Dec. 12, 1939. E. M. WINEGAR 2,182,833

VULCANIZING PRESS

Filed July 23, 1936 2 Sheets-Sheet 1

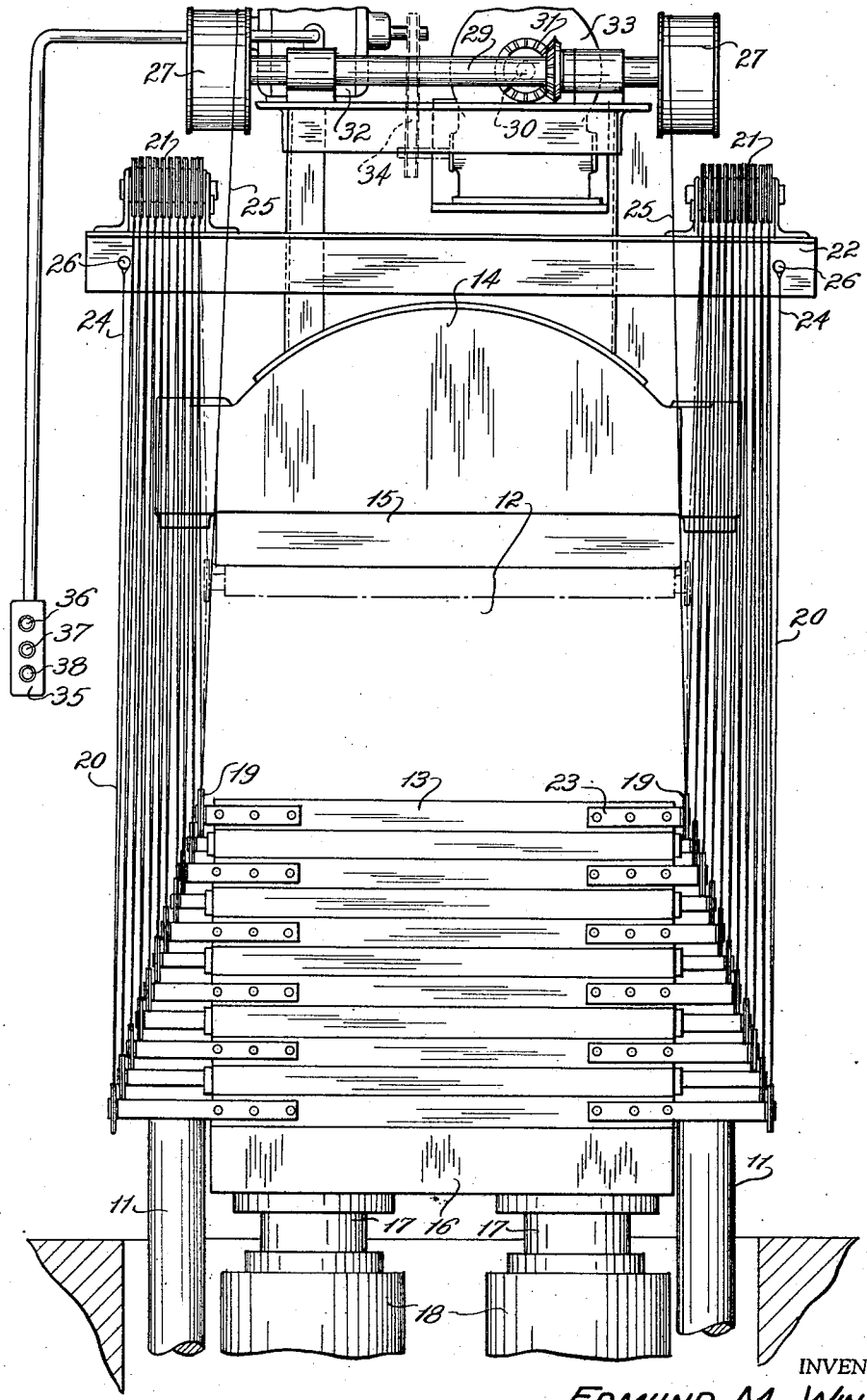


FIG. 1

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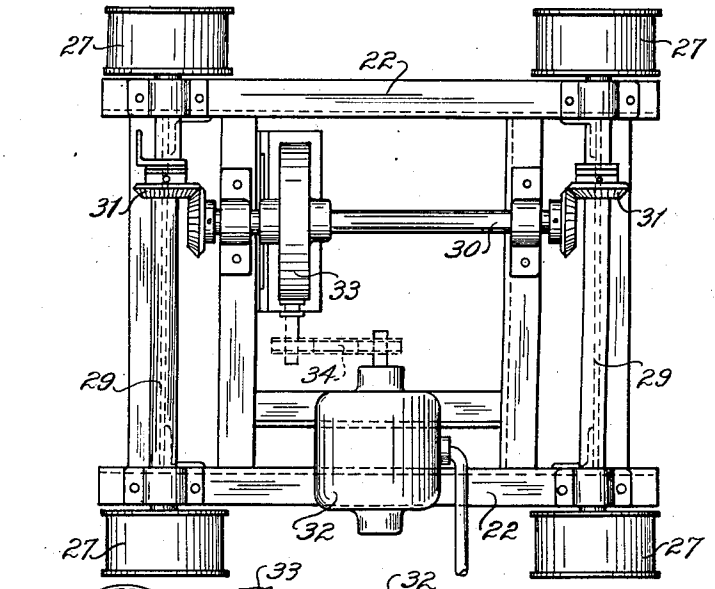


FIG. 2

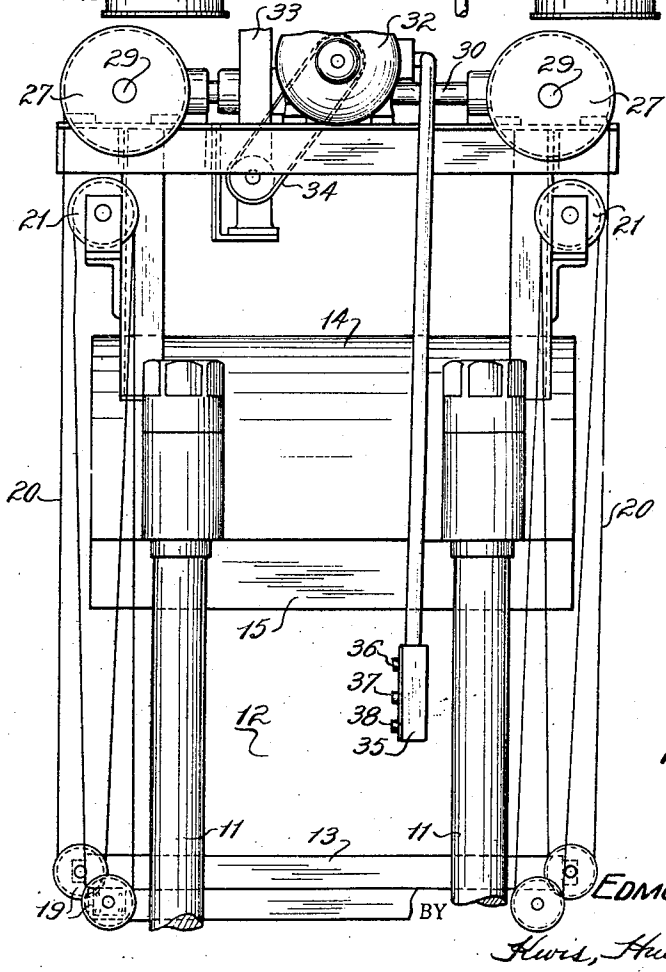


FIG. 3

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VULCANIZING PRESS

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Application July 23, 1936, Serial No. 92,056

2 Claims. (Cl. 18—17)

This invention relates to vulcanizing presses and, more particularly to an improved press of this type having a tier of mold members or platens.

An object of my invention is to provide an improved press for vulcanizing or the like, having a tier of cooperating movable mold members or platens, and wherein novel means is employed for causing the desired actuation of the platens.

Another object of my invention is to provide an improved press of the type mentioned, wherein a sheave and cable arrangement employed for actuating the platens in succession includes sheaves and a cable at each corner of the press and winding drums for the cables adapted to be operated in synchronism.

A further object of my invention is to provide an improved press of the type mentioned having a sheave and cable arrangement for actuating the platens and obtaining a relatively wide opening between adjacent platens for the insertion or removal of the material to be operated upon and in which a separate power means is adapted to apply pressure to the platens after they have been moved to closed position by the sheave and cable arrangement.

Other objects and advantages of my invention will be apparent from the following description, when taken in conjunction with the accompanying sheets of drawings, wherein

Fig. 1 is a front elevation, with parts broken away, showing a vulcanizing press or the like embodying my invention.

Fig. 2 is a top plan view thereof, and

Fig. 3 is a side elevation of the upper portion of the press.

In the accompanying drawings to which more detailed reference will presently be made, I have shown my invention embodied in a multiple platen press of the type used for vulcanizing or curing rubber products, such as mats for vehicle floors and other uses, and although detailed reference is made herein to a press of this type, it will be understood, of course, that the invention is not necessarily limited to a vulcanizing press but may be embodied in various other kinds of presses or apparatus having a tier of movable platens.

As mentioned above, the press illustrated in this instance is a vulcanizing press adapted to be used in curing and molding rubber articles, such as floor mats, and as is usual in presses of this type, is provided with an upright frame 11 having an opening 12 containing a tier of movable platens or mold members 13. The frame of the press may be provided adjacent the top thereof with a transverse head or stationary platen 14, having a bolster plate 15 or like member against which the upper platen 13 is held, as indicated in broken lines, when the tier of platens is lifted to a position corresponding with the closed position of the press. A lower bolster plate 16 supports the tier of platens when in their lower position and is, in turn, carried by a plurality of vertically reciprocable plungers 17. These plungers extend downwardly into cylinders 18 and are adapted to be actuated hydraulically, or otherwise to apply the desired vulcanizing and molding pressure to the platens and to the material disposed therebetween. By release of the pressure in the cylinders the plungers are adapted to be lowered after which the entire tier of platens can be lowered as a unit to the position of the press illustrated in Fig. 1.

In carrying out the molding or vulcanizing operation to be performed by the press, it is usual to provide the adjacent faces of the platens 13 with suitable cooperating mold members or dies which act on bodies of material disposed therebetween, such bodies usually being in the form of sheets of uncured rubber stock. The faces of the bolster plates 15 and 16 may also be provided with similar mold members or dies to cooperate with die members carried on the adjacent faces of the upper and lower platens of the tier. It will thus be seen that during each vulcanizing or curing operation an article or a set of articles, as the case may be, will be produced by each pair of cooperating mold members.

According to my invention I provide the platens 13 with sheaves 19, with which cables 20 cooperate for lifting the platens of the tier in succession. As a part of this novel platen actuating means I provide stationary sets of sheaves 21 which are mounted upon a framework 22 suitably supported upon the frame of the press, preferably adjacent the top thereof. The platens and the bolster plates 15 and 16 are usually rectangular in outline in presses of this type, and when my invention is applied to mold members of this form I mount one of the sheaves 19 adjacent each of the four corners of each movable platen. Corresponding with this, I mount one of the sheave sets 21 adjacent each of the four corners of the press so that these sets will be located directly above the sheaves of the platens.

The sheaves 19 may be connected to the corners of the platens in any suitable way, as for example, by bracket members 23, upon which the sheaves are rotatable and which may be bolted

or otherwise secured to edge faces of the platens. For the sake of compactness it may be desirable to mount the sheaves 19 in a staggered relation, as shown in Figs. 1 and 3, in which alternate ones of the brackets are secured against different platen faces. It may also be desirable to construct the brackets 23 of progressively increasing length, so that the sheaves of each successive platen will extend laterally outwardly beyond the sheaves of the platen thereabove. With this arrangement it will be seen from Figs. 1 and 3 that the sheaves of adjacent platens may overlap to some extent without causing interference.

I provide one of the cables 20 at each of the four corners of the press, and arrange these cables so that each cable extends as a continuous strand over the sheaves 21 and the sheaves 19 located at the platen corners. In other words, the cable is looped back and forth over the sheaves 19 and 21 as a continuous strand having one end 24 thereof extending from the sheave of the lowermost platen and the other end 25 thereof extending from the sheave of the uppermost platen. The cable end 24 is anchored, preferably on the frame 22 as indicated at 26, and the cable end 25 is led to a take-up or winding device, such as the drum 27.

With the cable and sheave arrangement just described it will be seen that when the plungers 17 are allowed to descend by release of pressure from their cylinders, the lower bolster will descend while the platens remain in their upper position. This causes the lower set of mold members to open permitting the cured and molded article to be removed therefrom. After the lower bolster 16 has descended the entire tier of platens is lowered as a unit to the position illustrated in Fig. 1, unwinding the cables 20 from the drums 27. During movement of the platens to this position the upper platen separates from the upper bolster plate 15, opening the uppermost mold. The operator then removes the cured and molded article from the uppermost mold and places another sheet or body of stock on the upper die or mold part of the platen 13. The upper platen is then lifted by taking up on the cables 20 until the uppermost mold has been closed by engagement of the platen 13 with the upper bolster plate 15. This movement of the upper platen to its closed position opens the next lower mold and the operation of removing the cured articles and substituting an uncured body of stock is repeated. The second platen is then lifted by taking up more of the cables 20 and this causes closing of the second mold and opening of the third mold. It will be understood, of course, that while the upper platen of the tier is being lifted by taking up on the cables 20 the other platens remain stationary. These operations are repeated until all of the platens have been thus individually lifted. Pressure is then introduced into the cylinders to cause the plungers and the bolster plate 16 to move upwardly, thereby closing the lowermost mold and applying pressure to the tier of platens and the dies and material disposed therebetween.

Any suitable winding means may be provided for taking up the cables 20, although I consider it important to have the winding operations performed at the same time and at the same rate, so that the platens will be lifted in an even and level condition. To obtain this result I provide the winding drums 27 of the same diameter for all the cables and operate the winding drums in synchronism with each other. This synchronized operation of the drums may be obtained by mounting two drums on each of the shafts 29 and interconnecting the shafts by means of a countershaft 30 and bevel gearing 31. A single driving device, such as a suitable electric motor 32, is connected with the countershaft 30 through a one-way drive worm gear reducing device 33 and a drive chain 34.

For the convenience of the operator in controlling the lifting of the successive platens of the tier, I provide the motor 32 with a push button control device 35 which is located adjacent the tier of platens so as to be readily accessible to the operator who unloads and reloads the molds. The device 35 may be suitably supported and may have stop and start buttons 36 and 37 for causing starting and stopping of the motor 32 in a direction to lower the platens. Preferably a limit switch is also provided for stopping the motor when the tier of platens reach their lower position. This relieves the operator from stopping the motor and prevents the accumulation of any slack in the cables 20. A third push button 38 is provided for controlling the motor 32 in a direction to take up on the cables and raise the platens. In view of the fact that the motor is intermittently operated a number of times in this direction the button 38 is such that the motor runs only while the button is depressed.

From the foregoing description and the accompanying drawings it will now be readily seen that I have provided an improved arrangement for actuating the platens or mold members of a multiple mold vulcanizing press or the like. It will be seen further that with my novel cable and sheave arrangement for actuating the platens a desired wide opening is obtainable between cooperating mold members which greatly facilitates the removal of articles and the insertion of the bodies of stock. It will be seen further that with the cable arrangement provided the mold members are lifted in succession and that while one individual member is being lifted the remaining members of the tier remain stationary.

While I have illustrated and described my improved press in a somewhat detailed manner it will be understood, of course, that I do not wish to be limited to the precise details of construction and arrangements of parts herein disclosed, but regard my invention as including such changes and modifications as do not constitute a departure from the spirit of the invention and the scope of the appended claims.

Having thus described my invention, I claim:

1. In a vulcanizing press, an upright frame having an opening therein and a stationary upper platen of quadrangular shape, a set of sheaves on the frame adjacent each of the four corners of the stationary upper platen, a tier of movable platens beneath the stationary upper platen and of a quadrangular shape corresponding with the latter, sheaves connected with each movable platen adjacent the four corners thereof, said tier being of a height substantially less than the height of the frame opening and the platens of the tier being movable substantially vertically in said frame opening for cooperation with said stationary upper platen and with each other, cables looped around said sets of sheaves and the corresponding corner sheaves of the movable platens, rotatable drums on the frame adjacent the corners of the stationary platen and operable to take up the cables for lifting the platens of said tier individually in succession and to pay out the cables in lowering the entire tier as a

unit, and a fluid pressure cylinder beneath said tier and operable to apply pressure thereto after the platens have been lifted by the cables.

2. In a vulcanizing press, an upright frame having an opening therein and a stationary upper platen of quadrangular shape, a set of sheaves on the frame adjacent each of the four corners of the stationary upper platen, a tier of movable platens beneath the stationary upper platen and of a quadrangular shape corresponding with the latter, sheaves connected with each movable platen adjacent the four corners thereof, said tier being of a height substantially less than the height of the frame opening and the platens of the tier being movable substantially vertically in said frame opening for cooperation with said stationary upper platen and with each other, a cable looped around each set of sheaves and around the corresponding corner sheaves of the movable platens with one end thereof extending from the corner sheave of the lowermost platen of the tier and anchored and its other end extending from the corner sheave of the upper platen of the tier, rotatable drums on the frame adjacent the respective corners of the stationary platen and said other end of each cable being connected with the corresponding drum, means for driving said drums including gearing and shafting interconnecting the drums for synchronized operation whereby taking up of the cables lifts the platens of said tier individually in succession and paying out the cables lowers the entire tier as a unit, and a fluid pressure cylinder beneath said tier and operable to apply pressure thereto after the platens have been lifted by the cables.

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