quickly control and operate the usual setting mechanism and select and operate the dogs to properly set and dog a log, to lessen the labor and decrease the cost of the work, and improve the product.

The "unit control" as I have devised it, is so arranged that while the log is being sawed, or the carriage is being returned, an operator can with ease and convenience select and set various controlling devices to actuate the dogs and other devices to be used in the next succeeding cut of a log, whereby to increase production and reduce the number of attendants on a carriage.

Therefore, one of the objects of this invention is to provide a selective mechanism forming part of a unit control, whereby at the will of an operator, during the period the carriage is in movement, dog setting mechanism can be set so that by the time the carriage and the log are positioned for the next sawing operation, the operator has to but actuate an operating element and the selected dogs are projected without the usual loss of time, and sawing can be immediately proceeded with.

In sawing, saw-dust chips, etc., accumulate on the knee block adjacent the knees and in time it materially interferes with the proper positioning of a log, and frequently prevents the sawing of boards of uniform thickness, and otherwise offsets the sawing operation. To meet this contingency and to positively insure of logs being properly located against the knees, I have provided pneumatic means, under control of the operator and forming part of the unit control, to blow this accumulation away from the knee blocks and keep the same clean.

A further object of this invention is to provide fluid pressure means, actuated by, and forming part of, the "unit control," to project the dogs at the discretion of, and at the will of, an operator, who also attends to the set works on the carriage.

Another object of this invention is to provide flexibly mounted dogs to co-operate with other dogs to engage the under side of a log and prevent it slipping endwise or otherwise on the carriage, these dogs being controlled and operated by devices included in the unit control.

It is of the utmost importance in sawing, particularly when handling large logs, that the dogs be driven into the wood at a great depth to extend through the bark to obtain sufficient grip to hold the log. This action, however, is detrimental when a log has been cut and a sawed surface is presented to the dogs, as the deep bite necessary to go through the bark pulls away a portion of the wood and mars the surface of the subsequent board cut from the log. To overcome this objection, and at the same time afford sufficient grip of the dogs and prevent them extending over the saw line when cutting a thin board, I have provided mechanism for making a partial stroke of the boss dogs, this mechanism also being under control of and actuated by devices included in the "unit control."

It is essential that means be provided on a saw-mill carriage to accommodate the operator, and to provide bracing means to enable him to resist the sudden change in movement when the carriage is reciprocated. To meet this condition, and as forming a part of my invention, I have provided as a part of the "unit control" pedals ar-

ranged convenient to the seat, so as to accommodate the feet of the operator. These pedals are arranged to perform a dual function, in that the operator braces himself thereon when movement of the carriage is reversed, and they are so connected as to be utilized in operating the various dogs and therefore they are included in and form a part of the unit control.

A still further object of this invention is to provide in the unit control, and forming a part of same, mechanism to permit an operator to select a group of dogs for action and lock out the others to prevent accidental operation, and so arrange the mechanism that irrespective of the group selection after operation, either or any of the dogs can be individually operated.

The invention also comprehends improvements in the details of construction and arrangement of parts which will be hereinafter described.

In the accompanying drawings—

Figure 1 is a top plan view of a saw-mill carriage illustrating the application of my improvements, the carriage and set works per se being but conventionally shown;

Figure 2 is a side elevation of the same, parts in rear of the knee being omitted for the sake of clearness;

Figure 3 is a detail perspective view of one of the knees and its associated parts;

Figure 4 is a side elevation of one of the hook dogs, the parts being illustrated in full lines after a full stroke is made and a log has been drawn up to a knee, and in dotted lines at the time the spike of the dog first struck the log. The lower dotted position of the hook in this figure indicates the extreme position of said hook had no log been on the carriage;

Figure 5 is a detail perspective view of the essential part of the unit control mechanism;

Figure 6 is an enlarged detail perspective view of a portion of the mechanism shown in Figure 5, and looking from the opposite end;

Figures 7 and 8 are enlarged detail views of the means employed to obtain lost motion in the unit control to permit operation of certain dogs;

Figure 9 is a diagram, in section, illustrating the position of the parts of the unit control when ready to operate a valve, the interponent being in dotted line position to indicate how a valve can be locked out of action;

Figure 10 is a similar view, the parts being positioned to make a partial stroke of the boss dog valve;

Figure 11 is a similar view, the parts being in position when an operator is individually actuating one of the valves in a group previously operated;

Figure 12 is a detail perspective view of a portion of a modified form of the unit control shown in Figure 5;

Figure 13 is a detail section of the boss dog control means of the mechanism shown in Figure 12;

Figure 14 is a detail view of a further modified form of the mechanism shown in Figure 5;

Figures 15 and 16 are diagrammatic sections of the form of the invention shown in Figure 14;

Figure 17 is a detail perspective view of the flexible or linked dogs and frame;

Figure 18 is a detail cross section of same;

Figure 19 is a detail perspective view of one of the link dogs;

Figure 20 is a detail side elevation of same;

Figure 21 is a longitudinal section of the boss dog control valve when in normal or inoperative position;

Figure 22 is a similar view but illustrating the position of the valve to make a partial stroke of the boss dogs;

Figure 23 is a similar view, but the valve is positioned to wholly project the boss dog;

Figures 24, 25 and 26 indicate similar sections of one of the valves employed in controlling the other dogs, the three views representing the three positions of said valve when a boss dog valve is operated as shown in Figures 21, 22 and 23;

Figure 27 is a diagram of the various valves and their connections with the dogs;

Figure 28 is a diagrammatic view illustrating an electric means for operating the boss dogs at a point remote from the carriage, but including my invention.

In the drawings and description, two knees and hook dogs, and a single arrangement of dogs for engaging the underside of a log, are shown and described. This, however, is in no way to be construed as a limitation, as it is evident as many knees and dogs may be employed as found desirable, this depending upon the length of the carriage and the character and size of logs to be sawed.

In the description of the movement of the boss dogs, I have employed the terms "wholly projected" and "partial stroke" which are to mean that when the boss dogs are "wholly projected" they extend out from the knees their full limit of movement to take deep bites in a log; while "partial stroke" is a predetermined point between the knees and the extreme limit of movement of the dogs. In other words, the description of the movements of these dogs must not be construed to mean that they may be projected at random distances determined by the will of the operator.

In the accompanying drawings, 1 indicates a saw-mill carriage of usual construc-

tion, provided with head blocks 2, knees 3, and saw-setting mechanism controlled by mechanism conventionally indicated at 4. These features form specifically no part of my present invention and are merely shown to illustrate the application of my improvements. It will, however, be necessary to describe somewhat in detail several of those old features to aid in understanding the operation of my invention.

Each knee is provided with a set of boss dogs 5, pivoted at 6, and connected by links 7. To the links 7, links 8 are pivoted, and at the upper ends, said links are connected to a rocking lever 9, pivoted at 10, as shown conventionally in Figure 27. Through these connections, when the lever 9 is actuated the two sets of dogs 5 are reversely operated to bite into a log in the usual fashion.

Extending from each knee is a support 11, and to the latter is pivotally mounted a cylinder 12, provided with three ports 13, 14 and 15. Operating in the cylinder is a piston 16, and extending therefrom is a piston rod 17, pivoted at its outer end at 18ª to the lever 9.

Pivoted on a bolt 18 extending through each knee is a yoke 19, provided with an extension 20, and to the outer end of this extension is pivoted at 21, a piston rod 22. The piston rod 22 is provided at its lower end with a piston 23, which reciprocates in a cylinder 24, pivoted at 25 to the support 11; this cylinder being provided with two ports 26 and 27. Pivoted on each of the pins 21 is a rocking frame 28, comprising a pair of plates 29—29, suitably bolted together and provided with adjusting holes 29ª. To the lower rear end of the frame is pivoted a brace rod 30, which for convenience is pivoted at its lower end on the stud shaft 25, which supports the cylinder 24. Mounted to rock on the pin 21, between the plates 29, is a hook dog 33, provided at its free end with a pointed spike 34. Supported on a pin 35 on the hook dog is a yoke 36, through the end of which extends a stem 37, pivoted in the frame 28. A spring 38 is interposed between the yoke 36, and a washer on the stem, the tension of the spring being regulated by a nut 39. The parts are so arranged that the tension of the spring will normally force the yoke, hence the hook dog toward the front of the frame 28, and against an abutment 40.

The boss dogs 5 are designed to engage in the surface of the log adjacent the face of the knee, while the hook dog is adapted to engage the top surface of the log and subsequently draw said log up to and hold it snug against the knee and into intimate contact relation with the boss dogs. It has, however, been found advisable, particularly when sawing large logs, to dog the under side of the latter to absolutely preclude the possibility of lengthwise displacement of the log during the sawing operation. As part of my invention I provide dogs for this purpose, as well as mechanism to operate same, which will now be described.

Extending inwardly on the carriage at a point adjacent one of the knees 3 is a bracket 41, and fulcrumed on a pin supported by said bracket is a dog supporting frame 42, which extends forward to a point to or about the saw-line, and is guided by a pair of ears 42ª. This frame comprises a pair of plates sharpened on their upper edges at 45 and formed on their inner surfaces with continuous grooves 43, and between the plates is an intermediate partition 44. The forward ends of the plates are provided with raised noses 46, which act in the capacity of auxiliary spikes to assist in holding the log when the knees are out toward the front of the carriage. Traveling in the grooves 43 are studs 48, of a series of pivotally connected links 49, and to one or more of said links is pivoted a link connection 50, the opposite end of which for convenience is pivoted to the rod 18 which supports the yoke 19 on one of the knees; this link, however, may be geared to the set shaft if desired. Extending upwardly from certain of the links are dogs or spikes 51, adapted to be thrust upwardly at the appropriate time to engage with the lower surface of a log, and for convenience, I will hereafter refer to these dogs as link dogs.

The construction of the flexible link dogs shown more particularly in Figures 17 to 20 is not claimed in this application, but, aside from the means for controlling the application of power thereto, is claimed in applicant's co-pending application Serial No. 604,062.

Below the forward portion of the carriage is mounted a shaft 52, provided at one end with a crank arm 53, pivotally connected at its free end by a pair of links 54, with the frame 42. The shaft 52 is provided with a second crank arm 55, to which is connected a piston rod 56, having a piston 57, operating in a cylinder 58, pivoted to the carriage at 58ª; the cylinder being provided with two ports 59 and 60.

It is customary to mount on a saw-mill carriage a seat 62 for the operator of the setting mechanism, and because of the rapidity and violent reciprocal movement of the carriage in operation the operator must also be suitably braced to prevent him being thrown off. I take advantage of this situation and utilize the braces to not only serve as a means for holding the operator in position but also as a means for partially controlling the doging of a log and a means to operate certain adjunctive devices. I further arrange within easy reach of the operator a battery or group of controlling

devices, which forms one of the essential features of my "unit control". Mounted on a frame 63 are a number of valves arranged in two groups 64 and 65, those of the group 64 being alike and those of group 65, while in themselves are alike, differ somewhat from group 64, therefore but one in each group will be specifically described, although for future reference they are consecutively designated *a*, *b*, *c*, *d*, *e*, *f*, and *g*.

66 indicates one of the group of cylinders 64, shown in Figures 21, 22 and 23, the cylinder thereof being open at both ends and provided with a fluid pressure inlet port 67, two outlet ports 68 and 69, and an intermediate outlet port 70. A pressure supply pipe communicates with the air inlet port 67; a partially flexible pipe 71 communicates with the intermediate port 70, and connects with the bottom port 13, of the boss dog cylinder; a partially flexible pipe 72 communicates with port 69 and connects with port 15 of the boss dog cylinder, and a partially flexible pipe 73 communicates with port 68, and connects with intermediate port 14 of the cylinder 12. Reciprocating in the cylinder 66 is a valve proper 74, the rear end of which is divided by a groove 75, thereby forming two elongated cylindrical portions 76 and 77, the portion 76 having an exhaust port 76ª, which communicates with groove 75. Extending from the cylindrical portion 77, is a reduced stem 78, which terminates in a disc like head 79, from which extends an operating stem 80.

When the valve 74 is in initial or normal position, as shown in Figure 21, pressure is admitted through port 67, and into the space surrounding the stem 78, thence through port 70, to the bottom of the cylinder 12 and the piston is forced up and acts to hold the boss dogs 5 in withdrawn position. When the valve 74 is in this position, the air in the upper end of the cylinder 12 is exhausted through pipe 72 and port 69 to the atmosphere. When the valve is partially withdrawn as shown in Figure 22, pressure enters through port 67 and into the space surrounding the stem 78, thence through port 69 and pipe 72, to the top of the cylinder 12, the opposite end of the cylinder exhausting through the pipe 73, port 68, and out to the atmosphere through port 76ª. In this position of the valve the enlarged portion 77 thereof covers the port 70, and the air in the bottom of the cylinder 12 is trapped and thereby forms a cushion, and holds the piston in a partial stroke position, thus but partially projecting the boss dogs and holding them in this position. Further movement of the valve, as shown in Figure 23, will cause the port 68 to be covered by the valve portion 76, and port 70 to register with the groove 75, and port 69 to register with the space surrounding the stem 78. Hence the pressure will pass through pipe 72 to the top of cylinder 12 and pressure from the bottom of said cylinder will exhaust through pipe 71, to and through ports 70 and 76ª to the atmosphere. In this position of the valve the piston, through the connections, will hold the boss dogs in full projected position. In the group of valves, two, *a* and *b*, control the boss dogs and two, *c* and *d*, the hook dogs. 65ª indicates one of the group of the valves 65, the cylinder thereof being open at both ends and is provided with a fluid pressure inlet port 65ᵇ, and two outlet ports 65ᶜ and 65ᵈ, a partially flexible pipe 65ᵉ communicates with port 65ᵈ and connects with port 26 in the cylinder 24 and a partially flexible pipe 65ᶠ communicates with port 65ᶜ and connects with port 27 in the cylinder 24. Reciprocating in the cylinder 65ª is a valve comprising two discs 65ᵍ and 65ʰ, connected by a reduced portion 65ⁱ and from the valve projects a stem 65ʲ. When one of the groups of valves 65 is in the position shown in Fig. 24 fluid pressure enters port 65ᵇ and through port 65ᵈ passes to pipe 65ᵉ and to the bottom of the cylinder 24 and drives the piston 23 forwardly and therefore holds the hook dog in normal position, air in cylinder 24 being exhausted through port 27, pipe 65ᶠ, and ports 65ᶜ in cylinder 65ª to the atmosphere. When the valve is in the position shown in Fig. 25, pressure is admitted through port 65ᵇ, thence through port 65ᶜ and pipe 65ᶠ to the forward end of cylinder 24 which drives the piston 23 toward the bottom of said cylinder, pressure behind the cylinder being exhausted through port 26, pipe 65ᵉ, port 65ᵈ in cylinder 65ª to the atmosphere. When the valve is in the position shown in Fig. 26, exactly the same action occurs as when the valve is positioned as shown in Fig. 25. As the groups of valves 64 and 65 are at times coupled together, and as group 64 make but a partial stroke in one instance and a full stroke in another instance, it is necessary that provision be made for the proper introduction of fluid pressure through the group of valves 65 without affecting the hook dogs when the boss dogs are in partial or full stroke position. Hence, the valves 65ª are so proportioned that when set for hook dog operation, the latter, while moved, will not be affected should valves *a* be coupled in the control to operate the boss dogs either partial or full stroke. In order to enable an operator to select in the shortest possible time, and if desirable while the saw is sawing a log, which of the dogs, or how many dogs, he desires to use for the next succeeding operation, a selective mechanism is provided.

Connected to the free end of the stem of each of the valves is a pair of spaced bars forming an extension 75ˣ, suitably guided in ways on the frame 63. The outer end of the extension is provided with a finger piece 77ˣ, and on the upper edge of each bar is an abutment 78ˣ. Hinged on a cross bar 79ˣ of the frame is a limiting bar 80ˣ equal to the width of the group of extensions, and adapted when thrown down on the extensions to co-operate with the abutments 78ˣ to limit the movement of the valves in one direction, as shown in Figure 10. Pivoted between the bars is an interponent 81 adapted when thrown in one position, as shown in Figure 9, to act as an abutment for one of a series of arms 82, and when thrown in the opposite direction, as shown in dotted lines in Figure 9, to engage a lock bar 83 to lock the valves out of action.

84 indicates a square shaft mounted below the group of extensions 75ˣ. This shaft carries a series of arms 82, each of which is provided with a hub 86, formed with an opening through which the square portion of the shaft extends. The walls of the opening in the hub are of angular formation, and form central bearing points of contact with the flat surfaces of the shaft, indicated at 87, the walls 88 oppositely inclining from the said surfaces, resulting in the formation of an opening resembling somewhat a star, although this particular shape is not absolutely necessary. The purpose of this construction is to permit of a movement of the arms 82 independently of the movement of the shaft, and it may be stated that the degree of this movement equals the full degree of movement of the group of valves. When the shaft or an arm is rocked, lost motion takes place before the flat surfaces of the shaft will engage the angular portions of the walls of the opening, but provision is made in the operation of the co-operative parts to take care of this movement. The upper ends of the arms 82 extend up between the spaced bars of the extensions adjacent the ends of the valve stems and the interponents 81, when the latter are thrown in operative position to actuate a valve or valves, as shown in Figure 9. A rod 90 is disposed below the group of extensions 75ˣ to limit the outward throw of the arms 82 to prevent their ends becoming displaced and out of operative relation with the interponents when a selected valve or valves is out of action.

The shaft 84 is provided on one end with a lever 91 connected at its lower end by a link 92, which in turn is pivoted to the end of a crank arm 93, extending from a rock shaft 94. On the opposite end of the rock shaft is a strongly built pedal 95, provided with substantial upstanding flanges 96 to form a brace for the right foot of the operator. This pedal is located on top of the carriage and to the right of the seat so that as the carriage reciprocates the operator can brace himself against the shock, and can, with equal facility, operate the valves to throw selected dogs at the proper time.

As stated, the purpose of the peculiar shape of the openings through the hubs of the arms 82 is to permit of a movement independent of the movement of the shaft. The function accomplished by this independent movement is important in my selective type of unit control. For instance, assume a selection has been made, and the valves set and the dogs operated, but for some reason it is desired to project an inactive locked out dog, and it is desired to return the dog to normal position when returning those in the selection previously made, the operator reverses movement of the pedal to take the pressure of the shaft 84 from the angular surfaces of the openings in arms 82, then the selected interponent is thrown up toward the stem of the valve, as shown in Figure 11 then the finger piece of the extension is grasped and the valve is shifted to admit pressure to the cylinder to actuate the selected dogs, and the operator then presses on the pedal and rocks shaft 84 to hold the valves in selected position, the inactive valve or valves having been brought into action, without in any way affecting the valves previously selected. In drawing out the valve, the end of the interponent slips down in rear of the arm 82, so that upon the reverse stroke of the pedal operated mechanism, this valve, with the others, is returned to normal position and correspondingly the dogs it controlled are returned. Suppose, however, a selection has been made and for some reason the operator finds it necessary to take a greater bite on the log with the dogs, then, and in that event, the motion of the pedal is reversed equal to the lost motion between the shaft and the openings in the hubs, which movement in no way affects the selection of the dogs. After the lost motion has been taken up by this movement the operator can, by grasping the finger piece, reciprocate the valve as much as he pleases, or until he is satisfied the dogs have taken the desired bite in the log. Then the motion of the pedal can again be reversed to hold all the selected valves in position to maintain pressure in the cylinders.

In order that the valves in group 64 can properly function when moved to partial stroke position in co-operation with the valves in group 65, the latter are constructed of such length that in either position of the valves in group 64, fluid pressure through the ports controlled by the group of valves

65 will flow to the desired points without interruption. The cylinder *e* in group 65 carries the valve for controlling the action of the link dog supports. The stem of the link dog valve is operated and controlled by a similar extension and interponent, and an arm 82, and may be locked out and operated to control the link dogs the same way and by the same mechanism employed in controlling the hook and boss dogs. That is to say, when the interponent is swung to position to be engaged by its co-operative arm 82, and the foot pedal is rocked, the valve will be operated and the link dogs will be thrown into gripping engagement with the log. In addition, the same selective and independent operation described in connection with the hook dogs is possible with the link dogs, and as the mechanism is similar it is not thought necessary to reiterate the possibilities of actions.

In Figure 12, I have illustrated a modified form of selective mechanism. In this construction, pins 100 are employed to at all times retain the ends of the arms 82^a and the stems of the valves which control the boss dogs in operative relation, and the interponents 81 are merely used as pawls to limit the movement of the valves when making a partial stroke. The extensions and their mountings for the remaining valves are substantially like those shown in the preferred form of the invention, except that the abutments 78^x, and the hinged plate 80^x are dispensed with, as to some valves the movement resulting from these elements being taken care of by other means about to be described. It may be stated, however, that in this modified construction, the two groups of valves have different strokes to accomplish the desired result, whereas in the preferred form all the valves have the same stroke.

84^a indicates a shaft supported in the frame 63, and mounted thereon is a rocking frame 103 adapted to have a free limited movement and comprising a pair of plates connected at their upper ends by rods 104. Mounted freely on the shaft 84^a are two arms 82^a, the upper ends of which project between the spaced bars of the extensions and between the pins 100 and the ends of the valve stems which control the boss dogs, a bar 105 being positioned in the frame 63^a to limit the movement of the rocking frame 103 in one direction. Depending from the rocking frame 103 is a yoke lever 91^a, the upper end of which is mounted on the shaft 84^a. On the cross bar 107 of the yoke lever are two interlocking lugs 108 and 109, one, 108, being closer to the shaft 84^a than the other one, 109, to effect a different degree of movement of the rocking frame 103, for a purpose to be described in connection with the general description of the operation.

On top of the carriage, and at the right of the seat 62, is a rock shaft 94. From this rock shaft extends a crank arm 93^a, and pivoted to the upper end thereof is a link 92^a, which extends through the yoke lever 106, as shown in Figure 12. The forward end of the link 92^a is bifurcated to form a seat for a pair of pivoted pawls 113. The pawls are oppositely disposed and are respectively oppositely beveled on their lower edges, and each is provided with an abutting edge 114 adjacent the beveled edge to engage with either of the lugs 108–109. To operate this mechanism to bring into play the group of cylinders 64, the rock shaft 94 is provided with a foot pedal 95, having a suitable upstanding flange to form a purchase for the operator's foot.

Connected to each of the stems of the valves in group 65, are extensions, similar to the extensions used in connection with the group of valves 64, except that the pins 100 are dispensed with, and interponents are employed to operate similar to the interponents shown in the preferred form. These extensions co-operate with a second frame 122, mounted on shaft 84^a, and include at their upper ends rods 123, and depending from this frame is an arm 91^b. Extending up through this frame and freely mounted on the shaft 84^a, are the arms 82^a which actuate the valves. To the lower end of arm 91^b is pivoted, at 124^a, a link 92^b, which is connected to a crank arm 93^b, on the shaft 94. The pivot 124^a is in alignment with the lug 108, so that when the shaft 94 is rocked the same movement will be imparted to the two frames 103 and 122. The rods 104 and 123 are spaced from the opposite edges of the arms 82^a, to permit of a movement of said arms independent of the movement of the rocking frames, such movement being about equal to the movement of the valves, while the limit of movement of the arms in a direction away from their valves is determined by the rod 105.

In the valve mechanism just described, the boss dogs of all knees will ordinarily be projected every time the hook dogs or the link dogs are operated when the pedal is depressed, but if desired the operator may select the boss dogs independently as a unit and throw them into or out of operation at will. It is possible, however, to adapt the construction so that the boss dogs of any particular knee may be cut out of operation and obtain the same result as that obtained in the preferred embodiment of the invention, which is merely a further development of the structure and requires but a slight change in the arrangement.

To provide means included in the unit control for tapering the end of a log to properly position it on a carriage the knees are each moved by fluid pressure, wholly inde-

pendent of the movement incident to the usual set works. Each knee is provided with a base 146 which may be provided with either the usual rack or screw 147 to receive motion from the ordinary set works operating mechanism. Each knee is slidably mounted on the head block engaging base 146, and pivotally mounted at 148 on the base is a lever 149, which is also pivoted at 150, between the cheeks of the knee. To the upper end of the lever 149 is pivoted the outer end of a piston rod 151, having a piston 152, operating in a cylinder 153. The cylinder is mounted on a support on the bracket 11, consequently the cylinder and its co-operating parts move in unison with the knee whether it be operated by the set works, or by the fluid pressure to move it on its base. Communicating with ports 155, at the bottom of the cylinders 153 are flexible pipes 156, which lead to valves *f* and *g*, included in the group 65, on the frame 63. At the opposite end of the cylinders are ports 157 which are also connected to valves *f* and *g* to admit pressure to move the knees in the desired direction. The valves *f* and *g* for the knees are as stated in the group included in the unit control, and are operated by extensions and other co-operative elements described in connection with the preferred form of the invention. That is to say, at the will of the operator, a knee or knees may be advanced simultaneously with all or any selection of dogs when the foot pedal is depressed, or the knee or knees may be cut out of this relationship and remain idle, or, if desirable, they may be brought into operation after the dogs are actuated and are in gripping relation with the log, by manipulating the appropriate interponents and valves.

On the carriage below, and to the left side of and forward of the seat is a short shaft 160, provided with a pedal 161, having a substantial upstanding flange 162 positioned as to be convenient to the left foot of the operator. Disposed under the forward part of this pedal is a valve 163 in an air supply pipe 164. This pipe branches out in direction of the knees, and adjacent each of the latter are two branch nozz'es 165, disposed to blow blasts of air at the bottom of each side the knees and onto the top of the head blocks. When the pedal is depressed the valve 163 is opened and blasts of air are ejected from the nozzles and any accumulation of saw-dust or other foreign refuse is blown away to permit the operator to properly seat the corner of a cut log square with the face of the knees to insure trueing of the log while sawing.

Up to this time I have described the details of the various elements of the mechanism, and to clear the description, I will now describe the operation of the separate parts, and will subsequently describe the combined functions accomplished thereby when sawing logs.

Boss dogs.

It is, of course understood that as many knees and boss dogs may be employed as may be found desirable, and as the dogs on any one knee are usually operated simultaneously, a description of one will be sufficient. It is also to be understood that the term "boss" is used herein as relative and for the purpose of identifying the particular dogs shown. As there are many dogs of this general type for holding a log, it is to be understood that the term "boss" as herein employed contemplates all such dogs. It may, however, be here stated that provision is made so that if but the dogs of one knee are to be manipulated the operator may do so. It must also be understood that the boss dogs may be wholly or partially projected, so that when a log is first placed on the carriage the dogs can be driven through the bark and into the wood to insure of a holding grip on a log, or when a sawed surface of the log is presented to the knees, and to prevent marring such surface unnecessarily and yet obtain sufficient grip to hold, the dogs are but partially projected.

Referring particularly to the preferred form of the invention shown in Figures 21 to 27, and assume for the sake of clearness the boss dogs on one knee are to be wholly projected. The operator will swing the interponent 81 see Fig. 9 which controls the valve *a*, see Fig. 27 so that the forward edge of such interponent will be in position to be engaged by the arm 82; the hinged plate 80ˣ, of course, being thrown up on top of the bar 79ˣ at this time. Upon rocking the pedal 95, see Fig. 5 through the connections described, the shaft 84 will be rocked until its flat surfaces engage the angular walls of the opening in the hub of the arm and then such arm will contact with the interponent and force the extension out, and consequently pull out the corresponding valve to the position shown in Figure 23. The pressure from the valve pas es to the top of cylinder 12, and through the levers described the dogs 5 will be projected to their fullest extent to grip the log. But, suppose the operator desires to but partially project the dogs, he then throws the hinged plate 80ˣ down on the extensions 75ˣ so that the abutments 78ˣ in the outward movement of the extensions will contact with it, and so limit the movement of the valve as to bring it into the position shown in Figure 22, with the result that the pressure acts on the top of the piston in cylinder 12, the same as before described, but because of the port 70 in the cylinder being closed by the valve 77, a cushion is formed and the piston

is prevented from making its full stroke. When the piston is thus operated the exhaust pressure behind it passes through ports 68 and 76ª to the atmosphere. By a reverse movement of the foot pedal 95, the interponent and its extension moves the valve to its normal position, as shown in Figure 21, with the result that the pressure on the piston in the cylinder is reversed and correspondingly the position of the dogs, the pressure in said cylinder being exhausted to the atmosphere through the port 69.

Now assume that all the boss dogs have been either partially or wholly projected by the foot pedal, and further assume the operator finds that the grip is not sufficient to hold the log, although the latter may be properly positioned. Under these circumstances the foot pedal is reversed until the contact is broken between the walls of the openings in the hubs of arms 82, and the square surfaces of the shaft 84, which brings into play the lost motion between these parts. The operator can now grip the finger pieces of the extensions controlling the boss dogs and force the valves *a* and *b* to normal position and direct the pressure to the cylinder or cylinders as the case may be, and thereby withdraw the dogs and then by the same instrumentalities quickly reverse the movement and again drive said boss dogs into the log to obtain the proper grip. This can be done as often as necessary without in any way interfering with the setting of the other valves and parts controlled thereby, a condition which is due entirely to the lost motion between the arms 82 and the shaft 84. There is, however, another condition possible in the manipulation of the boss dogs, which at times is important. That is, assume the operator has, in his selection of dogs to grip the log, omitted the boss dogs and subsequently finds it necessary to bring them into action. To have cut out the action of the boss dogs it was necessary in making the selection to have thrown the interponents rearwardly toward the operator to be in position to engage the lock bar 83. Hence, now that it is desirable to bring the inactive dogs into action, to wholly project them, the interponents are thrown forwardly over the arms 82 and the extensions and valves are pulled out by hand and the dogs are projected, the interponents falling in behind the arms 82 to be returned with the other valves. If the dogs under the circumstances mentioned are to be but partially projected, the same movements of operation are necessary, except that the hinged plate 80ˣ is thrown down on the extensions into the path of the abutments 78ˣ to limit the movement of the valves to cause registration of the ports to partially move the pistons. If this partial stroke action is necessary after the first selection and operation of the dogs occurs, the foot pedal must be depressed sufficiently to not only create the lost motion between the parts, but sufficient to partially reverse the movement of the previously selected valves so as to permit the limiting bar 80ˣ to drop in behind the abutments 78ˣ on the extensions of the selected valves. This in no way effects the operative positions of the selected and operated valves, as they are so proportioned and arranged as to have a latitude of movement in excess of the movement necessary to effect proper registration of the ports, to obtain and direct the pressure to the desired points.

Hook dogs.

There may be, of course, a hook dog associated with each knee. The operator may in making his selection of dogs to simultaneously grip a log, set all the hook dogs to be included in the selection, or he may so make his selection that but one hook dog will be brought into action after the boss or link dogs, or both, are operated, or he may elect to bring the hook dogs into action before any of the others. These possibilities are all provided for in the unit control and each will be specifically described.

If a hook dog or hook dogs are to be included in the selection for simultaneous operation of other dogs, the interponents are thrown into position to be engaged by the arms 82, then when the foot pedal 95 is depressed the arms 82, through the interponents pull the valves *c* and *d* out, and position them to permit pressure to pass to the top of cylinders 24, with the result that the pistons 23 are forced rearwardly into the cylinders, and because of the floating fulcrum 35ª, the frame 28 is rocked and throws the hook dogs downwardly in curved paths and drives the spikes into the log, and subsequently pulls the log up tight in a substantially linear direction against the knees, as will be described later on. This action, as stated, occurs at the same time the other selected dogs are actuated. But suppose the hook dogs are to be operated after the selected group of dogs is brought into action. Under these circumstances the interponents were in locked out position against the lock bar 83, otherwise the hook dogs would have been included in the first selection. Now, to bring the hook dogs into action, the interponents are thrown forwardly and over the top of the arms 82 of adjacent valves *c* and *d*, as shown in Figure 11, and the extensions are withdrawn by hand and the valves *c* and *d* are operated as before described, and the ends of the interponents drop down behind the extensions, consequently the hook dogs are brought into action. When the operation resulting from

the selection as a unit is completed the valves *c* and *d* like others selected, are returned to normal position by the foot pedal to reset the parts simultaneously. Even if a prior selection has been made, and the hook dogs were included, the operator can manipulate the valves to individually operate said dogs. For instance, if in case of prior selection the hook dogs were not included, and several attempts are necessary to obtain the desired grip, the operator reverses the movement of the foot pedal to produce lost motion between the shaft and the walls of the openings, and by grasping the respective finger pieces pushes in the extensions and returns the valves to normal position, and then pulls out the extensions by hand and admits the pressure and again the dogs are driven into the log. Under these circumstances, the operator may make several attempts to drive the spikes of the dogs into the log to finally make the grip hold sufficient to pull the log up to the knees, then the pedal is reversed to hold the valves set, and subsequently when the pedal is operated to return the parts to normal position all the valves will be returned. Suppose it is desirable to throw the hook dogs into action prior to the operation of the selection of other dogs to hold the log. This can be accomplished in either of two ways. The interponents of all other valves are thrown into locked out position, and the interponents of the hook dog valves are positioned adjacent their cooperating arms 82, and then the foot pedal is operated to throw the valves in position to direct the pressure. Or in lieu of operating the foot pedal, the operator can pull out the valves by hand and accomplish the same result, and without releasing the bite of the hook dogs he can subsequently operate the foot pedal to bring into action the grouped selection of dogs, and when the latter are returned to normal position by reversing the movement of the foot pedal, the hook dog valves are returned at the same time. This same result may be accomplished by grasping an interponent and elevating it and using it as a handle, to reciprocate the valve. This action will in no wise interfere with the other valves nor with the actuating mechanism while the latter mechanism is holding the selected valves in operative position.

It is, from a practical standpoint, essential that the hook dogs be so constructed and operated as to swing in a curved path to cause the spikes to strike logs of various diameters in substantially a line passing through the center inside of the said path and that such relationship be maintained to properly bite the log and subsequently bodily move it up to the faces of the knees. When pressure is admitted to a cylinder 24, the piston rocks the arm 20 and at the same time swings the frame 28 on the floating fulcrum 35^a, and because of the spring 38 and its mountings the dog swings with it in a curved path until the spike contacts with the log. Immediately the spike takes its bite, and as the piston continues its motion, the frame further swings on its floating fulcrum and in so doing exerts a direct pull rearwardly on the dog, and because of the disposition of the various centers, the frame swings rearwardly on its pivot as shown in full lines in Figure 4, which action materially increases the tension of the spring 38 on the dog and holds the latter in gripping relation with the log. This action also causes the spike to further penetrate the log and at the same time pulls the same rearwardly on the blocks and into abutting relation with the knees, the arrangement of the various pivots permitting of the necessary yielding movement to obtain the most direct pull of the piston in drawing the log in position.

From the relative arrangement of the parts for mounting and operating the hook dog, it will be apparent that the frame 28 swings about the pivot 35^a to operate the hook dog, and that in the initial position, with the dog elevated, the dog is pivoted in the frame and the power is connected to the frame in advance of and slightly below this pivot 35^a. Therefore as the frame is swung under the power means, the point of the hook dog is at the operative end of a lever of which the fulcrum or pivot 35^a is the inner end, with the power operating on the lever or dog between the fulcrum and dog point. As the movement continues, the power connection to this lever or dog moves toward a line passing through the pivot or fulcrum 35^a and normal to the line of travel of the power. This shortens the leverage on the dog, causes the power to more nearly coincide with the fulcrum or pivot, and even, as shown in Fig. 4, carries this power beyond the line of the fulcrum or pivot 35^a to in effect change the character of the lever from that under which the power initially acted. From this, it will be apparent that the result of the power on the penetrating point of the dog is at its maximum at the start of a stroke and is gradually reduced thereafter to the end of the stroke. As a result of this, the hook dog point engages large logs with greater penetration and power than it does smaller logs, the advantage of which is obvious.

Link dogs.

In the construction illustrated, but one set of link dogs is shown, but as many may be employed as may be found desirable. The purpose of these dogs is to grip and hold the bottom of a log when on the carriage, to prevent lengthwise movement of

the log, and otherwise assist in holding the latter rigid on the carriage. In handling large logs the link dogs work in combination with the other dogs, but if occasion requires they can be brought into action independently of the other dogs, and at any time the operator finds it necessary to bring them into use. It must be understood that the link dogs move in unison with the knees. Consequently when the link dogs are in gripping action they work in conjunction with the set works.

If the link dogs are to be operated together with other selected dogs, the necessary interponent is thrown forwardly to co-operate with its arm 82. Then when the the operator presses the foot pedal 95 the arm 82 acts to pull out the valve *e* and pressure is admitted to the cylinder 58 and through the connections described the action of the piston rocks the link frame upwardly on its pivot and drives the dogs on the links into the log. If the operator desires to bring the link dogs into action irrespective of the combination of other dogs selected, he may accomplish the result in either of two ways. That is, he may reverse the foot pedal and position the interponent so that upon subsequently operating the foot pedal the valve will be opened, or he can manipulate the valve by hand in exactly the same manner described in connection with the hook dogs.

In the drawings, I have illustrated a series of hinged links provided with teeth to engage the bottom of the log, but I may employ a continuous chain, operating in the groove 43. It is, however, necessary that links of some description be employed, inasmuch as they are shown connected to and movable with the knees, and when the latter approach the saw-line the links are, because of the continuous groove, carried around the end of the frame bar 44, and away from the saw.

The character, size, and condition of the log, largely determines the selection of the link dogs, and at what period of time they should be operated, and whether operation should be in group form, manipulated by the foot pedal, or individually operated by hand. In any event the mechanism I have described is adapted to meet all conditions in handling a log.

When a tapered log is rolled upon the carriage and against the knees by any of the well known means employed for this purpose it is essential that the small end of the log be moved over to approximately line up the center substantially parallel with the proposed line of cut of the saw. Sometimes in handling certain kinds and lengths of logs it is advisable in manipulate both knees to obtain the desired adjustment, and therefore I have shown both knees provided with my improved fluid operated means to act on the log; however, as they both operate alike, I will refer to but one in the description to follow.

When the operator notes the shape of the log, and finds it must be tapered at one end, one of the valves 65 is operated to admit pressure to the lower end of cylinder 153 which forces the piston 152 forwardly, and projects the rod 151 which rocks the lever 149, on the pivot 150. As the base 146 is fixed through its connection with the screw or rack of the ordinary set works, movement of the lever on pivot 148 will, through the pivotal connection 150, move the knee 3, and correspondingly adjust the end of the log to suit the convenience of the operator, the whole manipulation having taken place by simply operating the valve *f*. To reset the knee parallel with its companion, after the sawing operation is completed the movement of the valve is reversed by the reverse movement of the foot pedal, pressure being admitted through port 157, and the piston, consequently the knee is returned to normal position. The knees are not at all times to be operated at the same time the dogs are thrown into action. Should the operator find it necessary to advance a knee previous to the time the dogs are actuated he can do so by throwing an interponent into position against an arm 82, and then by pulling out the extension of either of valves *f* or *g* pressure will be admitted to advance a knee or knees, which movement will in no way affect the operation of the dogs previously set and projected. In either mode of operating the knees, the link dogs are correspondingly moved, so that said dogs will be positioned to engage the log in any position of the knees.

General operation.

From the foregoing description it will be seen that by the arrangement described, one operator can with ease control the set works and all the necessary dogs to set a dog and log, and can with equal ease taper a log to line it up; the various movements incident to dogging and positioning the log being accomplished by fluid pressure under control of but a single operator. It must, therefore, be understood that by this arrangement the doggers usually necessary to handle the dogs on the knees are unnecessary which effects a material saving in the cost of sawing and greatly expedites the operation.

When a log is delivered to the carriage, the operator quickly selects the interponents to be thrown into operative relation, and then by pressing the foot pedal the selected dogs are, by fluid pressure, brought into action and the log is held in the grip of the dogs. If the log is to be tapered this can be done either before the selected dogs are brought

into action, or the taper can be made subsequently thereto, this being determined by the size and condition of the log.

One of the important results flowing from this improvement resides in the possibility of wholly or partially projecting the boss dogs. While a deep bite of the dogs is necessary when a log is first placed on the carriage, if provision were not made to regulate the movement of the dogs, after the slabs are cut and the flat sawed surfaces are presented to the knees, such surfaces would be so mutilated as to damage the backing board. This difficulty is effectually overcome by providing the means employed to but partially project the dogs, consequently the surface of the backing board is but little marred, which in large lumber is not noticeable.

Not least in importance in the unit control, is the air blast to remove the refuse about the juncture of the knees and the head block. At present, time in sawing is lost by manually removing the refuse, and at times it is overlooked which results in a log being dogged out of alignment with the faces of the knees, in which event, not only the board cut is of unequal thickness, but the boards cut from the three other sides will likewise be of the same type. The air blast then, together with the convenient means employed to operate it, I consider of vital practical importance.

Due to the violent shock of the carriage at the end of the reciprocal strokes, it is of the utmost importance that the operator be properly braced to prevent him being thrown off. By providing the substantial pedals, and positioning them as shown, the operator can effectually obtain a footing in either direction of movement of the carriage, and because of the lost motion described in connection with the unit control mechanism the pedals can rock within a given range, which movement assists the operator in accommodating the position of his feet in obtaining a purchase to resist the effect of the momentum of his body. And as previously pointed out, the pedals provide convenient means for actuating the unit control which permits the operator to have his hands free to manipulate the selective mechanism.

After the log is set and dogged and during the period the carriage is carrying the log to the saw, and while returning for another cut, the unit control mechanism is such that the operator can select the interponents and set them for operating the desired dogs for the next cut, if a change in the next successive operation is necessary. Because of the simplicity of the arrangement of the unit control, an operator has ample time to make his selection of dogs for the next cut, and furthermore if the selection made does not accomplish the desired end when the carriage is at rest, practically no time is lost in selecting any particular valve, so that the time necessary to bring into action any particular set of dogs is negligible.

In the modified form of unit control shown in Figure 12, the interponents are not employed to obtain the necessary motion to shift the operating valves to actuate the boss dogs. In this construction the arms 82^a are confined and held against the ends of the valve stems by the pins 100, consequently when a partial movement of the valves is necessary, the link lever 92^a must be shifted to change the arcuate movement imparted to the frame 103. Hence to make a partial stroke movement of the valve in this form of the invention, the link lever 92^a is quickly removed from the lug 108 to the lug 109, consequently when the pedal is rocked the movement will rock the two frames 103 and 122, but the throw of frame 103 in this instance will be greater than that of the frame 122, thus the throw of the boss dog arms will be greater than the remaining arms 82^a of the control to cause proper positioning of the two groups of valves. In this form of control, the pawls 81 on the extensions are so arranged that when they are thrown rearwardly they will engage the locking bar 83 and lock the valves out of action. Aside from this detail the elements of the modified form of unit control all operate the same. That is to say, when the pedal is depressed the links pulling on the depending arms swing the frames 103 and 122 forwardly and the rod 90 engages the arms 82^a and abuts against the interponents, and through their connection with the extensions pull the valves out to cause pressure to flow to the respective cylinders. Because of the confinement of the ends of the arms 82^a by the pins 100, the boss dogs must be operated either partial or full stroke, every time the frames are operated, consequently they are not in this instance subject to the same latitude in the selective system, as in the preferred form. If however, the operator finds it necessary to eliminate projection of the boss dogs altogether, he can, in case of necessity, hold the link lever 92^a elevated and out of engagement with either of the lugs 108—109. In this event the other dogs may be selected and operated, and later on if the boss dogs are necessary the operator can pull out the extensions by grasping the finger piece. To this extent the system is selective, but not to the same extent as in the preferred form of the invention. Obviously by reversing the movement of the foot pedal the front bars 123 of the frame will contact with the arms 82^a and return the latter, together with the valves they control, to normal position.

The other valve operating devices each

have an interponent, and by throwing them forward against the ends of the arms 82^a any valve or valves may be selected to operate the desired dogs in the manner previously described.

In the modified form of unit control shown in Figure 14, the same general arrangement of the modified construction is employed, except that the boss dogs may be in the selective system in the same sense as in the preferred form. That is to say, the abutments 78^x and the hinged plates 80^{xa} are provided for the valves which control the boss dogs. To make a full stroke of a control valve, an interponent 81 is thrown forwardly into co-operative relation with an arm 82^a, the link lever 92^a is shifted to lug 108, and the hinged plate 80^{xa} is thrown over on plate 79^x. This permits the extensions to have a full stroke movement to position the valve to take pressure to the cylinder 12. To make a partial stroke of the valve, to partially project the dogs, the interponent remains as before, but the link lever 92^a is shifted to tooth 109 and the hinged plate 80^{xa} is turned down on the extension as shown in Figure 16. In this instance the hinged plate simply acts to prevent the valve being thrown too far when the arm 82^a is rocked by the foot pedal.

While this form of control performs all functions flowing from the preferred construction, it requires a little more manipulation on the part of the operator, but is nevertheless effective. In this form, like the others, the interponents are employed to lock the valves in normal position and against accidental movement at the same time any and all of the selections described can be made.

The invention is not limited in application to a unit control mounted on the carriage as it is evident such a control may be located at a point remote from the carriage. Any known means for remotely controlling the set works may be used in this connection, and therefore I have not deemed it necessary to show the combination of remote set works and a unit control to control the operation of the various dogs previously described. In Fig. 28, I have, in diagrammatic form, illustrated means by which the unit control may be stationarily located at a point remote from the carriage. This means is electrically operated, and comprises a switch 200 carried by each extension 200^a of group of valves 65 and adapted to cooperate with contacts 201 to energize solenoids 203, the cores of which are attached to the controlling valves 201^a. The contracts for operating the boss dogs (for the purposes of illustration) require two solenoids 204 and 205, the cores of which are connected to a bar 206 attached to the boss dog valves 208 corresponding to the group of valves 64. The two solenoids are wired as at 209 to contacts 210 and a switch 211 on an extension 212 so that when said extension is drawn out, the solenoids 205 will be energized to partially throw the dogs, and upon further movement the circuits will be closed to wholly throw said dogs as will be evident from the drawings. The operating means for simultaneously or individually operating the dogs is identically the same as that previously described.

It is evident the unit control is applicable to operate the various dogs when located either on the carriage or at a point remote therefrom. Therefore in the claims, unless otherwise specifically stated, it is intended that the operating mechanism for controlling the valves comprehends either location.

The construction of the flexible link under dogger shown in Figs. 17 to 20, is not claimed in this application, but aside from the means for controlling the application of power thereto, the structure is claimed in application, Serial No. 604,062 filed November 29, 1922.

The arrangement of pedals to permit the operator to brace himself and the means for clearing the saw dust is not claimed broadly herein, but in an application filed December 4, 1922, Serial No. 604,866. The hook dog is not specifically claimed herein but in a divisional application, filed December 8, 1922, Serial No. 605,653.

What I claim is—

1. In combination with a saw-mill carriage, knees, boss dogs on the knees, fluid pressure means for operating the boss dogs, hook dogs mounted to move with the knees, fluid pressure means for operating the hook dogs, a selective unit control including a group of devices capable of being selectively set to determine which of the fluid pressure means shall be operated, and means for simultaneously operating only the devices set to operate the fluid pressure means.

2. In combination with a saw-mill carriage, knees, boss dogs on the knees, fluid pressure means for operating the boss dogs, controlled to either partially or wholly project the boss dogs, hook dogs mounted to move with the knees, fluid pressure means for operating the hook dogs, a selective unit control including a group of devices capable of being selectively set to determine which of the fluid pressure means shall be operated, and means for simultaneously operating only the devices set to operate the fluid pressure means.

3. In combination with a saw-mill carriage, knees, dogs on the knees, fluid pressure means for projecting the dogs to either one of a plurality of definite and predetermined distances beyond the knees, and means for operating the fluid pressure means to project the dogs.

4. In combination with a saw-mill carriage, knees, dogs on the knees, fluid pressure means for wholly or partially projecting the dogs to either one of a plurality of definite and predetermined distances beyond the knees, and manually controlled selective means for operating the fluid pressure means to project the dogs.

5. In combination with a saw-mill carriage, knees, boss dogs on the knees, fluid pressure means for wholly or partially projecting the boss dogs, and a unit control for governing all the dogs simultaneously, the construction permitting subsequent and independent control of any one set of projected dogs.

6. In combination with a saw-mill carriage, knees, dogs on the knees, fluid pressure means for projecting the dogs, and a unit control for the fluid pressure means, including means to be selectively set whereby to simultaneously project the dogs on all the knees or project only selected dogs on certain of the knees.

7. In combination with a saw-mill carriage, knees, dogs on the knees, fluid pressure means for wholly or partially projecting the dogs, hook dogs mounted to move with the knees, fluid pressure means for operating the hook dogs, and a unit control with means to selectively determine whether the dogs on the knees are to be wholly or partially projected or whether or not the hook dogs are to be actuated, and means to simultaneously operate the unit control to throw into operation the selected dogs, the construction permitting subsequent actuation of the dogs independent of the simultaneous operation of the dogs.

8. In combination with a saw mill carriage, knees, means for operating the knees to taper a log, dogs on the knees, means for operating the dogs, a seat for the operator of the carriage, a selective unit control to determine the time of operation of the knees and dogs, a foot pedal mounted adjacent the operator's seat connected to simultaneously operate the selection of knees and dogs determined by the unit control, means to permit of individual operation of either dogs or knees, and a foot support located adjacent the seat and cooperating with the pedal.

9. The combination with a saw mill carriage, of adjunctive devices arranged thereon for cooperation with the log to be handled to perform different operations thereon, individual power means for operating said adjunctive devices, comprising means for permitting or preventing transmission of power from the source and individual elements, and a unit control capable of being selectively set to determine the operation of the power of the individual power means, said elements and the means controlling the transmission of power from said source being so placed adjacent each other that an operator may at the same time control said means or any of said elements.

10. In combination with a saw-mill carriage, dogs mounted on the carriage, independent fluid pressure means for the respective dogs, and a unit control for governing the independent fluid pressure means, said unit control including selective elements to adapt said control for the simultaneous operation of any number of said means or the independent operation of any one or more of said means.

11. In combination with a saw-mill carriage, knees, boss dogs mounted on the knees, dogs mounted directly on the carriage operable to engage the bottom of a log and hold same against the knees and preventing said log slipping lengthwise, and means arrangable for either simultaneously or independently operating the boss dog or the dogs which engage the bottom of a log.

12. In combination with a saw-mill carriage, knees, dogs mounted on the knees, dogs mounted directly on the carriage and operable to engage the bottom of a log and hold same against the knees and preventing said log slipping lengthwise, fluid pressure means for operating the dogs, and means to either simultaneously or individually operate the fluid pressure means to simultaneously or individually operate the dogs.

13. In combination with a saw-mill carriage, independent dogs mounted thereon, independent fluid pressure means for operating said dogs, and a unit control for said independent pressure means, said unit control including a selective element for each of said independent fluid pressure means, and an operating member whereby to operate the dogs in accordance with a selective setting of such elements.

14. In combination with a saw-mill carriage having sets of dogs, a fluid pressure means for each set of dogs, a manually operable member, and means arranged between said member and each fluid pressure means adapted in a predetermined position to cause and in another not to cause actuation of the fluid pressure means following movement of such member, whereby any one or more of the fluid pressure means may be actuated in a corresponding movement of the member.

15. Means for controlling and limiting the movement of dogs on a saw mill carriage, comprising a valve, means for limiting the valve to a full stroke movement to project the dogs to their fullest extent, and a movable abutment adapted to be positioned to limit the movement of the valve to cause partial projection of the dogs.

16. Means for controlling and limiting the movement of the dogs on saw mill carriages, comprising a valve, and means for selective-

ly determining the movement of the valve to a position to wholly or partially project the dogs.

17. In combination with a saw-mill carriage, knees, dogs for dogging a log, fluid pressure means for operating the dogs, means to determine which dogs are to be operated, and means to lock out the last mentioned means to prevent accidental operation of the dogs.

18. In combination with a saw-mill carriage, knees, dogs for dogging a log, fluid pressure means for operating the dogs, means to determine which selected dogs are to be operated, means including a foot pedal to actuate the last mentioned means, and lock out mechanism to prevent accidental operation of any dogs which have not been selected to be operated.

19. In combination with a saw-mill carriage, knees, boss dogs on the knees to hold a log against the latter, means for simultaneously operating the boss dogs, and other dogs engaging the log to prevent it moving lengthwise of the carriage, and a single control means to operate said other dogs prior to or after operation of the boss dogs.

20. In combination with a saw-mill carriage, knees, boss dogs on the knees, dogs on the carriage and movable in unison with the knees and operable to engage or disengage the under side of a log, hook dogs movable with the knees to engage the upper portion of a log, and means to individually or collectively operate the boss dogs, dogs to engage the underside of the log and hook dogs.

21. In combination with a saw-mill carriage, knees, dogs on the carriage, means for operating the dogs, means to determine whether certain or all the dogs shall be operated, and common operating means therefor including a pedal, said pedal serving additionally as an operator's bracing means.

22. In combination a saw-mill carriage, knees, boss dogs on the knees, a hook dog, means to cause said hook dog to engage the upper portion of a log including means to cause said hook dog to pull a log against the knees, selective mechanism to determine whether boss or hook dogs shall be operated, including means operable at the will of the operator to individually operate said dogs, and means for simultaneously operating the selected mechanism to cause actuation of the dogs to grip a log.

23. In combination a saw-mill carriage, knees, boss dogs on the knees, dogs to engage the under side of a log and operable to engage or disengage the log, selective mechanism to control the operation of the dogs which engage the underside of the log and boss dogs, including means operable at will to individually control the operation of said dogs, and means for simultaneously operating the selected mechanism to cause actuation of the selected dogs to engage a log.

24. In combination a saw-mill carriage, knees, boss dogs on the knees, fluid pressure means for operating the boss dogs, including cylinders, valves and ports arranged when in one position to wholly project the boss dogs and when arranged in another position to partially project said dogs, setting means arranged to determine the operation of the fluid pressure means, including means to control either whole or partial projection of the boss dogs, and means to simultaneously operate the boss dogs set and arranged to be actuated, including instrumentalities to be manually actuated to individually operate any particular boss dog or dogs prior to or after simultaneous operation of said boss dogs.

25. In combination a saw-mill carriage, knees, fluid pressure means for operating the knees, boss dogs carried by the knees, fluid pressure means for operating the boss dogs, setting means to determine the operation of the knee and boss dog, fluid pressure operating means, means to operate the setting means for actuating the knees and dogs and means to simultaneously actuate or to individually actuate the knees or boss dogs prior to or after simultaneous operation of said knees or boss dogs.

26. In combination with a saw-mill carriage, knees mounted thereon, fluid pressure means for operating the knees, valves for controlling said fluid pressure means, boss dogs mounted in each knee, fluid pressure means for projecting the boss dogs beyond the knees to their fullest extent, or partially projecting said boss dogs, said patrial projection of the boss dogs being to a predetermined distance between their normal position and the position of fullest extent, valves for controlling the boss dog fluid pressure operating means so as to thereby determine the full or partial projection of the boss dogs, and means arranged to operate the valves simultaneously or individually.

27. In combination with a saw-mill carriage, head blocks, knees, boss dogs mounted on the knees, hook dogs mounted on the knees, a cylinder mounted on each knee, a piston and rod operating in said cylinder, operating connections between the end of the rod and each head block to move the knee when fluid pressure is introduced to the cylinder, a second cylinder on each knee, a piston and rod operating in each second mentioned cylinder, operating connections between the last mentioned rod and the boss dogs to actuate the latter when fluid pressure is introduced to the second mentioned cylinder, a third cylinder on each knee, a pis-

ton and rod operating in said third mentioned cylinder, operating connections between the last mentioned rod and the hook dogs to actuate the latter when fluid pressure is introduced, setting mechanism arranged to permit an operator to selectively elect which of the cylinders is to receive fluid pressure to actuate the knees, boss dogs or hook dogs, and means to operate the selection from the setting mechanism, including means to individually operate the knees, boss dogs or the hook dogs.

28. In combination with a saw-mill carriage, knees, boss dogs mounted on the knees, fluid pressure means for operating the boss dogs, a valve for controlling the fluid pressure and the range of motion which it produces, means for operating and limiting the operation of said valves, and means for locking out said operating means to prevent accidental movement of the valves when in normal inactive position.

29. In combination a saw-mill carriage, knees, boss dogs mounted on the knees, a hook dog on a knee, fluid pressure means for operating the boss dogs, including a valve, fluid pressure means for operating the hook dog, including a valve, setting means, including an interponent and an extension for each valve, the interponents being mounted in the extensions and adapted to be thrown into operative relation with the valves when in one position, means for operating only those valves where the interponents have been thrown into operative position, and means permitting of individual operation of any particular valve irrespective of the position of the interponents.

30. The combination with a saw mill carriage, of adjunctive devices arranged thereon for cooperation with the log to be handled to perform different operations thereon, fluid pressure means for operating said adjunctive devices, and a unit control capable of being selectively set to determine the operation of the fluid pressure means.

31. In combination a saw-mill carriage, knees, boss dogs mounted on each knee, fluid pressure means for operating the boss dogs including a valve for controlling said means, a hook dog to engage the top portion of a log, fluid pressure means for operating the hook dog including a valve to control said means, dogs mounted on the carriage operable toward and from the log to engage the bottom of a log, fluid pressure means for operating the dogs which engage the bottom of the log including a valve to control said means, the valves for controlling the boss dogs having means to apply the pressure to either partially or wholly project said boss dogs and having a movement corresponding to the movement of the valves for the hook and link dogs, means for setting a selection of valves, including means for limiting the movement of the boss dog valves when partially projecting the boss dogs, and means for actuating the selected valves either simultaneously or individually.

32. In combination a saw-mill carriage, a plurality of knees, boss dogs carried by the knees, fluid pressure means for operating the boss dogs on the knees, a common means for actuating the fluid pressure means including a manually operated element having a predetermined lost motion to permit individual operation of the boss dogs of any particular knee without interfering with the bite of the other dogs operated to engage a log.

33. In combination a saw-mill carriage, a plurality of knees, boss dogs carried by the knees, fluid pressure means for operating the boss dogs on the knees, a hook dog, fluid pressure means for operating the hook dog, a common means including a manually operated element having a predetermined lost motion to permit individual operation of either the boss dogs of any particular knee or knees or the hook dog without interfering with the bite of the other dogs operated to engage a log.

34. In combination a saw-mill carriage, a plurality of knees, boss dogs carried by the knees, fluid pressure means for operating the boss dogs on the knees, a hook dog on a knee, fluid pressure means for operating the hook dog, dogs located on the carriage and operable to engage the under side of a log to prevent same slipping, fluid pressure means for operating the last mentioned dogs, means including a manually operated element having a predetermined lost motion to permit individual operation of either the boss dogs of any particular knee, the hook dog or the dogs which engage the underside of a log without interfering with the bite of the other dogs operated to engage a log.

35. In combination with a saw-mill carriage, knees, dogs co-operating with the knees to bite and hold a log, dogs connected with and movable with the knees and operable to bite into the bottom of a log in advance of said knees, fluid pressure means for operating the dogs, and a common manual means for controlling the fluid pressure means including means to permit of a predetermined lost motion to permit of operation of the dogs which engage the bottom of the log independent of the operation of the other dogs.

36. In combination with a saw-mill carriage, knees, boss dogs carried by the knees, fluid pressure means for operating the boss dogs on each knee, valves for controlling the fluid pressure means for controlling the operation of the boss dogs on each knee, said valves and fluid pressure means including means to wholly or partially project the boss dogs, and manual means for regulating the

position of the valves to wholly or partially project the boss dogs including means to provide a predetermined lost motion to permit operation of the boss dogs on either knee independent of and without affecting the bite of other dogs.

37. In combination with a saw-mill carriage, knees, dogs mounted on the carriage and movable at the time a knee is moved and actuable to engage the underside of a log in advance of the knees, fluid pressure operated means on the carriage, connections to be operated by the fluid pressure means to actuate the dogs, and means for controlling the fluid pressure means.

38. In combination with a saw-mill carriage, knees, a dog frame pivotally mounted on the carriage, a plurality of dogs operable and guided in the dog frame and movable at the time a knee is moved, fluid pressure means on the carriage for actuating the dog frame, connections between the frame and the fluid pressure means for actuating the dogs, and means for controlling the action of the fluid pressure means.

39. In combination with a saw mill carriage, a plurality of dogs on the carriage to engage a log at different points for different results, pneumatic means on the carriage for operating any of the dogs selectively, and means on the carriage for throwing out of operation simultaneously all of such operated pneumatic means.

40. In combination with a saw mill carriage, a plurality of sets of dogs on the carriage to engage a log at different points for different results, means on the carriage whereby any one or more of such dog sets may be selectively operated, and means on the carriage whereby all of the operated dog sets may be simultaneously returned to normal position.

41. In combination with a saw-mill carriage, knees, dogs carried by the knees, fluid pressure means for operating the dogs, a hook dog, floating means for mounting the hook dogs to cause same to swing in a curved path until a bite is made in a log and in the same movement thereafter pull in substantially a straight line to draw a log up to the knees, fluid pressure means for operating the hook dog, and means for controlling the fluid pressure means to simultaneously or independently operate the dogs on the knees or the hook dog.

42. In combination with a saw-mill carriage, knees, dogs, fluid pressure means for operating the dogs, and selective controlling means including interponents and means to provide lost motion to permit releasing or resetting the interponents without affecting the dogs operated to grip a log whereby an operator is free to set another selection of dogs to be operated while the dogs are gripping a log and the sawing operation is progressing.

43. In combination with a saw-mill carriage, knees, sets of boss dogs carried by the knees, fluid pressure means for operating the boss dogs including a cylinder for each set of dogs, each cylinder having ports at opposite ends and an intermediate port, a controlling means for each cylinder, each means comprising a cylinder formed with three ports and a valve having ports to co-operate with the ports in the last mentioned cylinder, and means for controlling the movement of the valve to admit pressure in one end of the first mentioned cylinder and open the port at the opposite end of said cylinder to impart a full stroke to the piston to wholly project the dogs or impart such movement to the valve as to admit pressure at one end of the first mentioned cylinder and open the intermediate port and close the port of the opposite end of said cylinder to form a cushion to but partially project the dogs.

44. In combination with a saw-mill carriage, knees, boss dogs on the knees, a cylinder, a piston and rod connected to the boss dogs, fluid pressure means including valves for introducing fluid pressure to the cylinders to impart full strokes to the pistons or forming cushions at one end of the cylinders to partially limit the stroke of the pistons, and means to simultaneously operate all the valves selected or individually operate the valves irrespective of their prior selection and simultaneous operation.

45. In combination with a saw-mill carriage, knees, dogs on the carriage, mechanism for operating the dogs, and means for controlling the operation including mechanism for simultaneously operating selected groups of dogs and permitting of individual operation of any of those selected before or after simultaneous operation without interfering with the others in the group to be simultaneously operated.

46. In combination with a saw-mill carriage, knees and boss dogs on the carriage, fluid pressure means for wholly or partially projecting the boss dogs, means for selectively controlling the fluid pressure means to simultaneously project all the dogs or wholly project certain boss dogs and partially project certain of the other boss dogs.

47. In combination with a saw-mill carriage, dogs mounted thereon, a fluid pressure means for the dogs, and a unit control for the fluid pressure means capable of manual adjustment to vary in a single operation the effect of the unit control with respect to certain dogs as compared with other dogs.

48. In combination with a saw-mill carriage, a plurality of sets of dogs mounted thereon, independent fluid pressure means

for each set of dogs, a single operating member, and means whereby said member may be operatively connected for the control of any one or more of said fluid pressure means, said last named means being manually variable before and following the operation of said member.

49. In combination with a saw-mill carriage, a plurality of sets of dogs mounted thereon, an independent fluid pressure means for each set of dogs, a selective mechanism whereby any desired number of fluid pressure means may be set for actuation, and a single member for actuating the selective mechanism, said member being mounted to permit a predetermined movement thereof without effect on the selective mechanism, whereby following the operation of the selective mechanism any fluid pressure means may be independently operated to an extent corresponding to the independent movement of the member.

50. In combination with a saw-mill carriage, a plurality of sets of dogs mounted thereon, a fluid pressure means for each set of dogs, a valve for controlling each fluid pressure means, a manually operable member, and means arranged between said member and each valve to permit selective movement of that valve by the member, the member having a free predetermined movement which is non-effective with respect to the selected valve and substantially equal to the movement of the member necessary to operate the valve.

51. In combination with a saw-mill carriage, dogs mounted thereon, a fluid pressure means for operating the dogs, a valve for controlling the fluid pressure means, a member to be actuated by an operator on the carriage, and a manually selective connection between the valve and member, said member having a free compensatory movement to permit possible involuntary actuation of the member by the operator incident to the momentum of the carriage without correspondingly actuating the valve.

52. In combination with a saw-mill carriage, boss dogs mounted thereon, fluid pressure means for actuating said dogs, and means for controlling the fluid pressure means, said latter means being selectively governed to limit the operation of the fluid pressure means to one or the other of two predetermined movements, whereby the dogs may be wholly or partially projected at will.

53. In combination with a saw-mill carriage, sets of dogs mounted thereon, a fluid pressure means for operating each set of dogs, a valve for each fluid pressure means adapted for manual actuation, an operating member, and selective means whereby any one or more of the valves may be arranged for simultaneous operation by the member without interfering with the capability of such valve or valves for independent manual operation.

54. In combination with a saw-mill carriage, sets of dogs mounted thereon, a fluid pressure means for operating each set of dogs, a valve for each fluid pressure means adapted for manual actuation, an operating member, and selective means whereby any valve may be arranged for operation by the member solely or simultaneously with others, said member having a free compensating movement without effect on the selected valves to thereby free said valves for manual operation to the extent of the free compensating movement of the member.

55. In combination with a saw-mill carriage, boss dogs thereon, a hook dog thereon, independent fluid pressure means for operating the respective boss and hook dogs, a valve for controlling each fluid means, a member to be actuated by an operator on the carriage, and a manually selective connection between the valves and member, said member having a free compensatory movement to permit possible involuntary actuation of the member by the operator incident to the momentum of the carriage without correspondingly actuating the valves.

56. In combination with a saw-mill carriage, boss dogs thereon, a hook dog thereon, a dog to engage the bottom of a log, independent fluid pressure means for operating the respective boss, hook, and dog which engages the bottom of a log, a valve for controlling each fluid means, a member to be actuated by an operator on the carriage, and a manually selective connection between the valves and member, said member having a free compensatory movement to permit possible involuntary actuation of the member by the operator incident to the momentum of the carriage without correspondingly actuating the valves.

57. In combination with a saw-mill carriage, knees mounted thereon, boss dogs carried by the knees, a hook dog, independent fluid pressure means for operating the knees, boss dogs, and hook dog, a valve for controlling each fluid means, a member to be actuated by an operator on the carriage, and a manually selective connection between the valves and member, said member having a free compensatory movement to permit possible involuntary actuation of the member by the operator incident to the momentum of the carriage without correspondingly actuating the valves.

58. In combination with a saw-mill carriage, boss dogs mounted thereon, a fluid pressure means for operating the dogs, a valve for controlling the fluid pressure means, and mechanism whereby the valve may be manually actuated, said mechanism

including a part for selective acutation, and a member inherently capable of a predetermined free movement without effect on the valve, whereby the operation of the valve requires the movement of the selective part and the operation of the member beyond the limit of its free movement.

59. The combination with a saw mill carriage having set works and additional adjunctive devices, an operator's seat located for convenient set works control, means associated with and arranged for operating said adjunctive devices, including a foot pedal having a limited free movement without operation of such adjunctive devices, said foot pedal being so formed and placed that the operator may brace himself on such seat against movement of the carriage tending to his displacement.

60. In combination with a saw mill carriage, knees, dogs adjacent the knees for engaging a log on the carriage, dogs for engaging the top of a log, fluid pressure means for operating the dogs, a selective unit control including a group of devices capable of being selectively set to determine which of the fluid pressure means shall be operated, and means for simultaneously operating only the devices set to operate the fluid pressure means.

61. In combination with a saw mill carriage, knees, dogs carried by the knees, means for operating the dogs, a selective unit control including a group of devices capable of being selectively set to determine which of the dog operating means shall be actuated, and means for simultaneously operating all the devices set to operate the dog operating means.

62. In combination with a saw mill carriage, knees, dogs mounted to operate on the front of the knees, means for operating said dogs, a hook dog, means for operating the hook dog, a selective unit control including a group of devices capable of being selectively set to determine which of the dog operating means shall be acutuated, and means for simultaneously operating only the devices set to operate the dog operating means.

63. In combination with a saw mill carriage, knees, dogs on the knees, means for operating the dogs, other dogs mounted to move with the knees, means for operating said other dogs, a selective unit control including a group of devices capable of being selectively set to determine which of the dog operating means shall be actuated, and means for simultaneously operating only the devices set to operate the dog operating means.

64. In combination with a saw mill carriage, knees, dogs for engaging a log, means for partially or wholly projecting certain of the dogs, fluid pressure means for operating the respective dogs, a selective unit control including a group of devices capable of being selectively set to determine which of the fluid pressure means shall be operated, and means for simultaneously operating only the devices set to operate the fluid pressure means.

65. In combination with a saw mill carriage, knees, dogs adjacent the knees for engaging a log on the carriage, dogs for engaging the top of a log, fluid pressure means for operating the dogs, a selective unit control including a group of devices capable of being selectively set to determine which of the fluid pressure means shall be operated, means for simultaneously operating only the devices set to operate the fluid pressure means, and means to permit individual operation of any of the group of devices after simultaneous operation without affecting the operative position of the other operated devices.

66. In combination with a saw mill carriage, knees, dogs on the knees, fluid pressure means for projecting the dogs to either one of a plurality of definite and predetermined distances beyond the knees, dogs supported on the carriage to engage the under side of a log, and means for operating the fluid pressure means to simultaneously project the dogs.

67. In combination with a saw mill carriage, knees, dogs on the knees, fluid pressure means for projecting the dogs to either one of a plurality of definite and predetermined distances beyond the knees, dogs supported on the carriage to engage the under side of a log, means for operating the fluid pressure means to simultaneously project the dogs, and means to permit individual operation of any of the dogs after simultaneous operation without effecting the operative position of the other dogs.

68. In combination with a saw mill carriage, knees, dogs, means for projecting the dogs, and a single means for operating and simultaneously controlling the projecting means to project the dogs to either one of a plurality of definite and predetermined distances beyond the knees.

69. In combination with a saw mill carriage, knees, dogs on the knees, fluid pressure means for partially or wholly projecting the dogs to either one of a plurality of definite and predetermined distances beyond the knees, dogs supported by the carriage and movable at the time the knees are moved, fluid pressure means for projecting the last mentioned dogs, and manually controlled selective means for simultaneously operating the fluid pressure means to project the dogs.

70. In combination with a saw mill carriage, knees, dogs on the knees, fluid pressure means for partially or wholly projecting the dogs to either one of a plurality of

definite and predetermined distances beyond the knees, dogs supported by the carriage and movable at the time the knees are moved, fluid pressure means for projecting the last mentioned dogs, and manually controlled selective means for simultaneously operating the fluid pressure means to project the dogs, and means to permit individual operation of any of the dogs after simultaneous operation without effecting the operative position of the other dogs.

71. In combination with a saw mill carriage, knees, dogs, means for projecting the dogs, and selective means for operating the projecting means to project the dogs to either one of a plurality of definite and predetermined distances beyond the knees.

72. In combination with a saw mill carriage, knees, dogs movable at the time the knees are moved to engage a log, and a unit control for governing all the dogs simultaneously, the construction permitting subsequent and independent control of any of the dogs.

73. In combination with a saw mill carriage, knees, dogs carried by the knees, dogs supported by the carriage and movable at the time the knees are moved, and a unit control for governing all the dogs simultaneously, the construction permitting subsequent and independent control of any of the dogs.

74. The combination with a saw mill carriage, knees, dogs on the knees, means for wholly or partially projecting the dogs, and a unit control for governing the projecting of all the dogs simultaneously, the construction permitting subsequent and independent control of any of the projected dogs.

75. In combination with a saw mill carriage, knees, dogs movable at the time the knees are moved, fluid pressure means for projecting the dogs, and a unit control for the fluid pressure means, including means to be selectively set whereby to simultaneously operate the dogs movable with the knees or operate only selected dogs movable with certain of the knees, the construction permitting subsequent and independent control of any one set of operated dogs.

76. In combination with a saw mill carriage, knees, dogs movable with the knees to engage the top and side of a log on the carriage, dogs supported on the carriage and movable at the time the knees are moved to engage the under side of a log, fluid pressure means for operating the dogs, and a unit control for the fluid pressure means, including means to be selectively set, whereby to simultaneously operate the dogs movable with all the knees or operate only selected dogs movable with the knees, the construction permitting subsequent and independent control of any one set of operated dogs.

77. In combination with a saw mill carriage, knees, dogs on the knees, means for wholly or partially projecting the dogs, a hook dog mounted to move with a knee, means for operating the hook dog, and a unit control with means to selectively determine whether the dogs on the knees are to be wholly or partially projected or whether or not the hook dog is to be actuated, and means to simultaneously operate the unit control to throw into operation the selected dogs, the construction permitting subsequent actuation of the dogs independent of the simultaneous operation of the dogs.

78. In combination with a saw mill carriage, knees, dogs mounted to move with the knees and located in advance of the same to engage the bottom of a log, said dogs being mounted on the carriage and operated to engage the log through movement of such mounting, other dogs on the knees to engage the side of a log, and means for simultaneously operating all the dogs or operating certain of the dogs independently.

79. In combination with a saw mill carriage, dogs on the carriage, independent means for operating the respective dogs, and a unit control for governing the independent operating means, said unit control including selective elements to adapt said control for the simultaneous operation of any number of said opertaing means or the independent operation of any one or more of said operating means.

80. In combination with a saw mill carriage, knees, dogs on the knees to engage a log to hold a log against the knees, and means arrangeable for simultaneously operating the dogs or for permitting independent operation of said dogs.

81. In combination with a saw mill carriage, knees thereon, dogs associated with the knees, means for operating the dogs, a selective unit control including means for simultaneously actuating the operating means for all the dogs, the construction permitting subsequent actuation of the dog operating means independently of the simultaneous operation of the dogs.

82. In combination with a saw mill carriage, knees thereon, dogs associated with the knees, means for operating the dogs including means for partially or wholly projecting certain of the dogs, a selective unit control including means for manually operating any of the dogs independently of the other dogs, and means for simultaneously operating all the dogs including those set for partial movement, the construction permitting subsequent actuation of any of the dogs independently.

83. In combination with a saw mill carriage, knees, dogs for dogging a log, means for selecting which dogs are to be operated, and means for simultaneously operating the selected dogs.

84. In combination with a saw mill carriage, knees, dogs for dogging a log, means for operating the dogs, means to determine which dogs are to be operated, and means to lock out the last mentioned means to prevent accidental operation of the dogs.

85. In combination with a saw mill carriage, knees, dogs for dogging a log, means for operating the dogs, means for selecting which dogs are to be operated, and means including a foot pedal for simultaneously operating the selected dogs.

86. The combination with a saw mill carriage, of adjunctive devices arranged thereon for cooperation with the log to be handled, means for operating said adjunctive devices, and a control including manually operable elements capable of being selectively set to determine and provide a unitary means for the operation of the means for operating the adjunctive devices.

87. The combination with a saw mill carriage, of adjunctive devices arranged thereon, including dogs for cooperation with the log to be handled, means for operating said adjunctive devices, and a unit control capable of being selectively set to determine the operation of the means for operating the adjunctive devices, the construction permitting subsequent and independent control of any of the adjunctive devices.

88. In combination with a saw mill carriage, independent dogs mounted thereon, independent means for operating said dogs, and a unit control for said independent dog operating means, said unit control including a selective element for each of said independent dog operating means, and an operating member for actuating the unit control.

89. In combination with a saw mill carriage having different types of dogs, means for operating each type of dog, a manually operable member, and means arranged between said member and each dog operating means adapted in a predetermined position to cause and in another predetermined position not to cause actuation of the dog operating means following movement of such member, whereby any one or more of the dog operating means may be actuated in a corresponding movement of the member.

90. In combination with a saw mill carriage, a plurality of knees, dogs carried by each knee, means for operating the dogs on each knee, common means for actuating the dog operating means including a manually operable element having a predetermined lost motion to permit individual operation of the dogs of any particular knee without interfering with the bite of the other dogs operated to engage a log.

91. The combination with a saw mill carriage, of adjunctive devices arranged thereon for cooperation with the log to be handled to perform operations on the log at different points, fluid pressure means for operating said adjunctive devices, and a unit control capable of being selectively set to determine the operation of the fluid pressure means.

92. The combination with a saw mill carriage, of adjunctive devices arranged thereon for cooperation with the log to be handled to perform operations on the log at different points, means for operating said adjunctive devices, and a unit control capable of being selectively set to determine the operation of the adjunctive operating means.

93. In combination, a saw mill carriage, knees on the carriage, dogs on the faces of the knees, a dog on a knee to engage the top of a log, dogs to engage the bottom of a log, and means operable at the will of the operator to simultaneously or selectively actuate any or all of the dogs to engage the log.

94. In combination, a saw mill carriage, knees, dogs associated with the knees, dogs between the knees to engage the under side of a log, and means for simultaneously or individually operating the dogs.

95. In combination, a saw mill carriage, knees, dogs for engaging the top of a log, dogs supported directly on the carriage and movable at the time the knees are moved to engage the bottom of the log, and means for operating the dogs.

96. In combination with a saw mill carriage, knees mounted thereon, dogs carried by the knees, means for operating the knees and dogs, an element for controlling each operating means, a member to be actuated by an operator, and a manually selective connection between the elements and member.

97. In combination with a saw mill carriage, knees on the carriage, dogs associated with the knees, fluid pressure means for projecting the dogs, including a cushion, means when in one position causing actuation of the fluid pressure means to bring into operation the cushion to cause partial projection of the dogs, and when in another position to cause said dogs to be wholly projected.

98. In combination with a saw mill carriage, knees on the carriage, dogs associated with the knees, means for projecting the dogs, including a cushion, means when in one position causing actuation of the dog projecting means to bring into operation the cushion to cause partial projection of the dogs, and when in another position to cause said dogs to be wholly projected.

99. In combination with a saw mill carriage, a knee thereon, a plurality of dogs of different type carried by the knee, means

for operating each type of dog or dogs, and a selective unit control, including means for manually operating the operating means for either type of dog or dogs independently of the other dogs, means for simultaneously operating the operating means for all selected dogs, and means for locking against accidental operation those dogs which have not been selected.

100. In combination with a saw mill carriage, knees thereon, dogs carried by the knees, means for operating the dogs, a selective unit control arranged to permit manual operation of any of the dogs independently of the other dogs, said unit control having means for simultaneously actuating the operating means for all the dogs.

101. In combination with a saw mill carriage, knees thereon, sets of dogs for holding a log on the carriage against the knees, means for operating the dogs, a selective unit control including a group of devices capable of being selectively set to determine which of the dog operating means shall be actuated, and means distant from the unit control and adapted to be connected therewith for operating only the devices set to actuate the dog operating means.

102. In combination with a saw mill carriage, knees thereon, dogs on the carriage, means for operating the dogs, and means for simultaneously or independently actuating the operating means, including a pedal, said pedal serving additionally as an operator's bracing means.

103. In combination with a saw mill carriage, knees thereon, dogs on the carriage, means for operating the dogs, and means for simultaneously or independently actuating the operating means, including a pedal, said pedal serving additionally as an operator's bracing means, and lock out means for the dogs not selected.

104. In combination with a saw mill carriage, knees thereon, means for operating the knees for tapering a log, dogs associated with the knees, means for operating the dogs, a selective unit control, including means for manually operating any of the dogs independently of the other dogs or a knee or knees, and means for simultaneously operating all the dogs and knees.

105. In combination with a saw mill carrige, knees, dogs, means for operating the dogs, and selective controlling means, including interponents to permit releasing or resetting without affecting the dogs operated to grip a log, whereby an operator is free to set another selection of dogs to be operated while the dogs are gripping a log and the sawing operation is progressing.

106. In combination with a saw mill carriage, knees thereon, dogs on the carriage, means for operating the dogs, a selective unit control, including means for manually operating any of the dogs independently of the other dogs, and means for simultaneously actuating the operating means for all the dogs, said latter means also serving as a means for simultaneously returning all the dog operating means to normal position.

107. In combination with a saw mill carriage, knees thereon, dogs on the carriage, means for causing certain of the dogs to be wholly or partially projected, means for operating the dogs, a selective unit control, including means arrangeable for manual operation of any of the dogs independently of the other dogs, including those set for partial stroke, and means for simultaneously actuating the operating means for all the dogs.

108. In combination with a saw mill carriage, a knee thereon, dogs on the knee, fluid pressure means for operating the dogs, means for partially or wholly projecting the dogs, including a valve to control the fluid pressure means, setting mechanism, including an interponent, the interponent permitting an operator to reset the setting mechanism while the dogs are gripping a log and the sawing operation is progressing, to thereby cause the dogs to be subsequently either partially or wholly projected, and means for operating the setting mechanism.

109. In combination with a saw mill carriage, a knee thereon, dogs on the knee, fluid pressure means for operating the dogs, means for partially or wholly projecting the dogs, including a valve to control the fluid pressure means, setting mechanism, including an interponent, the interponent permitting an operator at will to reset the setting mechanism for causing the dogs to be subsequently either partially or wholly projected, and means for operating the setting mechanism.

110. In combination with a saw mill carriage, dogs of different type mounted thereon, independent means for operating each type of dogs, a single operating member, and means whereby said member may be operatively connected for the control of any one or more of the dog operating means, said member connecting means being manually variable before and following the operation of said member.

111. In combination with a saw mill carriage, dogs of different type mounted thereon, independent means for operating each type of dogs, a single operating member, and means whereby said member may be operatively connected for the control of any one or more of the dog operating means, said member connecting means being variable before and following the operation of said member.

112. In combination with a saw mill car-

riage, a plurality of dogs of different type mounted thereon, independent means for operating each type of dogs, a single operating member, means whereby said member may be operatively connected for the control of any one or more of the dog operating means, said last named means being manually variable before and following the operation of said member, and a lock out for preventing operation of those types of dogs not designed to be operated.

113. In combination with a saw mill carriage, dogs mounted thereon, means for operating the dogs, an element for controlling the dog operating means, a member to be actuated by an operator on the carriage, and a manually selective connection between the element and member, said member having a free compensatory movement to permit possible involuntary actuation of the member by the operator incident to the momentum of the carriage without correspondingly actuating the element.

114. In combination with a saw mill carriage, knees thereon, dogs carried by the knees, means for operating the dogs, a selective unit control, including means for manually operating any of the dogs independently of the other dogs, and means for simultaneously operating all the dogs, said means having a free compensatory movement to permit possible involuntary actuation of the operating means by the operator incident to the momentum of the carriage without correspondingly actuating the operating means for the dogs.

115. In combination with a saw mill carriage, dogs on the carriage, means for operating the dogs, a selective unit control, including means for manually operating any of the dogs independently of the other dogs, and means for simultaneously operating all the dogs, said latter means having a free compensatory movement to permit possible involuntary actuation of the operating means by the operator incident to the momentum of the carriage without correspondingly actuating the operating means for the dogs.

116. In combination with a saw mill carriage, dogs on the carriage, fluid pressure means for operating the dogs, including a controlling valve therefor, and means for operating the valve, including means having a free compensatory movement to prevent possible involuntary actuation of the valve by the operator incident to the momentum of the carriage without correspondingly actuating the valve.

117. In combination with a saw mill carriage, dogs on the carriage, means for operating the dogs, including a controlling element therefor, and means for operating the controlling element, including means having a free compensatory movement to permit possible involuntary actuation of the controlling element by the operator incidental to the momentum of the carriage without correspondingly actuating the controlling element.

118. In combination with a saw mill carriage, dogs mounted on the carriage, means for actuating the dogs, including a cushion stop to limit the movement of the dogs in one position, and means for controlling the actuating means and thereby the said cushion stop, said latter means being selectively governed to limit the operation of the dog actuating means to one or the other of two predetermined movements, whereby the dogs may be wholly or partially projected.

119. In combination with a saw mill carriage, dogs mounted on the carriage, means for actuating the dogs, and means for controlling the actuating means, said latter means being selectively governed to limit the operation of the dog actuating means to one or the other of two predetermined movements, said controlling means being constructed to permit of the dogs selected for whole or partial projection being operated while sawing or at any other period.

120. In combination with a saw mill carriage, boss dogs mounted thereon, fluid pressure means for actuating said dogs, and means for controlling the fluid pressure means, said latter means being selectively governed to limit the operation of the fluid pressure means to one or the other of two predetermined movements, said controlling means being constructed to permit of the dogs selected for whole or partial projection being otherwise operated at any period.

121. In combination with a saw mill carriage, sets of dogs thereon, fluid pressure means for actuating said dogs, and means for controlling the fluid pressure means, including means for creating a cushion to limit the movement of the dogs in one of their operations, said latter means being selectively governed to limit the fluid pressure means by the presence of the cushion to project the dogs at one time to one position or by the absence of the cushion at another time to another position, whereby the dogs may be wholly or partially projected.

122. In combination with a saw mill carriage, dogs thereon, fluid pressure means, including a cylinder for operating the dogs, means adapted for creating a cushion in the cylinder to limit the movement of the dogs, whereby the dogs may be wholly or partially projected, and means for operating said latter means.

123. In combination with a saw mill carriage, a dog thereon, means for actuating the dog, and means for controlling the actuating means, including a cushion, whereby to limit the operation of the actu-

ating means to one or the other of two predetermined movements to wholly or partially project the dog.

124. In combination with a saw mill carriage, dogs mounted thereon, means for operating each of the dogs, an element for each of the dog operating means adapted for manual actuation, an operating member, and selective means, whereby any one or more of the elements may be arranged for simultaneous operation by the member without interfering with the capability of such element or elements for independent manual operation.

125. In combination with a saw mill carriage, knees, means for operating a knee for tapering purposes, dogs on the carriage, means for operating the dogs, and means for controlling the operating means for the knee and the dogs, including mechanism to predetermine which of the dogs are to be operated and whether or not the knee is to be operated with the selected dogs.

126. In combination with a saw mill carriage, knees, means for operating a knee for tapering purposes, dogs on the carriage, means for operating the dogs, and means for controlling the operating means for the knee and dogs, said controlling means including mechanism to predetermine which of the dogs are to be operated and whether or not the knee is to be operated with the selected dogs, and means to lock out the controlling means of the dogs and the knee to prevent accidental operation of the dogs and knee.

127. In combination with a saw mill carriage, knees, set works for operating the knees, means for operating a knee independently of the set works, an under log dogger, means for mounting the under log dogger on the carriage independent of the knees, said under log dogger including dogging elements capable of being moved in advance of the knees, at the time all the knees are moved by the set works or moved at the time one of the knees is independently operated.

128. In combination with a saw mill carriage, knees, dogs on the knees, means for operating the dogs, a hook dog mounted to move with a knee, means for operating the hook dog, a selective unit control, including a group of devices capable of being selectively set to determine which of the operating means shall be operated for a subsequent operation without affecting the operation of a prior selection of dogs, and means for simultaneously operating only the devices set to operate the dog operating means.

129. In combination with a saw mill carriage, dogs on the carriage, means for controlling the operation of the dogs, including means for selecting and setting the controlling means for operation of certain of the dogs only, and lock out means to prevent accidental operation of any dogs which have not been selected to be operated.

130. In combination with a saw mill carriage, knees, dogs for dogging a log, means for operating the dogs, means adapted to be actuated and set while a particular dog is in operated position whereby upon return of such dog to normal position said means locks the dog against subsequent operation.

131. In combination with a saw mill carriage, knees, dogs for dogging a log, means for operating the dogs, means to determine which dogs are to be operated, and means to prevent accidental operation of any dog which has not been selected to be operated, said means being adapted to be actuated and set for a particular dog while selected dogs are in operated position whereby upon return of the selected dogs to normal position said means locks the particular dog against subsequent operation.

132. In combination with a saw mill carriage, knees thereon, dogs on the knees, means for operating the dogs on the knees, a dog on the carriage to engage a log at a point between the knees, means for operating the last mentioned dog, and means for simultaneously or selectively operating all the dog operating means.

133. In combination, a saw mill carriage, knees, dogs on the knees, means for operating the dogs, means for wholly or partially projecting the dogs, setting means arranged to determine the actuation of the means for operating the dogs, including means to control whole or partial projection of the dogs, and means to simultaneously operate the dogs set and arranged to be actuated, including instrumentalities to be manually actuated to individually operate any particular dog or dogs prior to or after simultaneous operation of the dogs.

134. In combination, a saw mill carriage, knees, dogs on the knees, means for operating the dogs, means for wholly or partially projecting the dogs, setting means arranged to determine the actuation of the means for operating the dogs, including means to control whole or partial projection of the dogs, and means to simultaneously operate the dogs set and arranged to be actuated, including instrumentalities to be manually actuated to individually operate any particular dog or dogs prior to or after simultaneous operation of the dogs with lost motion between the parts to permit such manual actuation after simultaneous operation of the dogs.

135. In combination with a saw mill carriage, knees, means for operating a knee or knees, dogs carried by the knees to hold a log against the latter, means for operating the dogs, means for selectively and indi-

vidually actuating the knee operating means or the dog operating means, and a single means to simultaneously operate the dog and knee operating means.

136. In combination with a saw mill carriage, knees, means for operating a knee or knees, dogs carried by the knees to hold a log against the latter, means for operating the dogs, selective means for actuating a knee or knees or dog or dogs, and manual means for operating the selected operating means, said manual means having a lost motion without operating effect to permit other selection without interfering with the knee or dogs previously operated.

137. The combination with a saw mill carriage, knees, dogs on the knees, means for operating the dogs, and a unit control for the dog operating means, including means to be selectively set, whereby to simultaneously operate the dogs on all the knees or operate only dogs on certain of the knees.

138. The combination with a saw mill carriage, knees, dogs on the knees, means for wholly or partially projecting the dogs, a hook dog, means for operating the hook dog, a unit control, and selective elements forming part of said unit control and operable to predetermine whether all or part of said dogs are to be actuated, and means to operate the unit control to thereby actuate the selected dogs.

139. In combination with a saw mill carriage, knees mounted thereon, dogs for dogging a log, means for operating the dogs, an operator's seat on the carriage, controlling means located adjacent the seat to actuate the dog operating means, a pedal to operate the controlling means, said pedal being so located adjacent the seat as to act as a means for an operator on the seat to assist in obtaining a purchase to prevent being thrown off by momentum when the carriage is reciprocated.

140. In combination with a saw mill carriage, knees mounted thereon, a plurality of dogs to engage a log and hold same against the knees, means for operating the various dogs, some of said means including cushions for partially or wholly projecting certain of the dogs, means for controlling the operating means so as to thereby determine the full or partial projection of certain of the dogs, and means arranged to operate the controlling means simultaneously or individually.

141. In combination with a saw mill carriage, knees, dogs mounted on the knees, a hook dog on a knee, means for operating the first mentioned dogs, including a controlling element, means for operating the hook dog, including a controlling element, setting means including an interponent for each controlling element, the interponents being adapted to be thrown into operative relation with the controlling elements when in one position, means for operating only those controlling elements where the interponents have been thrown into operative position, and permitting of individual operation of any particular controlling element irrespective of the position of the interponents.

142. In combination with a saw mill carriage, of adjunctive devices, including dogs arranged thereon for cooperation with the log to be handled to perform different operations thereon, means for operating said adjunctive devices, and a unit control capable of being selectively set to determine the actuation of the operating means.

143. In combination with a saw mill carriage, of adjunctive devices, including dogs arranged thereon for cooperation with the log to be handled to perform different operations thereon, means for operating said adjunctive devices, a unit control capable of being selectively set to determine the operation of the adjunctive device operating means, including means to permit individual operation of any one of the adjunctive devices without interfering with those already operated, and means to simultaneously return the operated devices to normal position.

144. In combination with a saw mill carriage, a plurality of knees, dogs carried by the knees, means for operating the dogs on the knees, common means for actuating the dog operating means, including an element having a predetermined lost motion to permit individual operation of the dogs of any particular knee without interference with the bite of the other dogs operated to engage a log.

145. In combination with a saw mill carriage, a plurality of dogs carried by the knees, means for operating the dogs, including means to partially project certain of said dogs, common means for actuating the dog operating means, including an element having a predetermined lost motion to permit individual operation of any of the dogs or making a partial or whole stroke of certain dogs without interfering with the bite of the other dogs operated to engage a log.

146. In combination with a saw mill carriage, knees, dogs cooperating with the knees to engage a log, dogs movable with the knees at the time the knees are set and operable to bite into the bottom of a log in advance of said knees, means for operating the dogs, and a common means for actuating the dog operating means, including means to permit of a predetermined lost motion to permit of operation of the dogs which engage the bottom of the log independent of the operation of the other dogs.

147. In combination with a saw mill carriage, knees, dogs cooperating with the

knees, means for operating the dogs, means for controlling the dog operating means, said controlling means including means to wholly or partially project the dogs, and means for regulating the operation of the controlling means to permit a predetermined lost motion to allow operation of the dogs on either knee independent of and without affecting the bite of other dogs.

148. Means for operating dogs on a saw mill carriage, comprising mechanism operable by an operator while the carriage is in motion to select and set predetermined dogs for a subsequent operation, and means for operating the selected dogs.

149. Means for operating dogs on a saw mill carriage, comprising mechanism operable by an operator while the carriage is in motion to select and set predetermined dogs for a subsequent operation, means capable of operation to release any or all the dogs while the carriage is in motion, and means for operating the selected dogs.

150. In combination with a saw mill carriage, dogs mounted thereon, means for operating the dogs, and a unit control for the dog operating means capable of adjustment to vary in a single operation the effect of the unit control with respect to certain dogs as compared with other dogs.

151. In combination with a saw mill carriage, a plurality of dogs of different type mounted thereon, an independent operating means for each type of dogs, a selective mechanism, whereby any desired number of dog operating means may be set for actuation, and a single member for actuating the selective mechanism, said member being mounted to permit a predetermined movement thereof without effect on the selective mechanism, whereby following operation of the selective mechanism any dog operating means may be independently operated to an extent corresponding to the independent movement of the member.

152. In combination with a saw mill carriage, a plurality of dogs on the carriage, means for operating the various dogs independently of each other, means for simultaneously operating all the dog operating means, including means to withdraw the simultaneous operating means without affecting the dogs already operated, whereby to permit of the independent actuation of any of the operated dogs, said simultaneous operating means carrying a device to return all operated dogs to normal position.

153. In combination with a saw mill carriage, dogs mounted thereon, means for operating individual dogs, an element for controlling each individual dog operating means, an operable member, and means arranged between said member and each dog controlling element to permit selective movement of that element by the member, the member having a free predetermined movement which is non-effective with respect to the selected element and substantially equal to the movement of the member necessary to operate the element.

154. Dogging means for a saw mill carriage, comprising a dog or dogs, means for operating the dog or dogs, and an actuating element for operating said latter means, including means to permit retraction of said actuating element without disturbing the operated dog or dogs, whereby the dog operating means may be manually operable to actuate the dog independent of the actuating element, the actuating element serving as a means to subsequently return the dog operating means to normal position.

155. Dogging means for a saw mill carriage, comprising a dog or dogs, means for operating the dogs, means for determining the movement of the dog operating means to wholly or partially project the dogs, and an actuating element for operating said latter means, including means to permit retraction of said actuating element without disturbing the operated dog or dogs, whereby the dog operating means may be manually operated to change from a partial or whole stroke of the dog or dogs and vice versa, independent of the actuating element.

156. The combination for a saw mill carriage having the usual knee set works, dogs on the carriage, fluid pressure means for operating one or both knees, fluid pressure means for operating the dogs, an operator's seat, a frame adjacent the seat, a group of valves supported on the frame to control the fluid pressure operating means for both knees and dogs, certain of said valve or valves being set for individual manual actuation to operate the fluid pressure means and others having means capable of being set for selective group actuation to operate the fluid pressure means, and means to simultaneously operate the group selection means.

157. In combination with a saw mill carriage, knees, dogs for dogging a log, means for operating the dogs, means to determine which selected dogs are to be operated, means including a foot pedal to actuate the last mentioned means, and lock out mechanism to prevent accidental operation of any dogs which have not been selected to be operated.

158. In combination with a saw mill carriage, knees, dogs for dogging a log, and means for operating the dogs, comprising selective means, including an element for each dog to be manually set in one position or another to permit or prevent operation of a particular dog by the operating means, each element being capable of actuation with respect to its dog, following actuation of the operating means to thereby auto-

matically change the effect of the operating means on such dog in a subsequent actuation.

159. In combination with a saw mill carriage, knees, dogs for dogging a log, and means for operating the dogs, comprising selective means, including an element adapted to be manually set in one position or another to permit or prevent actuation of a particular dog by the operating means, each element after being set to prevent operation of a particular dog being capable of manual operation at any time to a position to arrange the element to cause it to set itself to permit operation of the particular dog in a subsequent actuation.

160. In combination with a saw mill carriage, a plurality of dogs on the carriage, means for operating the various dogs independently of each other, and means for simultaneously operating all the dog operating means, including means to withdraw the simultaneous operating means without affecting the dogs already operated, whereby to permit of the independent actuation of any of the operated dogs.

161. In combination with a saw mill carriage, a knee, a dog for dogging a log, means for operating the dog to cause a partial or full projection thereof, and a cushion combining with said operating means to limit the movement of the dog to a partial projection.

162. In combination with a saw mill carriage, knees on the carriage for tapering a log, power operating means for actuating the knees, and selective manual means for operating said knee operating means, dogs on the carriage, means for operating the dogs, selective manual means for operating the dog operating means, and means whereby the operator may, at will, simultanously throw out of operation all of the dogs.

163. In combination with a saw mill carriage, dogs thereon, means for operating the dogs, manual means for selectively actuating any of the dog operating means, and a single means operator controlled to either effect operation of or reset all of the dog operating means simultaneously.

164. In combination with a saw mill carriage, dogs on the carriage, means for operating the dogs, manual means for selectively actuating any of the operating means, and means for simultaneously throwing out of operation all of the operating means.

165. In combination with a saw mill carriage, knees on the carriage for tapering a log, power operating means for actuating the knees to taper, manual means for operating said knee operating means, dogs on the carriage, selective means for operating any one or more of the dogs at will, and dog return means simultaneously operating on all operated dogs.

166. The combination with a saw mill carriage, or adjunctive devices arranged thereon for cooperation with the log to be handled to perform different operations thereon, individual powers means for operating said adjunctive devices, comprising means for permitting or preventing transmission of power from the source and individual elements, and a unit control capable of being selectively set to determine the operation of the power of the individual power means, as to not only the time but the range of operation of at least one power means, said elements and the means controlling the transmission of power from said source being so placed adjacent each other that an operator may at the same time control said means or any of said elements.

167. In combination with a saw mill carriage, dogs for cooperation with a log, independent operating means for each set of dogs, a manually selective element having particular relation to each operating means and adapted when operated to in part provide for the control of the particular operating means, and a control element common to all operating means and adapted on actuation to complete the control of any or all such operating means wherein the manually selective element or elements have been actuated.

168. In combination with a saw mill carriage, dogs for cooperation with a log, independent operating means for each set of dogs, and a two-part control for said operating means, said control including a series of manually selective elements separately cooperating with the respective operating means, and an independent master control element common to all the operating means, whereby the actuation of particular operating means is secured by operation of the particular selective elements and the subsequent operation of the master control element.

169. The combination of a saw mill carriage, adjunctive devices arranged thereon which cooperate with the log to be handled. individual power means for operating said adjunctive devices, and a control means for said power means, said control means involving a manually selective element peculiar to each power means, and a master control element common to all power means, the master control element serving to actuate all power means for which the particular manually selective element has been set, the manually selective element for each power means being independently capable of operation to control the particular operating means following the operation of the master control means.

170. The combination with a saw mill carriage, of a plurality of sets of dogs, an operating means for each set of dogs, and a two-part control for said operating means, said

control involving a manually selective element peculiar to each operating means, and a master control common to all operating means, the manually selective element when set permitting the operation of the particular operating means by the master control, whereby any or all of the operating means may be set by actuation of the independent manually selective means and the subsequent operation of the master control, each manually selective means being capable of independent operation following the actuation of the master control to selectively and independently control the operating means.

171. The combination with a saw mill carriage, of a plurality of sets of dogs, an operating means for each set of dogs, a master control common to all operating means, and an independent selective control peculiar to each operating means, the operation of the master control governing only those operating means in which the manually selective control has been previously set, each independent selective control providing a means for governing its particular operating means at will following the operation of the master control.

172. A saw mill carriage, knees, dogs operative relative to the knees to engage a log, means whereby the striking distance of the dogs beyond the face of the knee may be varied, means whereby any one or all dogs may be set for operation to engage a log to the extent permitted by their adjustment relative to the knee, and a single dog controlling means including mechanism operative in one phase to actuate the dog or dogs so set and further operative in another phase to withdraw the dog or dogs so operated.

173. A saw mill carriage, knees, a plurality of independently-operable log engaging means cooperating with the knees, means for moving said log engaging means, means capable of selection for determining which log engaging means shall be moved, and means for simutaneously moving the log engaging means.

174. A saw mill carriage, knees, log engaging means cooperating with the knees, means for moving said log engaging means to engage the log, means whereby one or more of the log engaging means may be moved individually, and means for simultaneously moving the log engaging means.

175. A saw mill carriage, knees, log engaging means cooperating with the knees, means for moving said log engaging means, means whereby one or more of the log engaging means may be moved to log engaging position, and means for simultaneously returning the moved log engaging means to normal position.

176. In a saw mill carriage, knees, dogs on the knees, means for operating the dogs, and selective means operative to render any one or more of the dogs set for operation or to hold such dogs against possibility of operation, and means common to all dogs for simultaneously operating only those dogs previously selected for operation.

177. In a saw mill carriage, knees, dogs on the knees, means for individually operating the dogs, means for simultaneously throwing out of operation all of the operated dogs, and means permitting a selection of dogs to be actuated simultaneously in a subsequent operation while the carriage is in motion and without affecting the capability of the means for simultaneously throwing out of operation all of the operated dogs.

178. In a saw mill carriage, knees, dogs on the knees, means for operating the dogs, selective means for determining which of the dogs are to be operated, and means for simultaneously throwing out of operation all of the operated dogs, the selective means being capable of operation while the carriage is in motion to determine which of the dogs are to be operated at a subsequent operation without in any way affecting the capability of the throwing out means for affecting all of the dogs previously operated, the selective means functioning as such following the operation of the throwing out means and for the next dog operation.

179. In a saw mill carriage, knees, dogs for dogging a log, means for operating the dogs to engage a log, means for simultaneously withdrawing all of the operated dogs, and selective means whereby the dogs to be next operated may be predetermined, the selective means affecting only the dog operating means and being without effect on the dog withdrawing means, the operation of the dog withdrawing means being without effect on the selective means as previously set.

180. In a saw mill carriage, knees, dogs on the knees, unitary means serving in an advancing operation to operate one or any number of such dogs and in a withdrawing operation to return all dogs previously operated, and means selectively operable under any working condition of said unitary means to place any dog or dogs within the advancing influence of said unitary means, whereby dogs which have been operated as well as dogs which have not been operated may be selected for operation at the next advancing operation of said unitary means.

181. In combination with a saw mill carriage, dogging devices on the carriage, independent motor means for the respective dogging devices, and a unit control for governing such independent motor means, said unit control including a selective element for each motor means, whereby to enable such

control to simultaneously operate any number of said motor means or independently operate any one of said motor means.

182. In combination with a saw mill carriage, dogging devices mounted thereon, independent motor means for each of said dogging devices, and a unit control for said motor means, said unit control including a selective element for each of said motor means, and a common member operative to compel actuation of the motor means in accordance with the setting of the selective element of such motor means.

183. In combination with a saw mill carriage having a plurality of dogging devices, a motor means for each of said dogging devices, a manually operable member, and means arranged between said member and each motor means adapted in a predetermined position to cause and in another position to prevent actuation of the motor means following operation of said member, whereby any one or more of the motor means may be actuated in a corresponding movement of the member.

184. In a saw mill carriage, knees, a group of dogs cooperating with the knees, means for operating any or all the dogs of the group including means for permitting any previously operated dog to be returned to normal position without disturbing the operated position of the other operated dogs, and means for simultaneously returning to normal position all remaining operated dogs.

185. In a saw mill carriage, knees, dogs on the knees, operating mechanism for each of the dogs, selective means for determining which of the dogs shall be subjected to the operating mechanism, and means for simultaneously subjecting all selected dogs to the operating mechanism, said operating mechanism including power means which serves to initially actuate and then hold all operated dogs in operated position.

In testimony whereof I affix my signature.

FREDERICK EDWARD MARTIN.