United States Patent

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[15] **3,677,041**

[45] **July 18, 1972**

[54] APPARATUS FOR WORKING FLAT, FLEXIBLE MATERIAL

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[22] Filed: **Aug. 19, 1970**

[21] Appl. No.: **65,280**

[30] **Foreign Application Priority Data**

Aug. 8, 1969 Germany ..... P 19 42 416.9
July 23, 1970 Germany ..... P 20 36 636.3

[52] **U.S. Cl.** **69/33,** 100/257, 267/130
[51] **Int. Cl.** **C14b 1/40**
[58] **Field of Search** 69/33, 48, 1; 100/257; 267/130

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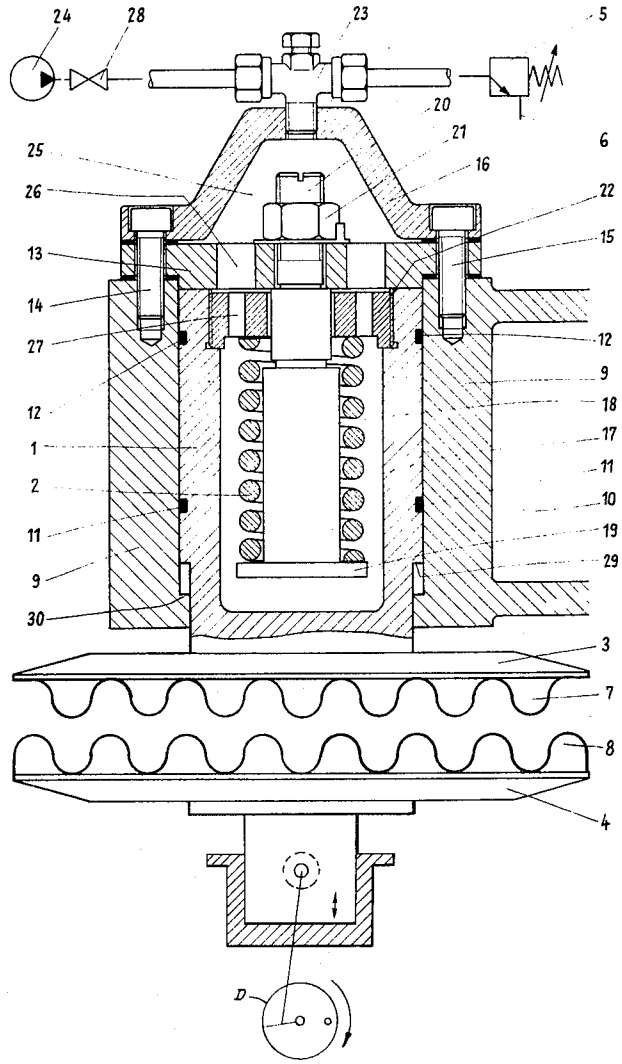
[57] **ABSTRACT**

This invention relates to apparatus for working flat, flexible material by means of working members opposing each other. One of the working members is driven back and forth toward and away from the other working member. A piston to which the other working member is connected, is subject to a pressure from a pump and subject to a reset force whereby the piston may be adjusted to predetermined starting elevational positions to provide a desired working pressure. A pressure relief valve assures that the piston yields when the working pressure exceeds said desired pressure and returns to said starting position when the working pressure is reduced again. In a further embodiment an auxiliary pressure space of selectively variable volume is provided for adjusting said piston to different elevational starting positions even during the operation of the apparatus.

14 Claims, 2 Drawing Figures



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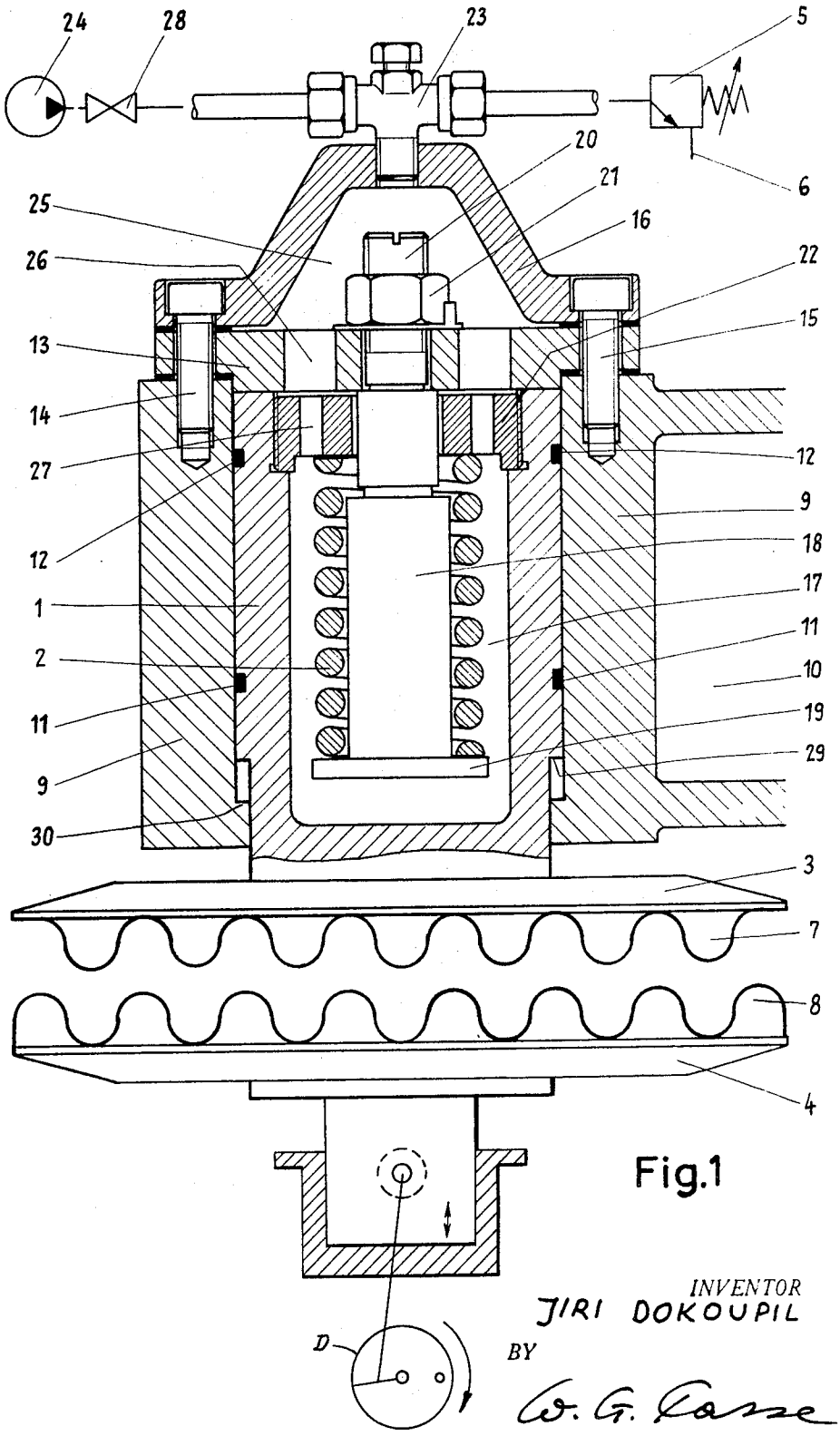

Fig.1

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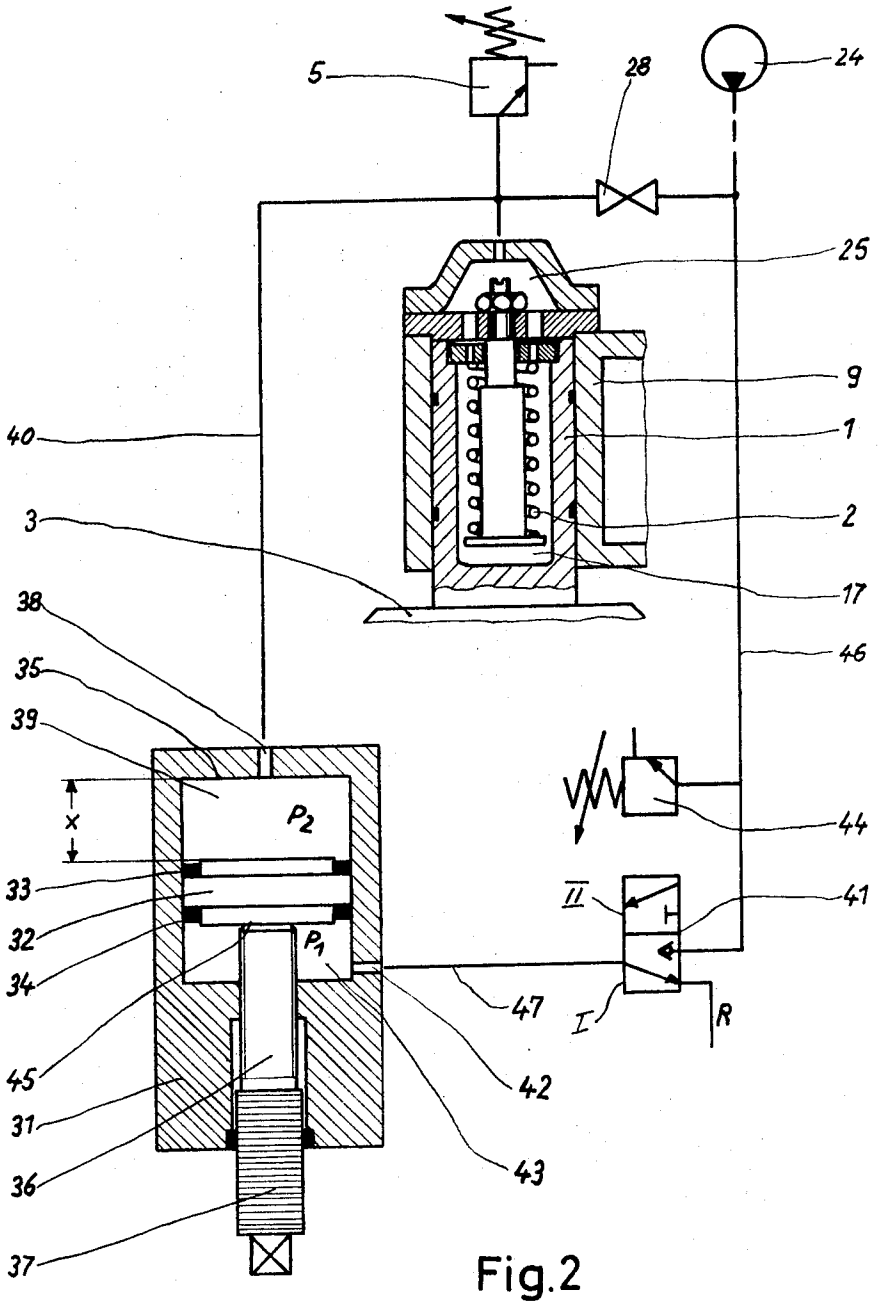

Fig.2

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APPARATUS FOR WORKING FLAT, FLEXIBLE MATERIAL

The present invention relates to apparatus for working flat, flexible material, for example leather, especially for softening leather. Such working or softening is accomplished by two working members arranged opposite each other to form a gap through which the material is fed. The spacing between the working members is periodically increased and decreased by moving the working members relative to each other whereby pressure is exerted sequentially on the material being worked to achieve the desired result such as softening.

If leather is to be worked the working members are provided with protrusions or corrugations facing each other in such a manner that the protrusions on one working member reach into the valleys between the protrusions on the other working member when the working members approach each other periodically. Thus the leather is stretched and softened.

OBJECTS

It is an object of the invention to provide in accordance with the material to be worked, a respective working pressure, more specifically, a working pressure which is adapted to the kind of material, especially leather which is being treated.

Yet another object is to adjust one of said working members of the apparatus to such a starting elevational position that due to such starting position and the relative movement between the working members, a certain minimum spacing between the working members could not be exceeded, that is, the working members must not get closer together than said minimum spacing so that the working pressure will not reach values larger than those determined by said minimum spacing.

A further object of the invention, especially in connection with leather working, is to assure that the extent to which the protrusions on one working member enter into the valleys of the other working member is adjustable to obtain a corresponding stretching without overstretching. Stated differently, it is desired to control the stretching, for example, to make it the smaller the less the protrusions enter into the valleys and vice versa.

Another object of the invention is to make said adjustment of the interaction of the working members especially simple for the operator.

A still further object is to assure that one of the working members will maintain its selectively adjusted position until a predetermined working pressure is reached and will yield as soon as such pressure is reached or exceeded, and that said member will return to said position as soon as the working pressure decreases again below the predetermined value whereby a maximum working pressure will not be exceeded.

Yet another object of the invention is to provide an apparatus of the mentioned type wherein a quantity of working fluid, for example a hydraulic working fluid, which has been displaced by the yielding of one working member will not be replenished so that the one working member will automatically assume, after a rough adjustment by an operator, an operational elevational position such that a maximum working pressure cannot be exceeded.

A still further object of the invention is to assure that the adjustment of the working position of said one working member can be adapted to changes in the working conditions as they may occur, for example due to the fact that the leather may vary in thickness and/or stiffness. For this purpose the working fluid displaced by a yielding of one working member is to be replenished automatically as soon as the working pressure is again decreased below a predetermined maximum value.

Another object is to provide means which permit the continuous positional adjustment of one working member in response to varying or changing working conditions even while the apparatus is in operation.

SUMMARY OF THE INVENTION

According to the invention there is provided an apparatus for working flat, flexible material, especially for softening

leather wherein one working member is adjustable by pressure means, for example hydraulic pressure means, to elevational starting position against a reset force, whereby the hydraulic pressure means limit the working pressure occurring during the operation of the apparatus by permitting a yielding of one of the working members when the operational pressure exceeds a maximum working pressure, and which pressure means prevent said yielding as soon as the working pressure has decreased to said maximum pressure or below said maximum pressure.

The moving of one of the working members to its starting elevational position is best, but not exclusively accomplished by hydraulic pressure means known as such, whereby such movement is against said reset force furnished, for example, by a compression spring. It is an advantage of the invention that it is not necessary to ascertain whether or not a certain elevational position has yet been reached by one of the working members, because the working pressure will be automatically limited by the yielding of one of the working members when the working pressure reaches a predetermined maximum value whereby the desired working pressure cannot exceed said predetermined value. Stated differently, the maximum working pressure does not result from the starting elevational position of one of the working members but rather it is determined by the pressure value to which said hydraulic pressure means have been adjusted. As a result the operation of the apparatus has been substantially simplified.

Another important advantage of the invention is seen in that the material being treated cannot be overworked. This is rather essential, especially in connection with leather which may rip when it is overstretched. The invention avoids such drawbacks.

In one embodiment the hydraulic pressure means are constructed and arranged so that the hydraulic liquid which has been displaced during the yielding of said one working member, will not be replaced during the continuing operation. As a result the one working member adjusts itself automatically to an elevational position which will then assure that during the continuing periodic and relative movement of the working members the maximum working pressure will not be exceeded. This means that the initial adjustment by the operator of one of the working members to a starting elevational position is in effect a rough adjustment, whereupon the one working member in the apparatus according to the invention assumes automatically the desired operational elevational position.

In another embodiment of the invention it is possible to continuously adapt the elevational position of one of the working members to the varying operational conditions, for example the thickness of the leather may vary and so may its stiffness. In this embodiment the pressure means, for example, in the form of hydraulic pressure means, are adapted for replenishing the quantity of hydraulic working liquid which has been displaced by the yielding of said one working member. Such replenishing takes place during the continuing operation during each increasing of the spacing between the two working members and thus during the periodically decreasing of the working pressure. The one working member thus returns in this embodiment repeatedly into its initially adjusted starting elevational position from which it yields sufficiently so that the desired maximum working pressure will not be exceeded. Hence, a continuous adjustment or adaptation of the apparatus to the varying operational conditions resulting, for example, from varying properties of the material being treated, has been provided.

In still another embodiment of the invention it is possible to adjust the starting elevational position of the one working member even during the operation of the apparatus. This has been accomplished by connecting a pressure fluid filled space to said hydraulic pressure means, whereby the volume of said space is selectively variable, for example, by means of a control valve.

In order that the invention may be clearly understood, it will now be described by way of example, with reference to the accompanying drawings, wherein:

FIG. 1 illustrates an apparatus for the softening of sheet material, such as leather, and

FIG. 2 illustrates a partial view of the apparatus according to FIG. 1 and including additional means for varying the starting elevational position of the working elements.

The apparatus shown in FIG. 1 is especially useful for softening of leather. FIG. 1 illustrates only those elements which are essential for the understanding of the invention. Any other structural members, especially the drive for causing a periodical relative motion of the working members may comprise well known means.

The present apparatus comprises an upper working member or element 3 which is not actively driven, and a lower working member or element 4 supported on drive means D. Such drive means impart to the working member 4 a back and forth movement as indicated by the double arrow shown below the working member 4. Both working members 3 and 4 are provided with protrusions or corrugations 7 and 8 which are displaced relative to each other and laterally in such a manner that the protrusions 7 fit into the valleys between the protrusions 8 and vice versa when the two working members 3 and 4 are advanced toward each other. This arrangement of the protrusions which permits their gripping into each other so to speak assures that the sheet material, especially leather, which is fed through between the working members will be simultaneously bent as well as stretched. Such bending and stretching of the leather is well known in the art.

The working member 3 is suspended from a piston 1 which is glideably supported in the cylinder 9. The cylinder 9 is supported by a carrier or beam 10 of the machine frame, the details of which are not shown. Sealing rings 11 and 12 assure a proper sealing between the piston 1 and the wall of the cylinder 9. The top of the cylinder 9 is closed by a ring flange or plate 13 and the piston 1 is shown in its upper rest position in which the upper end of the piston 1 bears against said flange or plate 13 which is attached to the upper end of the cylinder 9 by means of bolts 14 and 15. A sealing gasket is suitably positioned between the top of the cylinder 9 and the flange 13. The flange 13 and thus the cylinder 9 is closed by means of a bell shaped cover 16 which is fastened to the cylinder 9 also by said bolts 14 and 15. A further sealing gasket is located between the flange 13 and the cover 16 whereby the top of the apparatus is properly sealed.

The piston 1 is maintained in its shown rest position by means of a compression spring 2 which presses the piston 1 upwardly against the flange 13. The compression spring 2 is located in a bore 17 of the piston 1. A shaft 18 having a flange 19 at its lower end is surrounded by the compression spring 2 and reaches into said bore 17. The compression spring 2 bears against the flange 19. The upper end of the shaft 18 extends into a threaded shank 20 which extends through an aperture in the flange or plate 13. A nut 21 holds the shaft 18 in its desired position.

The compression spring 2 which bears with its lower end against the flange 19 at the lower end of the shaft 18 presses with its upper end against an insert member 22 which is secured in the bore 17 of the piston 1 at the upper end thereof, for example, by means of a threaded connection. The insert member 22 closes the bore 17 except for the apertures 27 the purposes of which will be described below. The shaft 18 is held in a fixed position by the nut 21 which rests on the flange 13. Furthermore, the compression spring 2 presses the insert member 22 and thus the piston 1 upwardly because the flange 19 is rigidly secured to the lower end of the shaft 18. Therefore, the piston 1 bears in its rest position against the flange 13. In this connection it should be noted that the aperture through the insert member 22 through which the shaft 18 extends is large enough to freely permit a back and forth motion of the piston 1 relative to the shaft 18.

The cover member 16 has a hole in the top of its bell shape to which is connected a Tee-pipe fitting 23. The left hand port of the Tee-pipe fitting 23 is connected to a pressure supply source such as pump 24. The right hand port of the Tee-pipe fitting 23 is connected to a maximum pressure valve 5.

Hydraulic fluid, for example, liquid such as oil under pressure supplied by the pump 24 is fed into the inner space 25 of the cover 16. The fluid passes through the apertures 26 in the flange 13 and through apertures 27 in the insert member 22 whereby it enters into the bore 17 of the piston 1. Thus, a pressure is built up in the bore 17 of the piston 1. Such pressure is effective against the force of the compression spring 2. When the pressure exceeds the force of the compression spring 2 the piston 1 is caused to move downwardly whereby the working member 3 is moved in the direction toward the working member 4 arranged opposite the working member 3. The duration or length of this motion is determined by the amount of fluid or liquid supplied or by its pressure because a given pressure will be reached in the bore 17 in response to a given supply pressure with reference to the increasing force or tension of the compression spring 2 which is compressed as the piston 1 moves downwardly. The given supply pressure of the hydraulic liquid supplied by the pump or the amount of the supplied liquid are easily adjustable by well known means. In this manner it is therefore possible to adjust the working member 3 in a predetermined position which will be referred to as its starting position.

The apparatus illustrated in FIG. 1 operates as follows. When during the periodical back and forth movement of the driven working member 4 a pressure is exerted upon the working element 3 for example, due to the fact that the leather is exceptionally stiff, so that the exerted pressure exceeds the pressure resulting from the adjusted position of the working member 3, the maximum pressure valve 5 will respond whereby pressure medium may escape through the return conduit into a sump or collecting container not shown. As a result, the piston 1 may yield to an extent corresponding to the volume of the escaping pressure medium. With the yielding of the piston 1 the working member 3 attached to piston 1 also yields backwardly until the pressure which exceeded the pressure to which the maximum pressure valve 5 has responded, is reduced to a value just below such response value. In this instant, the maximum pressure valve 5 will close again whereby the piston 1 and thus the working member 3 are stopped so that it will now take up an operational elevational position which is now adapted to the requirements of the material being treaded, for example, to the fact that the leather is exceptionally stiff so that it could not be handled with the working member 3 in its starting elevational position. In order to prevent during the further operation the replenishing of the pressure medium which has been displaced due to the yielding movement of the working member 3, a manually operated closure valve 28 is provided in the conduit to the pump 24. The closure valve 28 prevents subsequent to reaching the operational elevational position the supply of any pressure medium from the pump into the bore 17. Accordingly, the working member 3 remains in its operational elevational position during the further treatment of the sheet material so that overstraining or undue wear and tear of the material being treated is prevented. This is an important advantage of the invention, especially, since it also prevents any damages to the apparatus itself.

Another advantage of the present invention is seen in that the operational elevational position of the working member 3 is continuously adjustable in response to the variable instantaneous operational conditions which, for example, may vary due to differing thicknesses of the leather being treated. For this purpose, the closure valve 28 is either not used or it is maintained in its open position so that the amount of pressure medium which has been displaced by the yielding movement of the piston 1, will be replenished in response to the periodically and repeatedly decreasing working pressure. This periodical decrease of the working pressure results due to the

back and forth movement of the driven working member 4. As a result, the piston 1 will repeatedly return to its originally adjusted starting elevational position in response to the decrease of the working pressure. Such starting elevational position, for example, may be defined by a certain pressure delivered by the pump 24. As described, it is possible to adjust the starting elevational position of the piston 1 anywhere intermediate its upper and lower end positions. However, it is even simpler to move the piston 1 to a fixed starting elevational position by supplying sufficient pressure or volume of a pressure medium so that the piston 1 will bear against a stop ring 30 with its shoulder 29. As soon as the pump 24 has moved the piston 1 with its shoulder 29 against the stop ring 30 the operation of the apparatus may be started whereby the above described process steps will take place in response to the occurrance of pressures exceeding a maximum pressure as determined by the maximum pressure response valve 5. However, in response to the reduction of the working pressure due to the return stroke of the working member 4 the pump will repeatedly replenish the amount of pressure medium which has been displaced through maximum pressure valve 5. Thus, the piston 1 will always be returned to bear with its shoulder against the stop ring 30.

It should be noted that the maximum pressure valve 5 is adjustable so that any desired response pressure and thus the maximum working pressure may be established. Such adjustable maximum pressure valves are well known in the art.

The apparatus illustrated in FIG. 1 may be modified so that the starting elevational position of the piston 1 may be varied even during the operation of the apparatus. This may be accomplished by rather simple means in that a volume variable space is connected to the pressure means, for example the hydraulic pressure means whereby the variable volume space is filled with a pressure medium.

The space which is connected with the hydraulic pressure means takes up a predetermined amount or quantity of pressure fluid in response to its adjusted position or rather in response to its instantaneous adjusted position. The pressure medium yields in response to the increasing or decreasing volume of said space whereby one of the working members 3 or 4 are moved correspondingly. Thus, when the volume is being enlarged one of the working elements is displaced away from the other working element whereas upon decreasing the volume of the space one working element is moved toward the other working element. Therefore, a decrease of the working intensity will result from the movement of the working members away from each other. On the other hand, an increase of the working intensity will result from the movement of the working members toward each other.

An embodiment for performing the just described function is illustrated in FIG. 2 which also partially illustrates the apparatus of FIG. 1. Only those structural features are shown which are essential for the understanding of the apparatus according to FIG. 2. Especially, the working member 4 has been omitted from FIG. 2. Only the working member 3 which is adjustable in its starting elevational position, is shown in FIG. 2. The functional details of the adjustable working member 3 are described in connection with FIG. 1 and reference to FIG. 1 should be had in this connection. The same structural elements are designated by the same reference numerals in both Figures. Moreover, the working member 3 is supported in the cylinder 9 and adjustable to its starting elevational position as described in detail with reference to FIG. 1.

As in FIG. 1, the adjustment of the working member 3 to its starting elevational position is accomplished by supplying pressure medium from the pump 24 into the space 25 and thus also into the bore 17. The pump further supplies pressure medium to the maximum pressure responsive valve 5. As a result of the pressure built-up in the space 25 as well as in the bore 17 the upper working member 3 is displaced downwardly into a position defining the starting elevational position. Thus, the pump 24 and the maximum pressure valve 5 represent the above mentioned hydraulic pressure means.

A space 39 in a housing or auxiliary cylinder 31 is connected with an inlet port 38 through a conduit 40 to said hydraulic pressure means. The space 39 contains an auxiliary piston 32 which is freely movable within the auxiliary cylinder or housing 31 and thus in the space 39. The upper limit of motion for the piston 32 is determined by the housing wall 35 whereas the lower limit of motion of the piston 32 is determined by the stop member 45. Within these limits the piston motion is variable to thus vary the volume of the space 39. The stop member 45 is formed by an end face at the upper end of a threaded spindle 36 the function of which will be described below. The selected height of the variable space 39 is represented by the reference numeral X. The lower end of the spindle 36 protruding from the cylinder 31 is provided with a scale or dial 37 thus giving an indication of the presently adjusted position of the stop member 45 which is directly indicated by the extent to which the lower end of the spindle 36 protrudes from the cylinder 31. The adjustment of the instantaneous position of the stop member 45 is accomplished by simply turning the threaded spindle 36.

Let it be assumed that the upper working member 3 is in its starting elevational position whereby the piston 32 has taken up the position in which it is shown in FIG. 2. In this position the piston 32 is pressed against the stop member 45 by the pressure prevailing in the hollow space or volume 39 which pressure corresponds to that in the space 25 due to the direct connection through conduit 40.

The just described arrangement operates as follows. If in the course of a working or treatment of a sheet material the working intensity is to be increased, it is necessary for this purpose to adjust the starting elevational position of the upper working member 3 in the direction toward the other working member 4 which is not shown in FIG. 2. Accordingly, the working member 3 will be displaced downwardly and the piston 32 will have to be displaced upwardly that is in the direction toward the cylinder closing or housing wall 35. In order to displace the piston 32 in the desired just described manner a pressure P1 is supplied to the pressure volume 43 in the cylinder 31. This pressure P1 is larger than the pressure P2 in the pressure space 39. Both pressures are supplied by the pump 24. The pressure space 43 has an inlet port 42 through which it is connected by means of a conduit 47 and through a distributing valve 41 continuing through the conduit 47 and through a distributing 46 to the pump 24. When the distributing valve 41 is switched from its shown position I in which the conduit 47 is connected to a return conduit R, to the position II, fluid under pressure will be supplied from the pump to the volume 43 whereby the piston 32 is displaced upwardly and whereby fluid under pressure is displaced out of the volume 39 through the connecting conduit 40 into the inner space 25 and thus into the bore 17 of the piston 1. As a result of the entering of fluid under pressure into the space 25, the piston 1 to which the working member 3 is connected must yield downwardly whereby the just mentioned desired increased working intensity is achieved. A maximum pressure responsive valve 44 limits the pressure supplied by the pump 24 to such a value that the pump will not be able to damage itself by developing too large a pressure.

If it is now desired to reverse the just mentioned downward displacement of the working member 3, that is, if the originally adjusted starting elevational position is to be resumed, the distribution valve 41 is to be returned to its shown position I whereby the pressure fluid is removed from the space 43 through the conduit 47 and through the return conduit R. The removal of the pressure medium from the space 43, is accomplished as a result of the pressure which is effective in the volume or space 39 which pressure is the same as that in the space 25 and in the bore 17. As described above with reference to FIG. 1, the compression spring 2 drives the piston 1 back up whereby the pressure medium flows out of the bore 17 and out of the space 25 through the connecting conduit 40 into the space 39.

In this manner the piston **32** is enabled to slide back until it comes to rest against the stop member **45**. When the piston **32** has reached its just mentioned end position, the displacement of pressure medium from space **25** and bore **17** is such that the piston **1** and hence upper working member **3** may return into its originally adjusted starting elevational position. It will be seen from the foregoing, that the piston **32** which moves back and forth in the auxiliary cylinder **31**, and which is sealed by means of gaskets **33, 34**, thus adjusts selectively an additional working intensity which adjustment may take place during the operation of the apparatus because the distribution valve may be operated at any time.

If now during the treating or working of the sheet material an increase or a decrease of the working pressure is desired, the starting elevational position of the working member **3** is adjusted by positioning the piston **32** approximately intermediate the stop member **45** and the wall **35** of the auxiliary cylinder **31**. Thus it is possible to increase the working pressure by displacing the piston **32** from its center position toward the wall **35**, or to decrease the working pressure by displacing the piston **32** toward the stop member **45**. For this purpose the distribution valve **41** is adjusted either to its position II or to its position I.

If an especially large range of pressure variations is desired, the threaded spindle **36** will have to be turned so that its end extends correspondingly far out of the housing of the auxiliary cylinder **31** whereby a correspondingly large length x will result.

Although specific examples have been described, it is to be understood that the invention is intended to cover all modifications and equivalents within the scope of the appended claims.

What I claim is:

1. In an apparatus for working flat, flexible material by means of a first working member and a second working member, each working member having a respective working surface arranged to face the working surface of the other working member to provide a spacing between said working surface for feeding said flat, flexible material through said spacing, drive means operatively connected to said first working member for moving the first working member toward and away from the second working member whereby said spacing between the first and second working members is periodically decreased and increased and a working pressure is exerted on said material, wherein pressure means are operatively associated with one of said working members for adjusting said one working member to a starting position, said pressure means limiting the working pressure to a predetermined value by permitting a yielding of said one working member when the working pressure exceeds said predetermined value and until the working pressure is decreased again below said predetermined value, the improvement comprising a piston and cylinder means for confining a single pressure chamber in which said piston is movable, means for securing said cylinder means in a stationary position, said second working member being connected to said piston, means for connecting said pressure means to said single pressure chamber whereby said piston and with it said second working member are adjustable to said starting position and to perform said yielding, and reset means as well as means for locating said reset means in the cylinder means for exerting a reset force on said piston.

2. The apparatus according to claim **1**, wherein said pressure means are hydraulic pressure means including a pump and a pressure responsive member, piping means for connecting said pump and said pressure responsive member to said single pressure chamber, and a fluid control valve in said connecting piping means for preventing during further operation of the apparatus the replenishing of a quantity of hydraulic working fluid which has been displaced through said pressure responsive member by the yielding of said piston and second working member.

3. The apparatus according to claim **2**, wherein said pressure responsive member is adjustable for responding to different pressures.

4. The apparatus according to claim **1**, wherein said pressure means are hydraulic pressure means including a pressure responsive member and a pump for continuously replenishing a quantity of hydraulic working fluid in response to the displacement of such fluid by the yielding of said piston and second working member, whereby said replenishing takes place during the increasing of said spacing between the first and second working members and thus during the periodically decreasing working pressure.

5. The apparatus according to claim **4**, wherein said piston and cylinder means include cooperating stop means for defining outer limits of movement for said piston.

6. The apparatus according to claim **1**, wherein said reset force exerting means is a compression spring.

7. The apparatus according to claim **6**, wherein said piston has a longitudinal bore with an open end and a closed end, said compression spring locating means comprising a shaft having a threaded end and a flanged end, said shaft extending longitudinally through the compression spring so that one end of the spring rests on said flanged end of the shaft, an apertured closure member for closing said open end of the piston, said shaft extending through a central aperture of said closure member whereby the other end of said spring bears against said closure member inside said piston bore and whereby the threaded end of the shaft protrudes from said central aperture, and means for securing the threaded shaft end to said cylinder.

8. The apparatus according to claim **1**, further comprising means for defining a selectively variable volume, means for connecting said variable volume to said pressure means, whereby the variable volume may be filled with a pressure medium.

9. The apparatus according to claim **8**, wherein said pressure means include a single pump connected to said variable volume and to said cylinder.

10. The apparatus according to claim **8**, wherein said means for defining a selectively variable volume comprise an auxiliary piston cylinder means, conduit means for connecting said auxiliary cylinder means to said pressure means, and means for selectively adjusting the position of said auxiliary piston means in said auxiliary cylinder means to define said variable volume between a surface of said auxiliary piston and said auxiliary cylinder means.

11. The apparatus according to claim **10**, wherein said means for selectively adjusting the position of the auxiliary piston means comprises a threaded bore in said auxiliary cylinder means, a threaded shaft extending through said bore into the auxiliary cylinder meanS so that an end face of said shaft inside the cylinder means provides a stop for the auxiliary piston means, said threaded shaft having an end portion without threads extending out of said auxiliary cylinder means, and dial means on said end portion for indicating the extent to which the end face reaches into said auxiliary cylinder means.

12. The apparatus according to claim **10**, wherein said auxiliary cylinder means is divided into two spaces above and below said auxiliary piston means, said means for connecting including a first conduit for connecting one of said spaces to said pressure means, said apparatus including further pressure means, a second conduit for connecting the other space to said further pressure means, a return conduit, and control valve means in said second conduit for selectively connecting the other space to said further pressure means and to said return conduit.

13. The apparatus according to claim **12**, wherein said pressure means and said further pressure means are comprised in a single pump.

14. The apparatus according to claim **12**, further comprising selectively adjustable pressure relief means connected to said second conduit.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,677,041 Dated July 18, 1972

Inventor(s) Jiri Dokoupil

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet [30] , the filing date "Aug. 8, 1969" of German Patent Application P 19 42 416.9, should read -- Aug. 20, 1969 --.

Signed and sealed this 19th day of December 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
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