

April 1, 1952

F. E. SULLINGER
TIMBER SETTING MACHINE

2,591,475

Filed May 28, 1949

2 SHEETS—SHEET 1

Fig. 1.

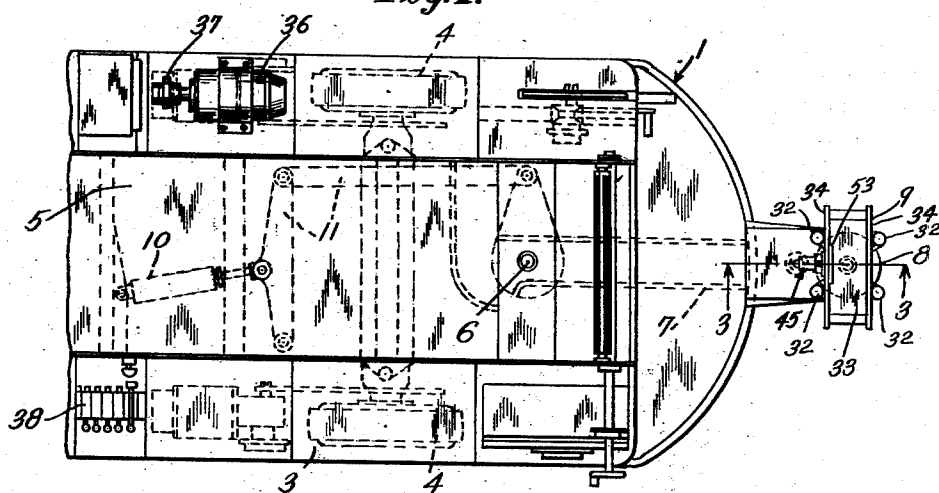


Fig. 2.

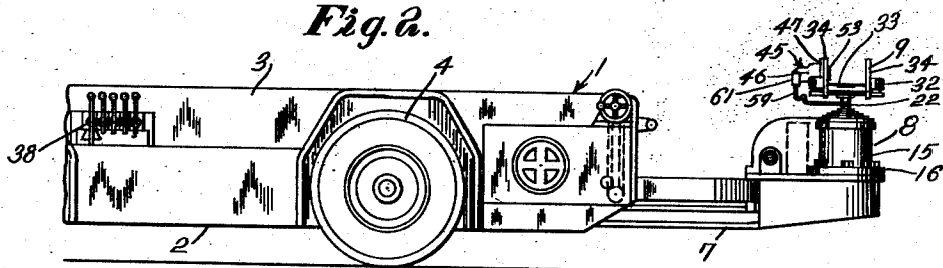
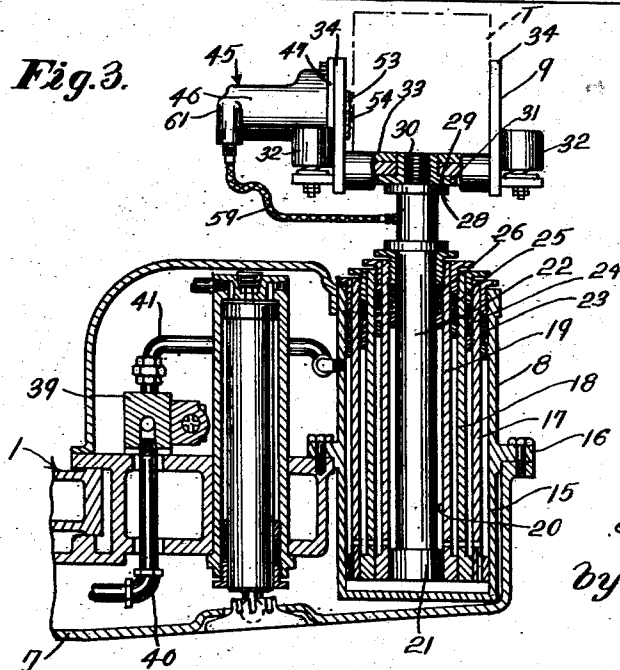


Fig. 3.



Inventor:
Francis E. Sullinger.
by Charles F. O'good,
attorney.

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2 SHEETS—SHEET 2

Fig. 4.

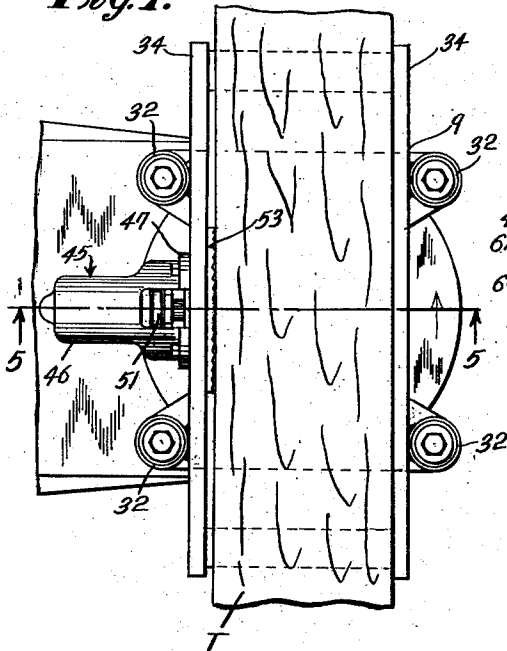


Fig. 5.

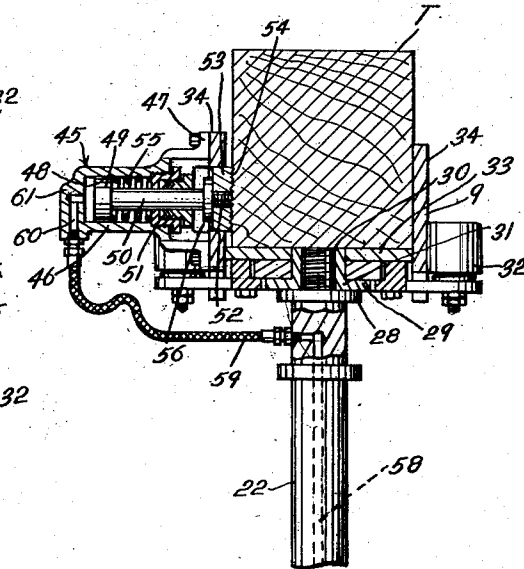


Fig. 6.

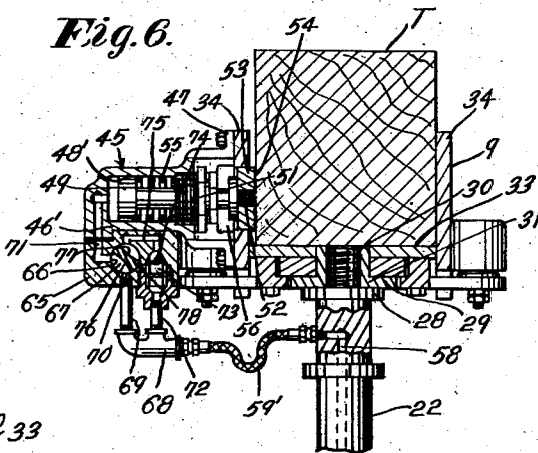
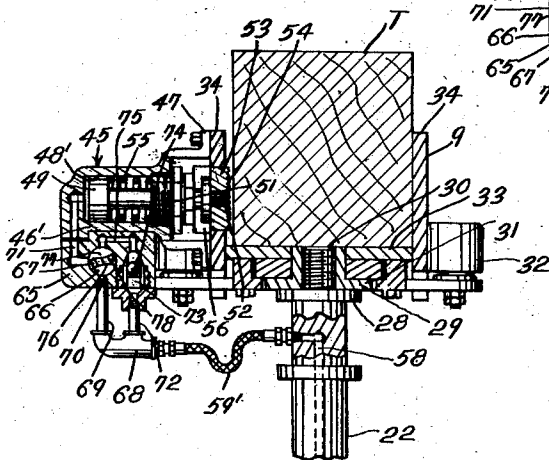


Fig. 7.



Inventor:
Francis E. Sullinger
by Charles F. Osgood,
attorney.

UNITED STATES PATENT OFFICE

2,591,475

TIMBER SETTING MACHINE

Francis E. Sullinger, Franklin, Pa., assignor to
Joy Manufacturing Company, Pittsburgh, Pa.,
a corporation of Pennsylvania

Application May 28, 1949, Serial No. 96,042

11 Claims. (Cl. 214—95)

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This invention relates to timber setting machines and more particularly to a power operated clamping device associated with the timber supporting saddle of a timber setting machine for securely holding a cross timber in place on the saddle during elevation thereof.

In timber setting machines of known types especially designed for use in underground mines for placing and holding cross timbers against the mine roof, as for example a timber setting machine such as disclosed in the Felderman et al. application Serial No. 746,832, filed May 8, 1947, and assigned to applicant's assignee, a mobile base has a horizontally swingable arm mounted thereon which supports an elevating jack for a timber supporting saddle. The horizontal arm may be swung horizontally relative to the base to vary the lateral position of the saddle and when the saddle is properly positioned with respect to the timber receiving compartment on the base a cross timber may be placed on the saddle and the jack may be operated to elevate the saddle to bring the cross timber up against the roof and hold it there during setting of the uprights or props. It has been found that in timber setting machines of known types the cross timber which is placed on the saddle sometimes slips endwise on the saddle during elevation thereof causing a condition of unbalance which results in the timber falling from the saddle, subjecting the machine and those standing near the machine to the possibility of injury. The present invention contemplates improvements over such known types of timber setting machines in that a power operated clamping device is associated with the timber supporting saddle so that when elevation of the saddle is initiated the timber is automatically firmly clamped in position on the saddle thereby eliminating the danger of a falling timber and the resultant possibility of injury to those standing near the machine and to the machine itself. The power operated clamping device of the present invention, in accordance with a preferred embodiment, is mounted on the timber supporting platform of the saddle and is operatively connected to the power supply for the timber elevating jack so that when the jack is operated to elevate the saddle the clamp is automatically operated to clamp the timber firmly in position on the saddle, and when lowering of the elevating jack is initiated the clamping device is automatically released. In a modification, a separate control device is provided for temporarily effecting release of the clamping device after elevation of the saddle has commenced so that the timber may be properly repositioned endwise on the saddle, and this control means is normally ineffective during raising of the saddle. The clamping device of the present invention is simple and rugged in design and may

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be applied to a timber setting machine of a conventional design with a minimum of change.

It is an object of the present invention to provide an improved timber setting machine having improved means for clamping a cross timber on the elevating saddle thereof during elevation of a timber up against the roof to be supported. Another object is to provide an improved power operated clamping device for a timber supporting saddle of a timber setting machine whereby, whenever elevation of the saddle is initiated, the timber is firmly clamped in position on the saddle, thereby eliminating the possibility of inadvertent falling of the timber from the saddle. A further object is to provide an improved power actuated clamping device which is connected to the power supply for an elevating jack so that when the elevating jack is operated the clamping device is automatically moved into clamping position. Yet another object is to provide an improved power actuated clamping device for a timber setting machine wherein the clamping device is connected to the power supply for the saddle elevating jack so that when a timber is placed on the saddle and is elevated, the clamping device is automatically set. A still further object is to provide an improved fluid actuated clamping device associated with a timber elevating saddle for clamping a cross timber firmly in position on the saddle during elevation of the timber. A further object is to provide an improved mounting and control means for a timber clamping device of the character above referred to. These and other objects and advantages of the invention will, however, hereinafter more fully appear.

In the accompanying drawings there are shown for purposes of illustration two forms which the invention may assume in practice.

In these drawings:

Fig. 1 is a plan view of a timber setting machine in which a preferred illustrative form of the invention is embodied.

Fig. 2 is a side elevational view of the machine shown in Fig. 1.

Fig. 3 is an enlarged vertical sectional view taken substantially on line 3—3 of Fig. 1.

Fig. 4 is an enlarged fragmentary plan view of the timber supporting saddle on which the improved timber clamping device is mounted.

Fig. 5 is a vertical sectional view taken on line 5—5 of Fig. 4, showing the clamping device in timber clamping position.

Fig. 6 is a vertical sectional view similar to Fig. 5, illustrating a modified construction.

Fig. 7 is a vertical sectional view similar to Fig. 6, showing the clamping device in released position.

The timber setting machine is generally designated 1 and for illustrative purposes is similar to that disclosed in the application Serial No.

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746,832 above referred to, and generally comprises a mobile base 2 having a body 3 mounted on wheels 4 and provided with a timber receiving compartment 5 arranged centrally lengthwise of the body whereby a load of cross timbers and props may be transported by the base. Pivotaly mounted at 6 on the base beneath the compartment 5 is an elongated horizontal supporting arm 7 which is swingable horizontally across one end of the base to locate its outer portion in any desired position between and beyond the sides of the base. Carried at the outer portion of the horizontal arm is an elevating jack 8 which supports a horizontal timber receiving support or supporting saddle 9. As described in the above mentioned Felderman et al. application, the arm 7 may be swung horizontally by a fluid operated cylinder 10 which is connected to the arm through linkage 11 to locate the saddle in the desired lateral position with respect to the timber receiving compartment 5, and a cross timber may be moved lengthwise from the compartment onto the saddle 9. The jack 8 may then be operated slightly to raise the saddle above the top of the machine body and the timber may be turned with the saddle into a position crosswise of the machine body at one end of the latter, and the jack 8 may then be operated to elevate the saddle to bring the timber up against the roof and to hold it there during positioning of the up-rights or props beneath the ends of the timber. It will be evident that the improved timber clamping device may be associated with timber setting machines of other types, as for example a timber setting machine disclosed in a copending Ball et al. application Serial No. 746,646, filed May 8, 1947, also owned by applicant's assignee.

The timber elevating jack 8 carried at the outer extremity of the horizontal arm 7 in so far as the present invention is concerned may assume various forms and herein comprises a vertical fluid cylinder 15 having a flange 16 rigidly secured to the upper surface of the horizontal arm and contained in this cylinder is a series of cylinder and piston sections 17, 18 and 19 herein arranged in telescopic relation and each having a piston portion and a tubular piston rod portion. Reciprocable in the bore 20 of the inner section 19 is a piston 21 having a piston rod 22. The outer cylinder 15 and the sections 17, 18 and 19 carry suitable packings 23, 24, 25 and 26, sealingly engaging the several piston rod peripheries to prevent leakage. The inner piston rod 22 has a circular upper portion 28 on which a horizontal frame 29 of the timber supporting saddle 9 rests and the piston rod has a threaded projection 30, above the circular portion 28, which is threadedly secured to a bottom plate 31 of a tiltable spring mounting 32 which carries a horizontal platform 33 of the timber supporting saddle. This tiltable spring mounting may be similar to that disclosed in a copending application to Charles F. Ball, Serial No. 24,534, filed May 1, 1948, now matured into Patent No. 2,574,857, granted November 13, 1951. By the provision of this spring mounting the saddle platform may have limited endwise tilt relative to the jack to compensate for the unevenness of the mine-roof against which the cross timber may be placed. The timber supporting platform may be swiveled to turn relative to the piston rod 22 so that the saddle may be turned horizontally into different angular positions. The timber supporting platform 33 has upstanding side plates 34 engageable with the sides of a cross timber on the platform to

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guide the timber and to prevent lateral displacement of the timber with respect to the saddle.

Carried by the base at one side of the timber receiving compartment 5 is a motor 36 which drives a conventional pump 37 which supplies fluid under pressure, desirably a liquid, to the valve box of a control valve mechanism 38, and this mechanism is carried by the base at the opposite side of the compartment and embodies control valves for controlling the supply of fluid under pressure to the elevating jack 8 and the arm swinging cylinder 10. Carried by the arm near the elevating jack is an auxiliary control valve device 39 (Fig. 3). Fluid under pressure may be supplied from the valve mechanism 38 through a conduit 40 to the auxiliary control device 39 and from the latter through a pipe 41 to the lower end of the outer cylinder 15 of the elevating jack and when fluid under pressure is supplied to the elevating jack the several pistons may be moved upwardly to elevate the saddle. When the auxiliary control device 39 is closed the fluid may be trapped in the jack cylinders to lock the saddle in its adjusted position. The valve mechanism 38 and the auxiliary control valve 39 may be positioned to vent the cylinders of the elevating jack to effect lowering of the saddle. Since this jack structure and the control means therefore are fully disclosed in the Felderman et al. application mentioned above further description thereof is herein unnecessary.

Now referring to the power operated clamping device shown in Figs. 1 to 5 inclusive, and generally designated 45, it will be noted that mounted on one of the vertical side plates 34 of the timber supporting saddle is a horizontal fluid cylinder 46 having a flange 47 secured, as by screws, to the plate 34. Contained in the bore 48 of this cylinder is a reciprocable piston 49 having its piston rod 50 extending outwardly through the packed head 51 of the cylinder. This piston rod at its outer end is threadedly secured at 52 to a clamp plate 53 having tooth-like serrations 54 on its outer surface. The side plate 34 is suitably cut away to receive the clamp plate, as shown. Arranged within the cylinder between the packed cylinder head 51 and the piston is a coil spring 55 which normally urges the clamp plate 53 toward its innermost retracted position within a suitable recess 56. Fluid under pressure may be supplied to the outer end of the cylinder 46 from the lower end of the bore of the outer cylinder 15 of the elevating jack through a vertical passage 58 which extends axially of the piston rod 22 and the upper end of the passage is connected by a flexible conduit 59 to a passage 60 in the outer cylinder head 61 of the cylinder 46. When a cross timber, designated T in Figs. 4 and 5, is placed on the platform 33 of the saddle 9 in the manner shown and the saddle is properly positioned and fluid under pressure may be supplied from the pump 37 under the control of the valve mechanism 38 and the auxiliary control valve 39 to the elevating jack 8. Fluid under pressure is concurrently supplied through the axial passage 58, conduit 59 and passage 60 to the cylinder 46 wherein the pressure fluid acts on the effective area of the piston 49 to move the latter inwardly thereby to cause the clamp plate 53 to grip the adjacent side of the timber, firmly clamping the timber in position on the saddle. Thus when elevation of the saddle is initiated fluid under pressure is concurrently supplied to the clamping device so that as the timber supporting sad-

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dle is elevated the timber thereon is firmly clamped in position. The cross timber is raised against the mine roof by the elevating jack and is firmly held against the roof during positioning of the uprights or props, and when the cross timber is properly set in position against the roof the control valve mechanism 38 and the auxiliary control valve 39 may be operated to vent the elevating jack to effect lowering of the saddle. When the elevating jack cylinders are vented and lowering of the saddle is initiated the cylinder 46 of the clamping device is concurrently vented through the passage 60, conduit 59, and axial passage 58 so that the clamp plate 53 is released from the timber. By mounting the clamping device on the tiltable timber receiving platform of the saddle it may tilt with the timber relative to the bottom frame 31 during setting of the timber against an uneven roof.

In the modified construction shown in Figs. 6 and 7, the timber supporting saddle 9 and the clamping device 45 are similar to those above described. In this instance, however, the cylinder 46' of the clamping device is mounted on a valve block 65 which is secured to the adjacent side plate 34 of the saddle. This valve block has a transverse bore 66 in which a rotary control valve 67 is arranged. The axial passage 58 in the piston rod 22 is connected by a flexible conduit 59' to a double elbow connection 68. A pipe 69 connects this elbow connection with a passage 70 communicating with the valve-receiving-bore 66. A passage 71 connects the valve-receiving-bore to the bore 48' of the cylinder 46'. The double elbow connection 68 is also connected by a pipe 72 to a chamber 73 which is communicable, under the control of a check valve 74, with a passage 75 communicating with the valve-receiving-bore 66. The valve 67 is of the manually operable, four-way type and has side grooves 76 and 77 separated by a partition 78. When fluid under pressure is supplied to the elevating jack 8 and the saddle is being elevated, the valve 67 is positioned as shown in Fig. 6 and fluid under pressure may flow from the axial passage 58, conduit 59', elbow connection 68, pipe 69, through the groove 76 on the valve, and passage 71 to the bore of the cylinder 46' to move the piston 49 inwardly to bring the clamp plate 53 into clamping relation with respect to the timber. When the saddle is partially elevated and it is desired to reposition the timber on the saddle the valve 67 may be rotated into position shown in Fig. 7 so that the pipe 69 is cut off from the clamping cylinder and the clamping cylinder is connected to the chamber 73 through the passage 71, groove 77 on the valve and passage 75, past the check valve 74 which is unseated at that time. Thus the pressure acting on the piston is sufficiently relieved so that the clamp plate 53 is moved out of clamping relation with respect to the timber. After the timber has been properly repositioned on the saddle the valve 67 may again be turned to the position shown in Fig. 6 to cut off the chamber 73 from the clamp cylinder and to connect the clamp cylinder to the source of fluid under pressure thereby again to clamp the timber in position on the saddle.

As a result of this invention an improved timber setting machine is provided having improved power operated clamping means whereby when the elevating jack is operated to elevate the saddle the timber is automatically clamped in position on the saddle, thereby eliminating

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the possibility of a falling timber. By associating the automatic clamping device with the power supply for the elevating jack the timber is always firmly clamped in position whenever the jack is operated to raise the saddle and the clamping device is automatically released whenever the saddle is lowered. By the provision of the supplemental control valve the clamping device may be released at will irrespective of the elevated position of the saddle thereby to enable repositioning of the timber on the saddle after elevation thereof has been initiated. By mounting the clamping device on the tiltable platform of the saddle the cross timber may be firmly held in position during setting of the timber against an uneven mine roof. The clamping device is simple and rugged in design and may be readily applied to a conventional timber setting machine with a minimum of change. These and other advantages of the invention will be clearly apparent to those skilled in the art.

While there are in this application specifically described two forms which the invention may assume in practice, it will be understood that these forms of the same are shown for purposes of illustration and that the invention may be further modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a timber setting machine, the combination comprising a timber supporting saddle, power operated elevating means for said saddle, a power operated clamping device for clamping a timber firmly in position on said saddle during elevation of the latter, means for effecting operation of said elevating means to elevate said saddle, and means automatically operative upon initiation of operation of said elevating means for effecting operation of said clamping device whereby the latter is actuated to effect clamping substantially concurrently with the operation of said elevating means.

2. In a timber setting machine, the combination comprising a timber supporting saddle, fluid operated elevating means for said saddle comprising an elevating motor, a fluid operated clamping device for firmly securing a timber on said saddle during elevation of the latter, means for supplying fluid under pressure to said motor of said elevating means for effecting operation of the latter, and means communicating with the fluid supply within said elevating motor for supplying fluid under pressure to said clamping device whereby the latter is actuated to effect clamping of the timber on said saddle only when the fluid supply to said elevating motor is initiated.

3. In a timber setting machine, the combination comprising a timber supporting saddle, fluid operated elevating means for said saddle comprising an elevating motor, a fluid operated clamping device for firmly securing a timber on said saddle during elevation of the latter, means for supplying fluid under pressure to said motor of said elevating means for effecting operation of the latter, and means communicating with the fluid supply within said elevating motor for supplying fluid under pressure from said elevating means to said clamping device for operating the latter whereby said clamping device is actuated to effect clamping of the timber on said saddle substantially upon operation of said elevating means to raise said saddle.

4. In a timber setting machine, the combination comprising a timber supporting saddle, power operated elevating means for said saddle, a power operated clamping device for clamping a timber firmly in position on said saddle during elevation of the latter, means for effecting operation of said elevating device to elevate said saddle, means automatically effective upon initiation of operation of said elevating means for effecting operation of said clamping device whereby the latter is actuated to effect clamping substantially concurrently with the initiation of operation of said elevating means, and means operable at will for effecting release of said clamping device irrespective of the elevated position of said saddle.

5. In a timber setting machine, the combination comprising a timber supporting saddle, fluid operated elevating means for said saddle including an elevating cylinder, a fluid operated clamping device for firmly securing a timber on said saddle during elevation of the latter, means for supplying fluid under pressure to said cylinder of said elevating means for effecting operation of the latter, and means communicating with the fluid supply within said elevating cylinder for supplying fluid under pressure to said clamping device whereby the latter is actuated to effect clamping of the timber on said saddle substantially upon initiation of fluid supply to said elevating cylinder, and means including control valve means for effecting release of said clamping device at the will of the operator irrespective of the elevated position of said saddle.

6. In a timber setting machine, the combination comprising a timber supporting saddle, an elevating jack by which said saddle is carried for elevating the latter, a power operated clamping device carried by said saddle for clamping a timber in position on said saddle during elevation of the latter, power operated means for effecting operation of said jack to elevate said saddle, and means automatically effective upon initiation of operation of said jack for substantially concurrently supplying a power medium to said clamping device whereby the latter is actuated to clamp a timber firmly in position on said saddle only when said jack is operated to elevate said saddle.

7. In a timber setting machine, the combination comprising a timber supporting saddle, a fluid operated jack for elevating said saddle including an elevating cylinder, a fluid operated clamping device for firmly securing a timber in position on said saddle during elevation thereof, means including a control valve mechanism for supplying fluid under pressure to said cylinder of said jack to effect elevation of said saddle, and fluid conducting means communicating with the interior of said elevating cylinder for supplying fluid under pressure from said jack cylinder to said clamping device to actuate the latter to effect clamping whereby a timber is clamped in position on said saddle only when said jack is operated to elevate said saddle.

8. In a timber setting machine, the combination comprising a timber supporting saddle, a fluid operated jack for elevating said saddle, a fluid operated clamping device for firmly securing a timber in position on said saddle during elevation thereof, means including a control valve mechanism for supplying fluid under pressure to said jack to effect elevation of said saddle, fluid conducting means communicating with said elevating jack for supplying fluid under pressure

from said jack to said clamping device whereby a timber is clamped in position on said saddle whenever the jack is operated to elevate said saddle, and means including a separate control valve carried by said saddle for interrupting fluid supply to said clamping device and for relieving the pressure within said clamping device to effect release thereof irrespective of the elevated position of said saddle.

9. In a timber setting machine, the combination comprising a timber supporting saddle, a bottom support for said saddle, said saddle including a timber receiving platform yieldingly mounted on said bottom support to tilt relative thereto, a power operated clamping device carried by said tiltable platform for clamping a timber in position on said saddle, and means for supplying a power medium to said clamping device including power conducting means on said bottom support and operatively connected to said clamping device to effect power supply to the latter.

10. In a timber setting machine, the combination comprising a timber supporting saddle, a bottom support for said saddle, said saddle including a timber receiving platform yieldingly mounted on said bottom support to tilt relative thereto, a power operated clamping device carried by said tiltable platform for clamping a timber in position on said saddle, means for supplying a power medium to said clamping device including power conducting means on said bottom support and operatively connected to said clamping device to effect power supply to the latter, and means including a control device on said tiltable platform for interrupting operation of said clamping device and for effecting release of the latter at the will of the operator.

11. In a timber setting machine, the combination comprising a timber supporting saddle, a bottom support for said saddle, said saddle including a timber receiving platform pivotally mounted on said support, a fluid operated clamping device on said platform for clamping a timber firmly in position thereon and including a fluid cylinder containing a clamp operating piston, means for supplying fluid under pressure to said clamping device including a fluid passage in said bottom support and a flexible fluid conduit for connecting said passage with said clamp cylinder, and means including a control valve on said platform for interrupting fluid supply to said cylinder and for relieving the pressure within said cylinder to effect clamp release.

FRANCIS E. SULLINGER.

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