



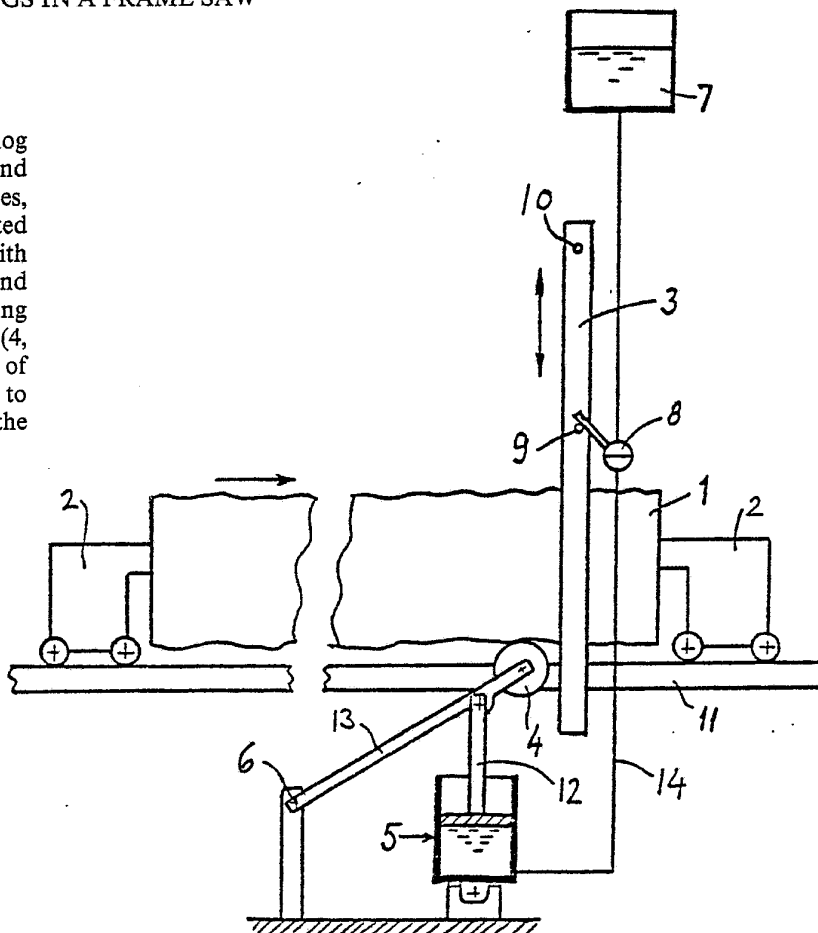
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification<sup>3</sup> : <b>B27B 3/02, 25/00, 29/00</b></p>	<p><b>A1</b></p>	<p>(11) International Publication Number: <b>WO 83/ 03996</b>  (43) International Publication Date: 24 November 1983 (24.11.83)</p>
<p>(21) International Application Number: PCT/NO82/00027 (22) International Filing Date: 12 May 1982 (12.05.82)  (71)(72) Applicant and Inventor: PEDERSEN, Nils [NO/NO]; Grefsen Allé 4A, N-Oslo 4 (NO).  (74) Agent: DIETRICHSON, Rolf; Onsagers Patentkontor, Onsager &amp; Dietrichson, Camilla Colletts vei 4, N-Oslo 2 (NO).  (81) Designated States: AT (European patent), AU, BE (European patent), CH (European patent), DE (European patent), DK, FI, FR (European patent), GB (European patent), LU (European patent), NL (European patent), SE (European patent), US.</p> <p><b>Published</b> <i>With international search report.</i></p>		

## (54) Title: SUPPORT DEVICE FOR LOGS IN A FRAME SAW

## (57) Abstract

A support device for supporting a log (1) advancing through a frame saw (3) and taking up the forces from the saw blades, comprises supporting elements (4) adapted to be resiliently pressed into contact with the log (1) with a predetermined force, and to be locked during the entire working stroke of the saw blades, said elements (4, 17) being releasable during at least a part of the return stroke to allow the elements to adapt themselves to the varying shape of the advancing log.



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Support device for logs in a frame saw

The present invention relates to a support device for supporting a log advancing through a frame saw, said device comprising one or more supporting elements positioned adjacent to the saw frame.

Frame saws represent the oldest known sawing technique for mechanically ripping round logs into various types of sawn timber. The frame saws in principle consist of a frame which is guided for reciprocating movement in a plane, preferably in a vertical direction. The frame may be guided by means such as rollers, slides etc., and the movement may be provided by means of various mechanical systems of which the most usual comprises a crank shaft with a connecting rod. One or more parallel saw blades are strapped in the frame, and the log to be ripped is advanced towards the frame and the saw blades. As the log is advanced through the frame, the reciprocating saw blades will cut the log and rip it into a plurality of planks, boards, blocks etc. according to the size and shape of the log and the positioning of the saw blade in the frame.

However, for a good result to be obtained it is essential that the log is advanced towards the saw blades in a stable and linear fashion. This can be obtained by fixing one or both ends of the log in a trolley accompanying the log during the advancement thereof and preventing the log from rolling laterally or twisting. Additionally, the log is usually fixed and supported by a plurality of rollers under, above and possibly also at the sides of the log immediately in front or upstream of the saw frame. These rollers will support the log adjacent the frame and are primarily intended to take up the reaction forces from the sawing operation. However, the rollers may also be rotationally driven and thereby provide the necessary force for advancing the log. Alternatively, the advancement or feeding of the log can be obtained by a winch or the like pulling the log through the saw. In order to prevent twisting of the log, strong riving blades

are often provided behind the saw blades.

This way of supporting and fixing the logs is satisfactory provided the logs are approximately straight and without large irregularities due to twigs and the like or provided the logs are trimmed on one side, preferably the lower side so as to provide a uniform plane surface as a basis. However, this trimming should take place in another apparatus and requires a separate operation which will hamper the work. If the log has large irregularities due to twigs, or if it is somewhat bent in the longitudinal direction, the log will change its position when the irregularities pass over the rollers with a consequent risk of a corresponding deformation of the sawn timber. If the log is bent, there is a large risk that the sawn timber will be correspondingly bent. Logs having such defects are therefore not suited for ripping in existing frame saws.

An object of the present invention is to stabilize a nonuniform log having lopped-off twigs in a manner allowing for irregularities in the log, while providing a fixed, rigid support capable of taking up the forces from the saw blades.

This object is met according to the present invention by providing supporting elements adapted to be resiliently pressed into contact with the log with a predetermined force, and to be locked for fixedly supporting the log and taking up the forces from the saw blades during the entire working stroke thereof, said elements being releasable during at least a part of the return stroke to allow the elements to adapt themselves to the varying shape of the advancing log.

Thereby it becomes possible to handle even very irregular logs with a good result, which is of great importance with respect to utilizing as much as possible of the available raw material in the production of sawn timber. The required fixation of the log during the working stroke of the saw blades is obtained in a simple manner and with great precision. At the same time the advantages of a resilient support accommodating the varying shape of the advancing log are obtained.

Preferably, the force with which the elements are pressed into contact with the log in released condition, is adjustable in accordance with the weight and shape of the log.

Each supporting element may be associated with an hydraulic system pressing the element into contact with the log. Alternatively, each supporting element may be associated with a mechanical device providing the force pressing the element into contact with the log. In both cases the supporting element may be blocked during the working stroke by mechanical means such as wedges, stepped stops or brakes. When an hydraulic system is used, the locking of the supporting elements may be achieved by means of a valve which when closed blocks the flow of hydraulic medium, thereby locking the supporting elements. When the valve is open the supporting element is released. Further supporting elements may be arranged over the length of the log path. Such supporting elements are preferably lockable like the previously defined supporting elements. However, such locking may not be necessary in connection with supporting elements positioned at a substantial distance from the saw frame.

The supporting elements may consist of rollers or wheels, and in this case one or more of the rollers or wheels may be rotatably driven to provide the feeding movement of the log.

It will be understood that during the working stroke of the saw frame, that is when the saw frame and thereby the saw blades are moved so as to cut their way through the log, the supporting elements are fixed and will not yield, so that they may take up the reaction forces from the sawing operation. When the saw frame and thereby the saw blades perform the return stroke, the supporting elements are released and may then freely adapt themselves to the shape of the log by being forced into contact therewith by the hydraulic or mechanical means referred to. When a new working stroke starts the supporting elements are locked in position to effectively support the log during the cutting operation.

The system will operate particularly effectively if the known technique comprising a mounting of the saw blades with a suitable inclination relative to the path of reciprocation is used. In this case the log may be halted during the working stroke and be advanced only during the return stroke. This will provide the greatest precision of the sawing operation.

Surprisingly, the described device while easily adapting itself even to large irregularities and bends of the log, will at the same time provide a stable fixation of the log during the sawing operation without any tendency of yielding or twisting under the effect of the relatively large reaction forces from the cutting operation of the saw blades. Thereby, even very nonuniform logs can be easily advanced and fixedly supported in the frame saw without resulting defects in the sawn timber. By concentrating the feeding to the return stroke, the largest possible precision will be obtained, since the log will be supported in a stable and fixed manner during the sawing operation. At the same time power is saved since the advancement of the log will take place against unstressed saw blades during the return stroke, provided the saw blades are inclined as referred to above, so that they are not in contact with the bottom of the kerf during the return stroke.

Further features and advantages of the support device according to the invention will appear from the following description, reference being had to the drawings.

Fig. 1 shows a support device using an hydraulic system.

Fig. 2 shows a device using a mechanical system including a counter weight and a wedge for biasing and locking the supporting elements.

Both figures are highly diagrammatical leaving out all details not required for understanding the invention.

In Fig. 1 the round log 1 to be cut is advanced to the right as indicated by an arrow. A saw frame 3 is mounted for reciprocal movement up and down. The guides and the operating system for the frame are not illustrated since they may be conventional. A plurality of parallel saw blades are

strapped in the frame in a conventional manner. The log 1 is advanced against and through the saw frame, while being supported at the ends on two trolleys 2 running on rails 11. The trolleys 2 are designed to allow the log 1 to be "fetched" and "delivered" through the saw frame past the saw blades without the trolley itself having to pass through the frame. The advancement or feed may be obtained by means of a winch (not shown) pulling the rear trolley forwards. Immediately upstream of the saw frame 3 there is positioned a supporting element in the form of a roller 4 which is mounted at the end of a one-armed lever 13 mounted on a pivot 6. The roller 4 is pressed into contact with the log 1 by a piston 12 of an hydraulic piston-cylinder unit 5. For sake of simplicity only one roller 4 is illustrated in Fig. 1, but to support the log effectively several rollers with separate hydraulic systems should preferably be arranged side by side. Hydraulic liquid under pressure acts on one side of the piston 12 in order to raise the roller 4 and press it into good contact with the log 1. The pressure of the hydraulic liquid may be obtained by means of an hydraulic liquid tank 7 positioned at a high level and communicating with the cylinder through a conduit 14. In the conduit 14 there is provided a valve 8 which may be actuated by cams or dogs 9 and 10 on the saw frame 3. The cam 10 will open the valve 8 when the saw frame 3 arrives at its lower dead point, and the valve will be closed by the cam 9 when the saw frame arrives at its higher dead point. Thus, during the downward working stroke of the frame, when the saw blades are cutting into the log, the valve 8 will remain closed. Because of the low compressibility of the hydraulic liquid the piston 12 and the roller 4 cannot move up or down, but remains in a fixed position even if the downwardly directed reaction forces from the saw blades are large. When the frame 3 arrives at its lower dead point indicating the end of the cutting stroke, the valve 8 is opened by the cam 10 and remains open during the return movement of the frame. Thereby the piston 12 and the roller 4 will be movable in both directions, since hydraulic

liquid can be supplied and displaced through the open valve 8. Consequently, the log is held in a fixed position during the working stroke, and the supporting roller 4 will adjust itself to the irregularities of the log during each return stroke.

As previously indicated the pressure of the hydraulic liquid in the cylinder 5 may be provided in any suitable manner. For instance, pressure can be imparted to the hydraulic liquid in a closed tank by means of a gas cushion, a spring or weight loaded piston or the like. The valve 8 may alternatively be controlled by the operating mechanism for the saw frame through cams or by transmission of electromagnetic impulses. It is essential for a proper functioning of the device that the valve 8 is kept closed during the working stroke, so that the roller 4 is fixed and can take up the reaction forces from the saw blades in the frame 3, which forces will act on the log 1 in the direction of movement of the saw frame during the working stroke. On the other hand, the valve 8 must be open during the return stroke for a sufficient period to release the roller and allow it to adapt itself to the shape of the log during advancement thereof. It is especially advantageous for the feeding means for advancing the log through the saw frame to be synchronized with the stroke of the saw frame, so as to be operative only when the supporting elements are released, the feeding being interrupted during the working stroke. Experience has shown that it is an advantage to be able to vary the static pressure in the hydraulic system according to the weight and dimensions of the logs. Larger logs require a higher pressure in order to provide the correct contact pressure between the log and the roller 4, whereas long and thin logs will require a lower pressure to prevent the force from the roller 4 from deforming the log. If the system is provided with a closed tank having a pressure control, for instance in the form of a gas cushion, the pressure can be varied simply by increasing or reducing the pressure of the gas cushion, for instance by means of a com-

pressor and a relief valve, respectively.

In Fig. 2 a mechanical system is shown strictly diagrammatically. The reference numerals 1, 2, 3 and 11 designate the same elements as in the embodiment in Fig. 1. The saw frame 3 is driven by a connecting rod 16 connected to a crankshaft having a flywheel 15. The supporting element may be a roller as in Fig. 1, but the element 17 shown in Fig. 2 is a plate with a curved upper side. The supporting element 17 is provided with a stem 18 guided for vertical reciprocal movement in a suitable guide 19. Through a two-armed lever 21 a weight 20 acts on the stem 18 to press the supporting element 17 into contact with the log 1. A "wedge" or stepped stop 26 is mounted at the end of a two-armed lever 24, and is biased to a position below the lower end 27 of the stem 18 by means of a spring 25. At the other end of the two-armed lever 24 there is mounted a cam follower 23 which engages a cam surface 22 on the circumference of the flywheel 15. When the cam surface 22 engages the cam follower 23, the stepped stop or "wedge" 26 will be retracted from the position below the lower end of the stem 18, as illustrated in Fig. 2. When the crankshaft rotates as indicated by the arrow 28, the "wedge" 26 will be retracted from the stem 18 when the saw frame 3 is moving upwards, i.e. during the return stroke. The supporting element 17 will then be freely movable in the guide 19, following the shape of the log 1 under the influence of the weight 20. When the saw frame 3 is moving downwards during its working stroke, there is no cam surface to influence the lever 24 through the cam follower 23, and the "wedge" 26 will then be pulled by the spring 25 to a position below the stem 18. The log 1 will then be rigidly supported by the supporting element 17, except for a possible small downward movement which cannot exceed the pitch of the stepped stop 26.

Also in this embodiment it is convenient, but not essential that the log 1 is advanced only during the return strokes of the saw frame 3. The log may be advanced by means of a feeding device, which is not illustrated since it may be

of a conventional type.

The two embodiments illustrated or corresponding devices functioning in the same manner will permit ripping even very irregular, bent logs in a frame saw with a good result, which has heretofore been impossible. Thereby new possibilities are opened for using previously nonacceptable logs in the production of sawn timber.

**SUBSTITUTE SHEET**



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## P a t e n t   C l a i m s :

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1. Support device for supporting a log (1) advancing through a frame saw, said device comprising one or more supporting elements (4, 17) positioned adjacent to the saw frame (3), characterized in that these supporting elements (4, 17) are adapted to be resiliently pressed into contact with the log (1) with a predetermined force and to be locked for fixedly supporting the log and taking up the forces from the saw blades during the entire working stroke thereof, said elements (4, 17) being releasable during at least a part of the return stroke to allow the elements to adapt themselves to the varying shape of the advancing log.
  2. Support device as claimed in claim 1, characterized in that the force with which the elements (4, 17) are pressed into contact with the log (1) in released condition, is adjustable in accordance with the weight and shape of the log.
  3. Support device as claimed in claim 1 or 2, characterized in that each supporting element (4) is associated with an hydraulic system (5, 7, 8, 14) pressing the element (4) into contact with the log (1).
  4. Support device as claimed in claim 1 or 2, characterized in that each supporting element (17) is associated with a mechanical device (18-21) providing the force pressing the element into contact with the log (1).

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5. Support device as claimed in claim 3, characterized in that each hydraulic system has a valve (8) which when closed blocks the flow of hydraulic medium thereby locking the supporting element (4), and when open releases the supporting element.

6. Support device as claimed in claim 3 or 4, characterized in that the supporting elements (17) are blocked during the working stroke by mechanical means (26) such as wedges, stepped stops or brakes.

7. Support device as claimed in any of the preceding claims, characterized in that it comprises further supporting element arranged over the length of the log path.

8. Support device as claimed in any of the preceding claims, characterized in that the supporting elements (4) are rollers or wheels.

9. Support device as claimed in claim 8, characterized in that at least one of these rollers or wheels are rotatably driven in such a manner as not to impede its movement transversely to the log, said driven wheels or rollers transmitting to the log at least a part of the force necessary for advancing the log.

10. Support device as claimed in any of the preceding claims, characterized in that a feeding means for advancing the log through the saw frame is synchronized with the stroke of the saw frame (3) so as to be operative only when the supporting elements are released.

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FIG. 1

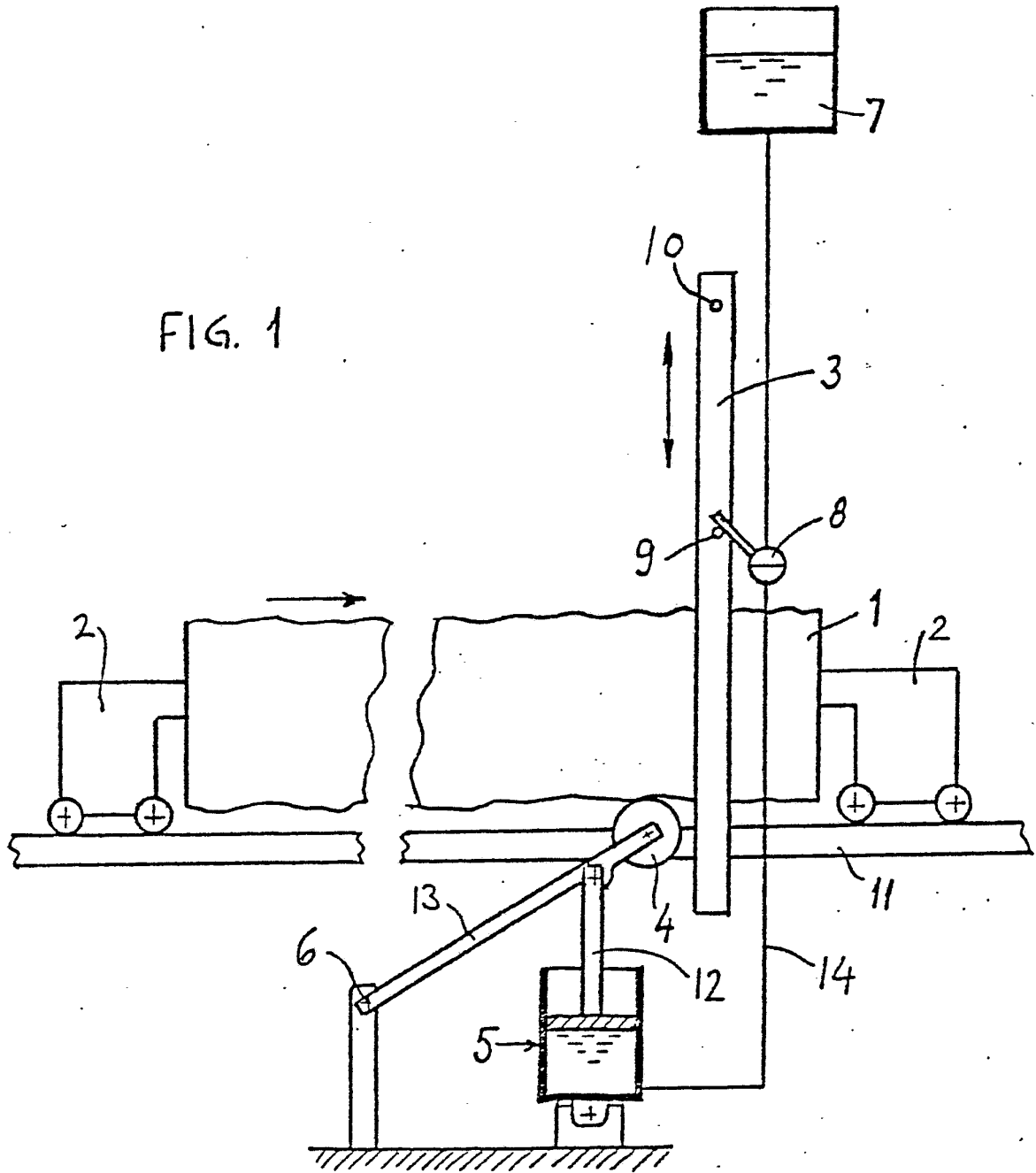
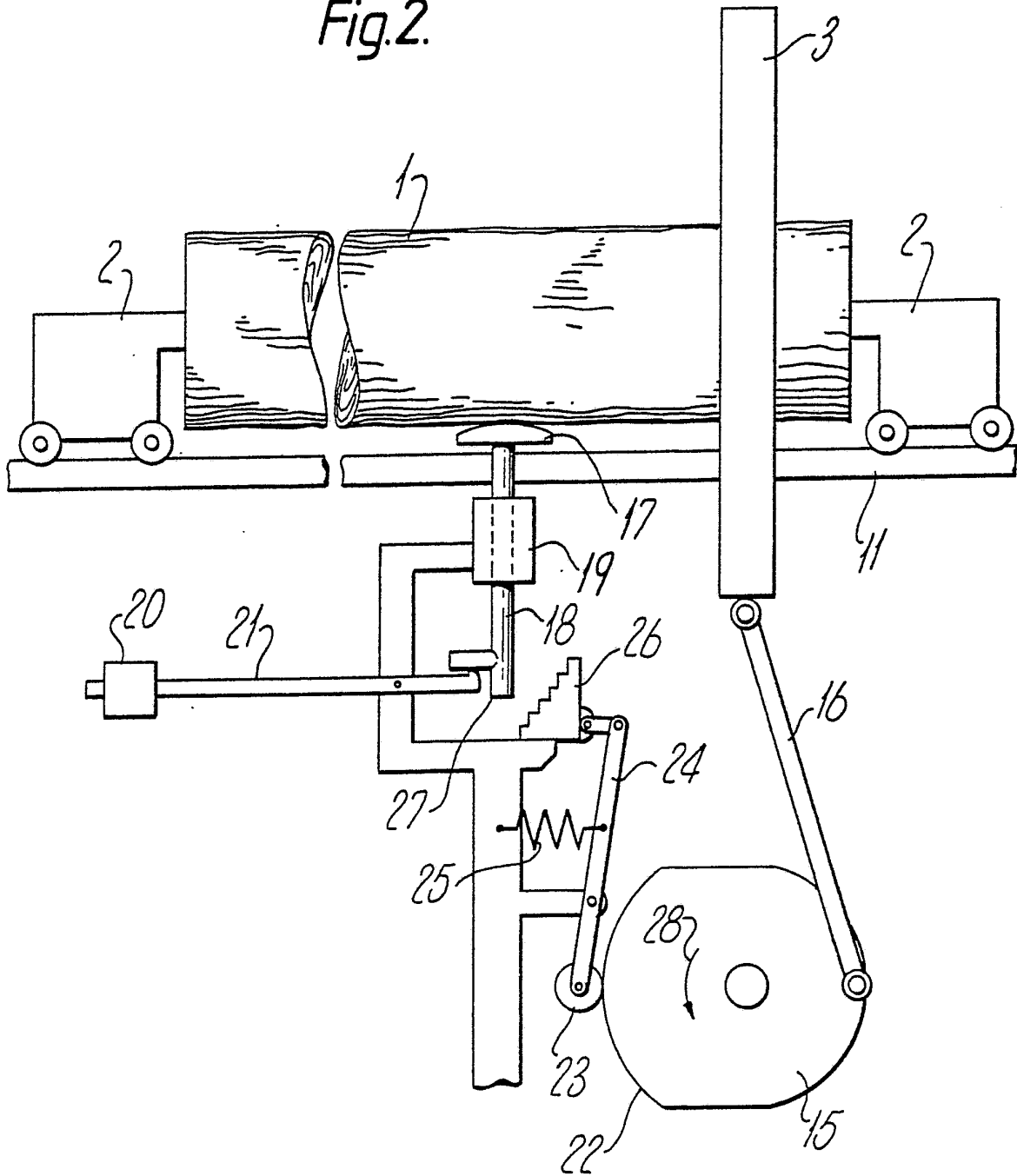
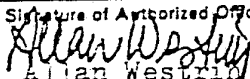


Fig.2.



# INTERNATIONAL SEARCH REPORT

International Application No PCT/N082/00027

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>3</sup>				
According to International Patent Classification (IPC) or to both National Classification and IPC <sup>3</sup>				
B 27 B 3/02, 25/00, 29/00				
<b>II. FIELD SEARCHED</b>				
Minimum Documentation Searched <sup>4</sup>				
Classification System	Classification Symbols			
IPC 3	B 27 B 3/00-3/40, 25/00-25/10, 29/00-29/10			
National Cl	38a:1, 8, 9/01, 9/02			
US Cl	83:403.1, 418, 421, 435.1, 734, 776-780; 144:242, 246-249, 312, 326			
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>5</sup>				
SE, NO, DK, FI classes as above				
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <sup>14</sup>				
Category <sup>6</sup>	Citation of Document, <sup>15</sup> with indication, where appropriate, of the relevant passages <sup>17</sup>	Relevant to Claim No. <sup>18</sup>		
X	SE, C, 10 397 (C F W KUYLENSTRJERNA) 2 December 1899	1, 4, 7-9		
X	DE, C, 346 512 (WILHELM HOFMANN IN BRESLAU) 2 January 1922	1, 4, 7-9		
X	DE, C, 523 722 (ADOLF MÜLLER IN SCHEESSEL) 20 June 1931	1, 4, 6-9		
A	DE, C, 258 119 (MASCHINENFABRIK KAPPEL IN CHEMNITZ-KAPPEL) 28 March 1913			
A	DE, C, 362 791 (WILHELM HOFMANN IN BRESLAU) 1 November 1922			
A	DE, B, 1 033 399 (SÖDERHAMNS VERKSTÄDER AKTIEBOLAG) 3 July 1958			
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> <sup>9</sup> Special categories of cited documents: <sup>16</sup>                      "A" document defining the general state of the art which is not considered to be of particular relevance                      "E" earlier document but published on or after the international filing date                      "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)                      "O" document referring to an oral disclosure, use, exhibition or other means                      "P" document published prior to the international filing date but later than the priority date claimed                 </td> <td style="width: 50%; border: none; vertical-align: top;">                     "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention                      "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step                      "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.                      "Z" document member of the same patent family                 </td> </tr> </table>			<sup>9</sup> Special categories of cited documents: <sup>16</sup> "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "Z" document member of the same patent family
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<b>IV. CERTIFICATION</b>				
Date of the Actual Completion of the International Search <sup>1</sup>	Date of Mailing of this International Search Report <sup>2</sup>			
1982-11-25	1982-12-02			
International Searching Authority <sup>1</sup>	Signature of Authorized Officer <sup>10</sup>			
Swedish Patent Office	 Allan Westrin			