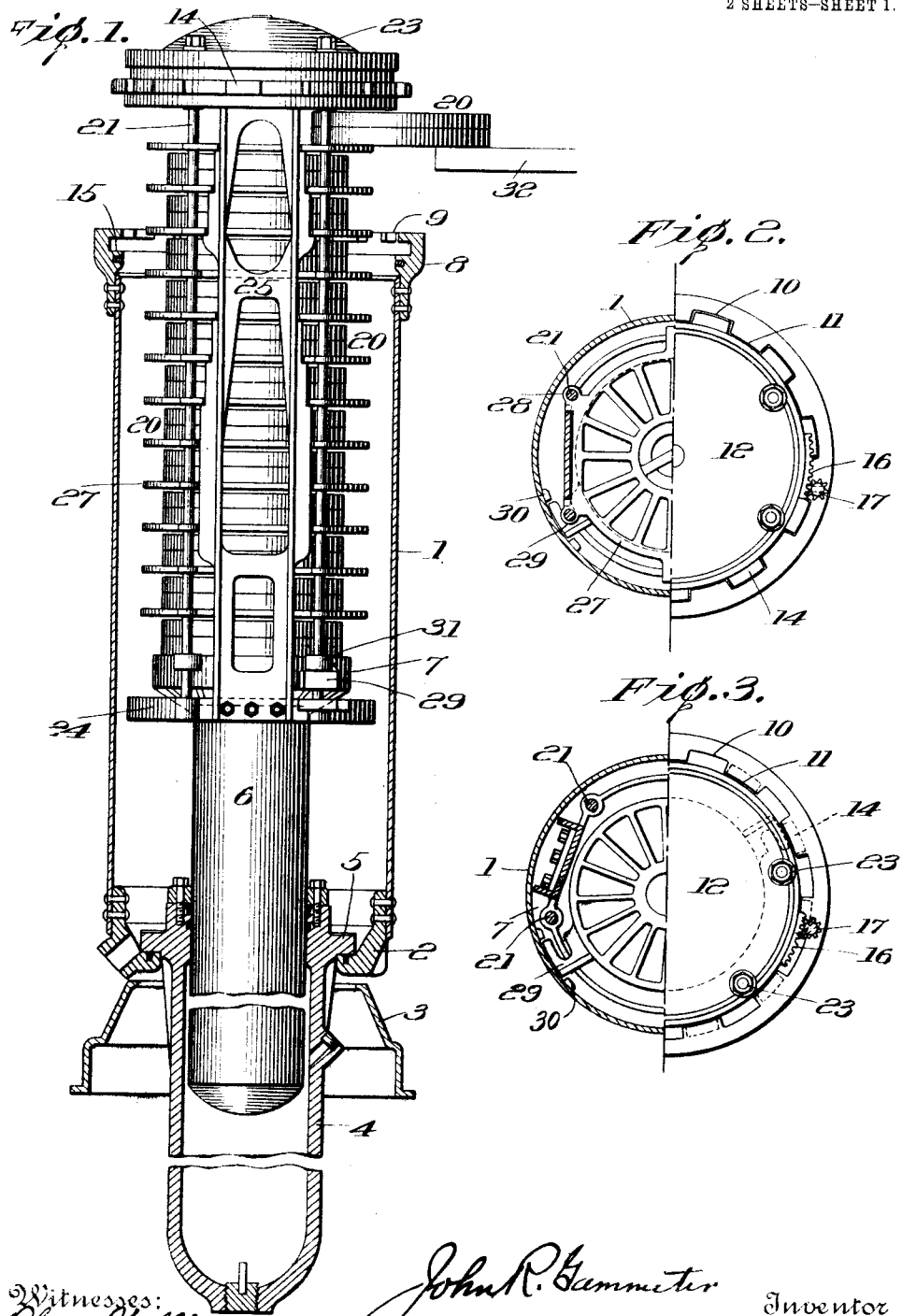


J. R. GAMMETER.
VULCANIZING PRESS.
APPLICATION FILED NOV. 3, 1910.

1,064,721.

Patented June 17, 1913.

2 SHEETS-SHEET 1.



Witnesses:
Olin Williams
Edmund Quinn Moore

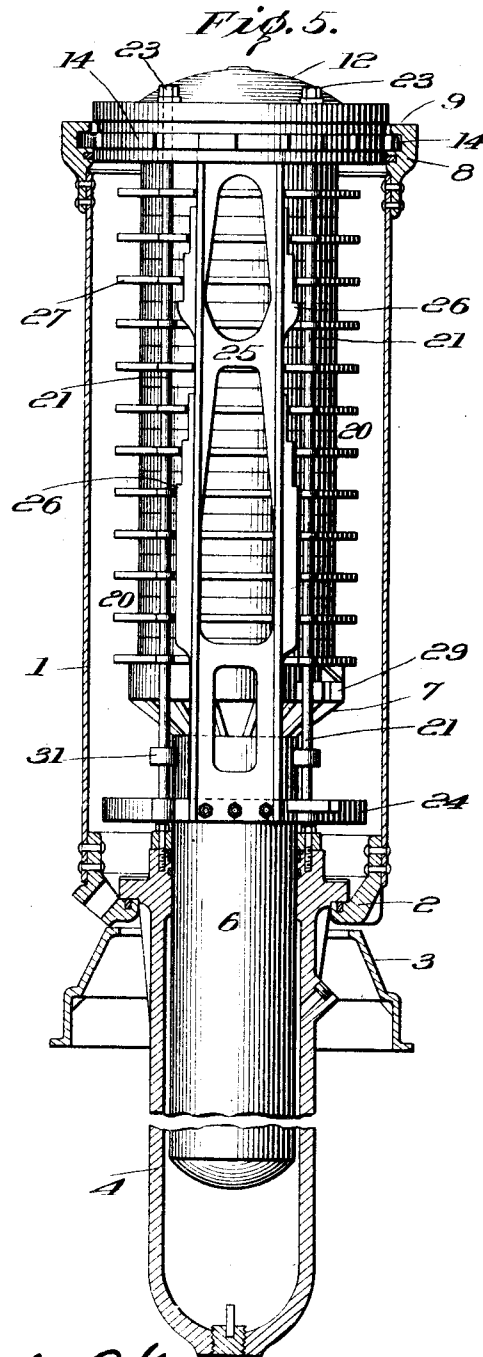
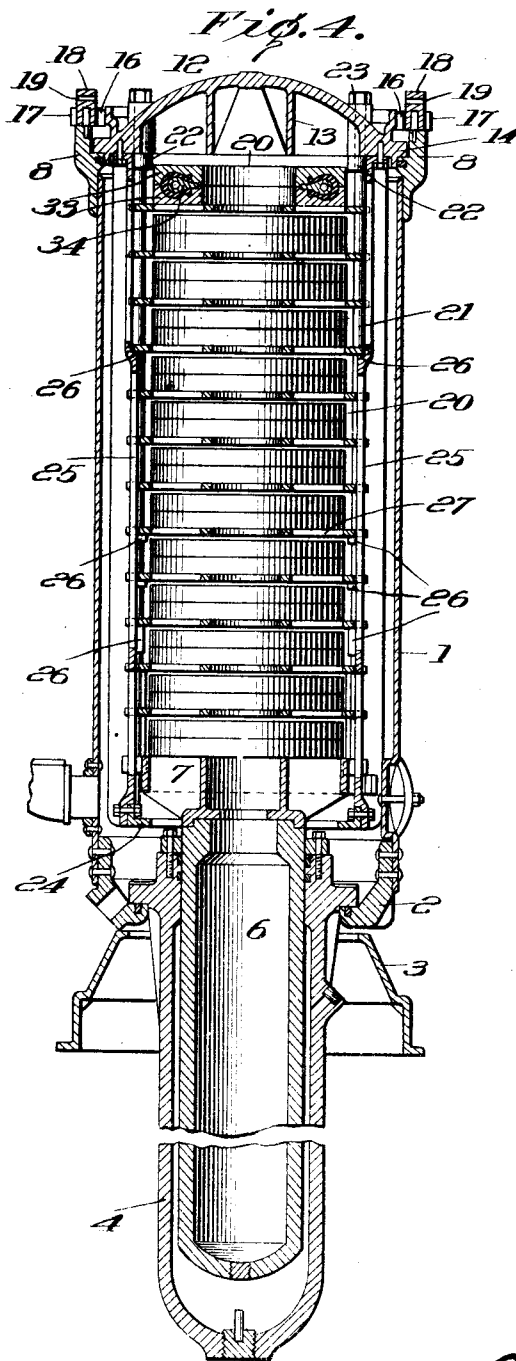
John R. Gammeter Inventor
By his Attorney Edward Davis

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2 SHEETS—SHEET 2.



Witnesses:
Chas. Williams
Edmund Quincy Moore

John R. Gammeter Inventor
By *His Attorney* *Seward Davis*

UNITED STATES PATENT OFFICE.

JOHN R. GAMMETER, OF AKRON, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE
B. F. GOODRICH COMPANY, A CORPORATION OF NEW YORK.

VULCANIZING-PRESS.

1,064,721.

Specification of Letters Patent.

Patented June 17, 1913.

Application filed November 3, 1910. Serial No. 590,413.

To all whom it may concern:

Be it known that I, JOHN R. GAMMETER, residing in the city of Akron, county of Summit, and State of Ohio, have invented certain new and useful Improvements in Vulcanizing-Presses, of which the following is a specification.

This invention relates to vulcanizing presses designed primarily for the vulcanization of articles of rubber, and is particularly adapted to presses of the vertical type, in which a number of molds containing rubber tires or similar articles are retained and vulcanized at one operation. Presses of this nature as heretofore constructed have comprised a shell in which the molds are contained and subjected to the action of steam, this shell being closed at the top by a cover which may be removed to permit the charge and discharge of the press. Means have been provided for supporting a number of the tire molds one above the other within the shell, for lifting the cover from the shell, for lifting the molds out of the shell and lowering them thereinto, and for compressing the molds within the shell to hold them closed during the vulcanizing process.

In many forms of vulcanizers as heretofore constructed hydraulic rams have been used for performing these various functions. A separate ram or set of rams has ordinarily been found necessary for the carrying out of each of these operations. In my present invention, however, I utilize but a single ram, which lifts the cover and discharges the molds, and clamps the latter closed during the vulcanizing operation. My invention contemplates the provision of a structure by which such a result is obtainable, thereby achieving greater simplicity and less cost of manufacture and operation than has heretofore been possible, and in the provision of certain details of structure, as will be hereinafter more fully set forth.

In the accompanying drawings, which form a part of this specification, Figure 1 is a view partly in vertical section and partly in side elevation of a vulcanizer embodying my invention, the parts being shown in position for charging and discharging the same; Fig. 2 is a view partly in plan and partly in horizontal section, showing the cover in unlocked position and the plunger head operatively connected with the cover and mold-carrying frame; Fig. 3

is a view similar to Fig. 2, the cover and mold-carrying frame being shown rotated in order to lock the former, and disengage the latter from the plunger head; Fig. 4 is a view partly in vertical section and partly in elevation of the parts shown in Fig. 1, but taken at right angles from the position at which Fig. 1 is taken, the parts being in the position shown in Fig. 2, that is, with the cover unlocked and the plunger head in engagement with the supporting frame, ready to lift the latter, the cover and the molds; Fig. 5 is a view similar to Fig. 1, the parts being shown in the position illustrated in Fig. 3, the cover being locked in position and the molds being compressed between the same and the plunger head.

In these drawings I have illustrated but one specific modification of my invention, but I do not wish to be limited to the exact structure therein shown, as this invention may be embodied in presses of various other forms.

Referring to the drawings in detail, the numeral 1 designates the shell or casing of the vulcanizer, which has riveted or otherwise suitably secured to its lower end a massive flanged ring 2, which rests upon the base plate 3 which supports the vulcanizer. The cylinder 4 of the hydraulic ram is provided with a flange 5 which rests upon the flanged portion of the ring 2. A plunger 6 works in the cylinder 4, a suitable packing device being provided to prevent leakage. The plunger 6 is provided at its upper end with an enlarged head 7 which will be more fully described hereinafter. The upper end of the shell 1 has secured to it a ring 8 having in its inner face a groove 9, the upper wall of the groove being notched as indicated at 10, the remainder of the wall forming a series of inwardly projecting lugs 11.

12 is the cover of the vulcanizing chamber, this being preferably formed of cast metal provided with depending strengthening webs 13 which engage the uppermost mold during the vulcanizing operation, and, in addition to their strengthening action, permit the free circulation of steam above the mold. The cover 12 is provided with a series of radially projecting lugs 14 adapted to pass through the notches 10, when being applied or removed and, when the cover is rotated through a fraction of a revolution,

to engage beneath the lugs 11. A slight rotation of the cover thus serves to lock or unlock the same. The engaging faces of lugs 11 and 14 are preferably inclined slightly in order that a wedging action may be produced when the cover is locked in position to force it upon its seat 15. Suitable packing may be interposed to seal the joint between the cover and the ring 8, if found necessary. The cover is preferably provided with means for turning the same, such as one or more gear segments 16 engaged by the pinions 17 journaled upon the ring 8 secured to the shell. For rotating the pinions the latter may be provided with upwardly projecting hubs 18 perforated at 19 for the reception of bars or other suitable means for turning the same. Depending from the cover 12 is a frame adapted to support the molds 20 during the charging and discharging of the press, this frame also being utilized to lift the cover. The frame preferably comprises four rods 21 provided with collars 22 which engage beneath the cover, and nuts 23 screwed on the upper end of the rods and engaging the top of the cover. The lower ends of the rods are joined by a horizontal ring or frame 24.

A pair of racks 25 are supported one between each pair of the rods 21, the upper ends of these racks being bolted to the cover and their lower ends to the ring 24. These racks are provided with one or more series of steps or shoulders 26 adapted to be engaged by portions of mold-carrying grids or trays 27, the trays being provided with eyes 28 through which the rods 21 pass. The grids or trays are maintained in vertical alinement by these rods and are prevented from dropping, each below a predetermined position, by means of suitable stops with which each is provided, adapted to engage corresponding pairs of shoulders on the racks 25. The grids or trays are, however, free to move upwardly toward the cover 12 in order to permit the molds which are interposed between them to be subjected to compression by the ram 6 or to permit some of the grids to be brought into contact in case it is desired to operate the press at less than its full capacity. The construction and mode of operation of these racks and trays is fully illustrated and described in United States Letters Patent Number 758,863, granted May 3, 1904, to Edwin Coupland Shaw, and their operation need not be more fully set forth herein. This structure, while advantageously used with my invention, is not an essential part thereof, and may in some cases be dispensed with.

In order that the ram may be free at proper times to compress the molds between the plunger head and the cover, and at other times to be utilized to remove the cover and to lift the molds from the vulcanizing cham-

ber, means are provided for separably connecting the plunger head with the cover and mold-carrying frame. The construction I use for this purpose is preferably as follows: The plunger head 7 has projecting from it, preferably at diametrically opposite points, a pair of slotted lugs or hooks 29, the plunger head being prevented from rotation by means of vertical guide bars 30 secured to the inner surface of the shell 1 between which the ends of the lugs or hooks 29 slide. Any other suitable means may be used for this purpose if desired. Collars 31 are provided near the lower ends of two of the rods 21, beneath which the lugs or hooks 29 engage when the cover and rods depending therefrom are rotated. The lugs or hooks are so located that when the cover is rotated so that its locking lugs 14 are disengaged from the lug 11 and are free to be lifted through the notches or slots 10, the rods 21 will be moved into the openings or slots in the hooks or lugs 29 and the collars 31 will rest upon these hooks or lugs. The movement of the cover to unlock the same therefore automatically causes the cover and mold-carrying frame to be engaged with the plunger head. This is the position of the parts shown in Figs. 2 and 4. As will be obvious, the plunger may now be raised, carrying with it the rods 21, cover 12, racks 25, grids or trays 27, each supported by its proper set of shoulders thereon, and the molds 20 resting thereon, as shown in Fig. 1. The molds may then be removed laterally, one at a time, as they are brought up to a level with the loading and unloading table 32. When the molds have all been discharged new ones may be placed upon the trays or grids in a similar manner, after which the plunger may be lowered until the parts are again in the position shown in Figs. 2 and 4, when the cover is rotated in the position shown in Fig. 3. This action locks the latter in place, and also moves the depending frame so that it is disengaged from the plunger head, as indicated in the left-hand side of Fig. 3. The plunger head is now free to be forced upwardly between the bars 21 and racks 25 and caused to compress the several molds against the under-side of the cover, as indicated in Fig. 5. While in this position steam is forced into the vulcanizing chamber and the vulcanizing operation performed. The plunger may then be lowered and again connected to the frame, as above described, in order that it may be utilized to discharge the molds from the press.

In Fig. 4 I have shown a typical mold in section containing a casing or shoe for a pneumatic tire. The mold illustrated comprises a pair of mold parts 33 suitably shaped to receive the tire casing, a ring or core 34 being utilized to support the interior

of the casing. As will be obvious, however, the press may be used with molds of other kinds adapted for the vulcanization of other articles than tires. As is well understood in the art, presses of the type here described are designed to hold one or more multiple part molds during the vulcanizing operation, the pressure exerted by the press serving to retain the parts of the mold together against the force due to the tendency to expand of the article being vulcanized in the mold. The necessity for the use of bolts or other fastening devices for securing the parts of the mold together is thus obviated.

While I have shown a vulcanizing press having but a single hydraulic ram for performing the several functions referred to, and have so described my press throughout, it is to be understood that I may, if desired, use a plurality of rams acting in unison, or any means capable of reciprocating a pressure member.

Having thus described one preferred embodiment of my invention, but without desiring to limit myself to the details thereof, I claim:

1. In a vulcanizing press, a vulcanizing chamber, a mold-carrying frame therein, unitary means for moving said frame from and into the chamber and for pressing the mold carried thereby, and independent means for supporting the said frame.

2. In a vulcanizing press, in combination, a vulcanizing chamber, a cover therefor, and unitary means for compressing a mold containing an article to be vulcanized, moving said cover to a position permitting the discharge of the mold, and moving said mold out of said chamber.

3. In a vulcanizing press, in combination, a vulcanizing chamber, a cover therefor, and unitary means for introducing a mold containing an article to be vulcanized into said chamber, moving said cover into position to close said chamber, subjecting said mold to pressure during the vulcanizing operation, moving said cover to a position permitting the discharge of the mold and moving said mold out of said chamber.

4. In a vulcanizing press, in combination, a vulcanizing chamber, a cover therefor, and unitary means for subjecting a mold containing an article to be vulcanized to pressure during the vulcanizing operation, and for moving said cover into a position in which it closes said chamber or into a position permitting the discharge of the mold.

5. In a vulcanizing press, in combination, a vulcanizing chamber, a cover therefor, and a plunger adapted to compress a mold containing an article to be vulcanized between its face and said cover, said plunger acting also to move said cover to a position permitting the discharge of the mold.

6. In a vulcanizing press, in combination,

a vulcanizing chamber, a plunger movable therein, a cover for said chamber, and means for detachably connecting said cover to said plunger.

7. In a vulcanizing press, in combination, a vulcanizing chamber, a plunger movable therein, a mold-carrying frame in said chamber, and means for detachably connecting said plunger to said mold-carrying frame.

8. In a vulcanizing press, in combination, a vulcanizing chamber, a plunger movable therein, a cover for said chamber, a mold-carrying frame carried by said cover, and means for detachably connecting said plunger to said mold-carrying frame.

9. In a vulcanizing press, in combination, a vulcanizing chamber, a cover therefor, means for locking said cover in position to close said chamber, a plunger movable in said chamber, and means for detachably connecting said cover to said plunger.

10. In a vulcanizing press, in combination, a vulcanizing chamber, a cover therefor, means for locking said cover in position to close said chamber, a plunger movable in said chamber, and means for detachably connecting said cover to said plunger, the operation of said cover-locking-means causing the operation of the means for connecting said cover and plunger.

11. In a vulcanizing press, in combination, a vulcanizing chamber, a cover therefor, means for locking said cover in position to close said chamber, a plunger movable in said chamber, and means for disconnecting said cover and plunger when said cover is locked in said position.

12. In a vulcanizing press, in combination, a vulcanizing chamber, a plunger movable longitudinally thereof, but incapable of rotary movement therein, a cover for said chamber, means for locking said cover in position to close said chamber, and for unlocking the same, said means being operable by the rotation of said cover, and means operable by the rotation of said cover for connecting the same to and disconnecting the same from said plunger.

13. In a vulcanizing press, in combination, a vulcanizing chamber, a plunger movable longitudinally thereof, but incapable of rotation, a cover, and means operable by the rotation thereof for locking the same in position to close said chamber, a mold-carrying frame supported by said cover and contained within said chamber, and means operated by the rotation of said cover and mold-carrying frame for connecting said frame to and disconnecting it from said plunger.

14. In a vulcanizing press, in combination, a vulcanizing chamber, a plunger movable longitudinally therein, a cover for said chamber, a mold-carrying frame carried by said cover, interlocking means carried by

said plunger and frame adapted to be unlocked or engaged by the relative rotation of said mold-carrying frame and plunger, and means for causing relative rotation between said frame and plunger.

15 15. In a vertical vulcanizer press, in combination, a vulcanizing chamber, a plunger movable vertically therein, and having a head at its upper end, a cover for said chamber, rods depending from said cover, and inter-engaging means on said plunger head and the lower ends of said rods, said plunger acting to move said rods and cover when said means are engaged.

15 16. In a vulcanizing press, in combination, a vulcanizing chamber, a plunger movable longitudinally therein, a cover for closing said chamber, a mold-carrying frame carried by said cover and projecting into said chamber, said plunger being movable within said frame to engage and compress a mold carried thereby between the face of said plunger and said cover, and means for causing said plunger to operate said frame and cover.

25 17. In a vulcanizing press, in combination, a vulcanizing chamber, a plunger movable therein, a mold-carrying frame supported in said chamber, said plunger normally being movable independently of said mold-carrying frame so as to compress the molds carried thereby, and means for causing said plunger when moved to force said mold-carrying frame from said chamber.

35 18. In a vertical vulcanizing press, in combination, a vulcanizing chamber, a plunger movable vertically therein, a cover closing the upper end of said chamber, a frame depending from said cover, said plunger being normally free to move within said frame, and means for detachably connecting said plunger to said frame to cause said plunger when operated to move said frame and cover.

45 19. In a vertical vulcanizing press, in combination, a vulcanizing chamber, a plunger movable vertically therein, a cover for closing the upper end of said chamber, means for locking said cover in position to close said chamber, a frame depending from said cover, a plurality of trays carried by said frame, inter-engaging means on said frame and trays for individually determining the lower limit of movement of each tray, said trays being free to move upwardly with relation to said frame, said plunger being normally free to move within said frame, and means for detachably connecting said frame to said plunger to cause the latter when operated to lift said frame, trays and cover from said chamber.

65 20. In a vertical vulcanizing press, in combination, a vulcanizing chamber, a plunger movable vertically therein, a cover for closing the upper end of said chamber, inter-

locking means carried by the walls of said chamber and said cover, respectively, operable by rotary movement of the said cover, for locking said cover in position to close said chamber, a frame depending from said cover and rotatable therewith, and inter-engaging means for detachably connecting said frame to said plunger, operable by the rotary movement of said frame.

75 21. In a vertical vulcanizing press, in combination, a vertically disposed hydraulic cylinder, a vulcanizing chamber shell mounted above the same, a plunger movable in said cylinder and having a head movable in said shell, means for preventing relative rotary movement between the said plunger head and shell, a cover for closing the upper end of said shell, interlocking means carried by the upper end of said shell and cover, respectively, operable by rotary movement of said cover with relation to said shell for locking and unlocking the same, rods depending from said cover, collars on said rods, and slotted lugs projecting from said plunger head adapted to be engaged by said rods and collars when said cover is rotated.

90 22. In a vertical vulcanizing press, in combination, a vulcanizing chamber, a plunger having a head movable vertically therein, a cover for closing the upper end of said chamber, a frame depending from said cover, a plurality of mold-carrying trays carried by said frame and free to move upward with relation thereto, interengaging means on said frame and trays for individually limiting the downward movement of each tray with relation to said frame, means operable by the relative rotation of said plunger head and frame for detachably securing said plunger head and frame together, and means for accomplishing such relative rotation.

105 23. In a vulcanizing press, a vulcanizing chamber shell, an internally grooved ring supported at one end thereof, the upper wall of said groove being notched, a cover for closing the end of said shell having lugs projecting therefrom adapted to pass through the said notches and to engage with portions of said ring, and means for rotating said cover, relatively to said ring, said means comprising a gear segment carried by said cover and a pinion engaging therewith carried by said ring.

120 24. In a vulcanizing press, a vulcanizing chamber, a cover for closing the same, locking means carried by the walls of said chamber and said cover, respectively, operable by the rotation of said cover to lock said cover in position, and means for rotating said cover relatively to the walls of said chamber, said means comprising a gear segment carried by said cover, a pinion carried by the walls of said chamber and meshing with said segment, and means for rotating said pinion.

125 25. In a vulcanizing press, a shell, a flanged 130

ring secured to the lower end thereof, a cover for closing the upper end of said shell, means for detachably securing said cover to said shell, a hydraulic cylinder depending below
5 said shell and having a flange engaging the upper side of the flanged portion of said ring, and a plunger movable in said cylinder and having a head movable within said shell.
26. In a vulcanizing press, a shell, a ring
10 secured to the lower end thereof and having an inwardly projecting flange, a hydraulic cylinder mounted below said shell closed at its lower end and having an outwardly projecting flange near its upper end, said flange

resting upon the inwardly projecting flange 15 on said ring, and a plunger working within said cylinder.

27. In a vulcanizing press the combination of a vulcanizing chamber, a frame therein carrying a plurality of molds, unitary means 20 for moving said frame relatively to said chamber and for moving the molds carried by said frame relatively to it, and independent means for supporting said frame.

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