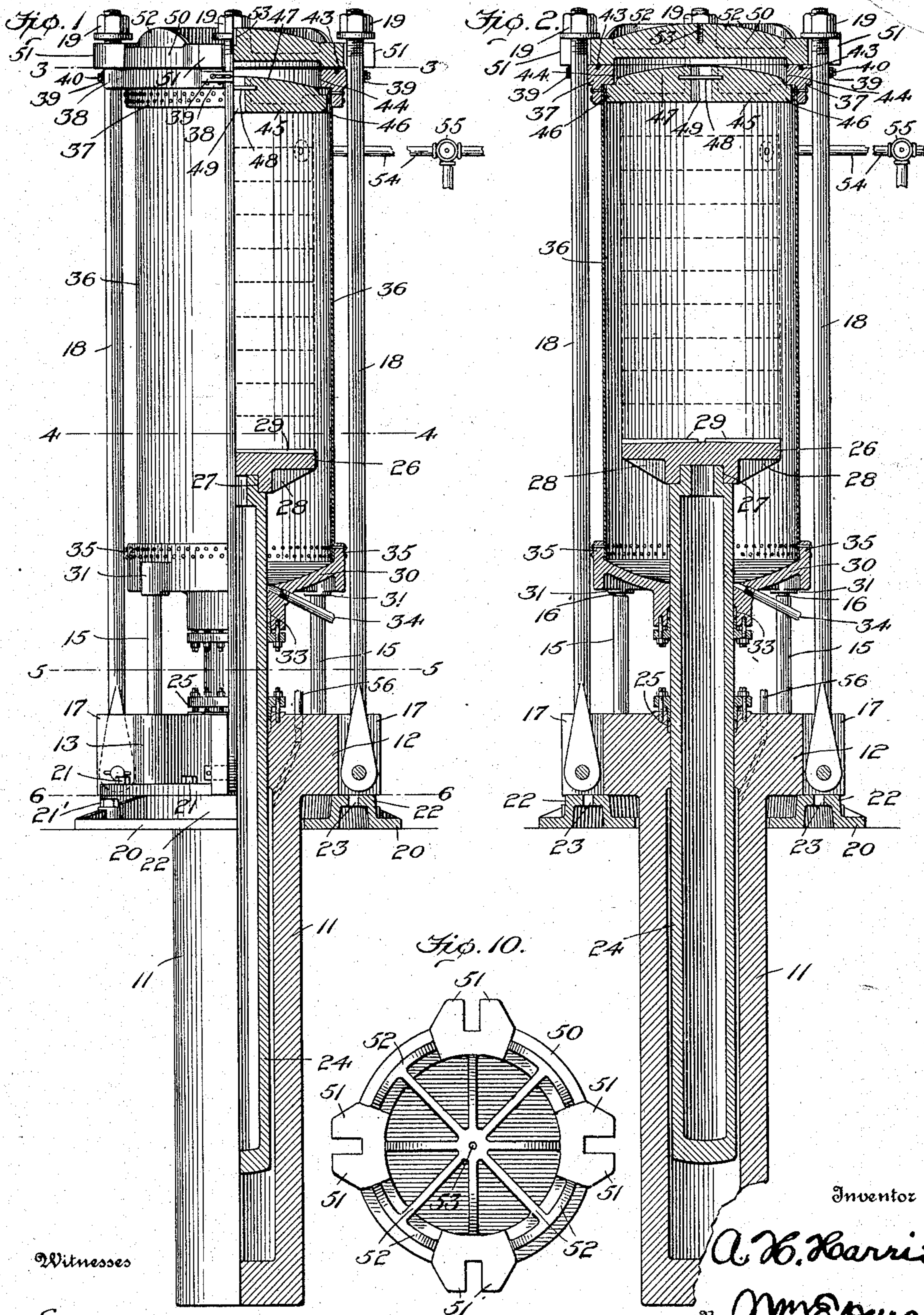


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VULCANIZING PRESS.  
APPLICATION FILED AUG. 31, 1909.

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Patented Feb. 15, 1910.

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Witnesses

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# UNITED STATES PATENT OFFICE.

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VULCANIZING-PRESS.

949,428.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, ARCHER H. HARRIS, a citizen of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented certain new and useful Improvements in Vulcanizing-Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to apparatus for heating, shaping and vulcanizing rubber products in general, but is particularly designed and adapted for the vulcanization of outer shoes or casings of automobile or other resilient tires.

It has for its object primarily the production of a hydraulic press of greater general efficiency than those heretofore known, also a simplification and corresponding reduction in the number of necessary parts, also a peculiarly advantageous distribution of strains and consequent uniformity of pressure upon both press and contents, also certain details of construction and novel arrangement of parts which combine to produce new and useful results, among which are those above enumerated.

The invention will be hereinafter particularly described and pointed out in the claims following.

In the accompanying drawings which form part of this application, and whereon like characters of reference indicate corresponding parts in the several views: Figure 1, represents the invention completely assembled, one half of this figure being a side elevation, and the other half a vertical longitudinal central section. Fig. 2, is a vertical longitudinal central section through the complete invention, showing diagrammatically in dotted lines a series of molds in operative position. Figs. 3, 4, 5 and 6 are horizontal sectional views upon the lines 3—3, 4—4, 5—5 and 6—6 respectively, of Fig. 1, looking from above upon base plate of the press below. Fig. 7, is a fragmentary detail view showing in side elevation one of several reciprocating rod-retaining guards. Fig. 8, is a view of one tank guide partly broken away, and its adjacent cooperating members in fragmentary section. Fig. 9, is a detail view taken on the line 9—9 Fig. 5, showing in vertical section means for introducing water or other operating fluid to the

ram cylinder, and, Fig. 10, is a plan view of the removable tank-cover.

Reference being had to the drawings and numerals thereon 11 indicates the ram cylinder ordinarily depressed in the lowermost depths of a vulcanizer pit (not shown). The upper end 12 of said ram cylinder is flanged as best shown in plan by Fig. 5, and is provided with circumferential bosses 13 at regular intervals, in each of which is secured as by a babbitt anchorage 14 (Fig. 8) upstanding guide posts 15 each having a reduced upper end as 16 for purposes that will later appear. Intermediate of said bosses 13 are radial lugs 17, 17 arranged in diametrically opposite pairs, serving as pivotal connections for four, more or less, equidistant cover-retaining tie rods 18 shown in Figs. 1, 2, 3, 4, 5, 7, and fitted with flanged end nuts 19 in tight fitting screw-threaded connection. The flanged end 12 of said ram cylinder 11 rests upon a base plate 20 to which it is bolted as at 21, said base plate in turn being similarly secured as at 21' to a suitable bed or foundation in the vulcanizer pit (not shown). This plate 20 also is provided with a raised annular hollow seat 22 upon which said flange 12 directly rests, and is perforated at regular intervals by elongated holes 23 through which cement and grouting may be introduced for purposes of an additional anchorage, and for leveling the base plate 20 upon its foundation.

Projecting vertically and centrally from ram cylinder 11 is a reciprocating ram piston 24, by preference cast hollow, suitably packed at 25 to prevent leakage from said cylinder, and surmounted by a piston or ram head 26 shown in section by Fig. 2 but best shown in plan by Fig. 4. This head 26, conical in form, is rigidly shouldered at 27 upon the piston 24, is strengthened by radial flanges 28 below, and by flanges 29 above the latter being also radially arranged and in groups of three having upper edges in a common horizontal plane which constitute a skeleton-like working surface of the ram head; while, as may be seen by reference to Figs. 1 and 2, the intervening relatively depressed end proper of said head is conical in form and slopes uniformly from center to circumference to insure proper drainage.

Surrounding the ram piston 24 concentrically, and mounted upon the guide-posts 15 aforesaid, is a circular cup-shaped lower tank head 30, having radial lugs 31 upon its

outer edge drilled as at 32 (Fig. 8) to loosely receive the upper reduced ends 16 of said posts 15, thus providing for a moderate vertical reciprocatory movement of the head 30, and parts carried thereby. As clearly shown, a suitable packing 33 is interposed between said tank head 30 and the reciprocating ram piston 24 to prevent leakage at this point, and said lower head 30 is further provided through its base with a drain pipe 34, guarded by a suitable valve or cock of any well known form, for drainage purposes. Securely riveted or otherwise attached to the upstanding circumferential flange 35 of lower tank head 30 is a cylindrical press-tank body 36 of relatively light sheet iron or other steam tight material, to the upper edge whereof is permanently secured an upper annular tank rim 37, as shown by Figs. 1, 2 and 3. The said rim 37 at regular intervals is provided with radial lugs 38 upon each of which is slidingly mounted a horizontally movable guard 39 retained in position by the head of a machine screw 40 passing through slot 41 of said guard, and by underlying pins or projections 41 extending radially from each lug 38 as clearly indicated by Fig. 7. The said tank rim 37 further serves as a seat for an annular packing gland 43 normally projecting slightly above its surface, as shown by Fig. 1; and is further provided with inwardly projecting horizontal quarter flanges 44 at points diametrically opposite for locking purposes, as best shown by Fig. 3; said gland 43 and quarter flanges 44 performing functions which will hereinafter appear. Within said tank rim 37 is removably located a resistance platen 45 as indicated by Figs. 1, 2 and 3, the latter a plan view, this removable platen is of skeleton form, is provided with circumferential locking flanges 46, shown by dotted lines in Fig. 3, adapted to mate with the flanges 44 aforesaid, is strengthened by upstanding radially arranged surface ribs 47, and is equipped at its center with a lifting pin 48 crossing transversely a central aperture 49.

Surmounting the platen 45 as shown by Figs. 1 and 2 is the press tank head or removable cover 50, which, as clearly shown in plan by Fig. 10 has circumferential radial lugs 51 arranged in pairs, at points diametrically opposite, adapted to receive the upper ends of the cover retaining tie rods 18, and configured upon its upper surface by up-  
 rising radially arranged reinforcing ribs 52, while at its center the said cover is tapped part way through as at 53, to receive a screw-eye or clevis (not shown) to facilitate lifting.

The upper screw threaded extremity of the cover retaining tie rods 18 fitted, as shown by Figs. 1 and 2, with substantial  
 65 adjusting nuts 19, resist upward movement

of the cover 50 and the entire tank press during operation of the ram.

Entering the press tank at any convenient point, for example that indicated by Figs. 1 and 2, is an inlet pipe 54 controlled by a by-pass valve 55, the latter for introducing either a vulcanizing medium such as steam, or a mold cooling medium, such as water, when occasion requires. While in like manner entering the interior of ram cylinder 11 through its flanged end 12 is a suitable supply inlet 56 for water or other fluid, by agency whereof action of ram piston 24 is controlled; and, it will be noted that the last mentioned inlet is guarded by a valve (not shown) preferably a graduating valve, common to this class of devices; moreover, all of the valves aforesaid are so positioned, or at least so equipped, as to be readily controlled from the surface of the vulcanizing pit common to vertical presses of this character, but not shown in the present illustrations.

The operation of this invention is substantially as follows: Let it be understood that ram head 26 has been elevated into the plane of the tank rim 37; also that molds properly charged with roughly shaped but uncured rubber products such as tire casings, have been successively placed above said head 26, to the number of ten—more or less—as indicated by dotted lines in Figs. 1 and 2. At this stage of the operation resistance platen 45 is lowered, by agency of its central lifting pin 48 and an overhead crane, into the open mouth of the tank or press body 36, and is given a quarter turn to entrap its flanges 46 beneath those of the tank rim marked 44, as indicated by dotted lines in Fig. 3. The press cover 50 is next positioned in like manner, with its annular under surface resting upon the annular packing gland 43 in the upper surface of said rim 37; whereupon tie rods 18, moved inwardly upon their respective horizontally arranged pivotal connections 17, are received at their upper ends within each pair of radial lugs 51 projecting from the cover or closure 50, the latter being surmounted by close-fitting screw-threaded nuts 19 carefully adjusted to leave a slight clearance (as shown by Fig. 1) between said nuts and cover. This accomplished, the tie-rods 18 are retained in the position stated, prior to application of the pressure, by action of guards 39 each latched over its respective tie rod by a slight horizontal movement, as shown in Fig. 7. Operative fluid, such as water, under pressure, is now injected into a like body contained within the fluid pressure cylinder 11, by way of inlet 56 and a suitable controlling valve, preferably a graduating valve previously set at, or about, the required degree of pressure. As a consequence ram piston and head 24—26 is elevated, and, acting through the series of charged molds indicated by

dotted lines in Fig. 1, serves to lift resistance platen 45, tank body 36 with its rim 37, and top or closure 50 until the latter is arrested by engagement with nuts 19 upon tie rods 18 as indicated by Fig. 2 of the drawings, the structure being thus instantly and securely packed against leakage by agency of the gland 43 interposed between said rim and cover. This accomplished, and drain pipe 34 being normally closed, steam or other vulcanizing medium introduced into the press tank 36 by way of valve 55 and inlet 54, envelops the contents of said tank at a temperature and for a period of time proportionate to the character and size of rubber products under treatment. When then the contents of each partially closed mold has been reduced to the proper degree of plasticity, fluid is again admitted to cylinder 11 to forcibly actuate the ram members 24—26 thereby closing all molds within tank 36 and pressing to final shape their contents, between the surface-ribs 29 of ram head 26 and the relatively fixed resistance platen 45 above. Following said shaping process a partial turn of the three-way valve 55 aforesaid serves to instantly cut off the vulcanizing medium and introduce in place thereof a suitable mold cooling medium after which the molds and their vulcanized contents are removed from the vulcanizer by a reversal of the charging process hereinbefore described.

As thus described in its preferred form of construction, it will be noted that a single ram is employed for the threefold purpose of sealing the press tank, shaping the contents of a mold or molds contained therein, and maintaining the proper degree of pressure during the process of vulcanization. Also that the top closure or cover 50 is retained in its closed position by agency of the radially removable tie rods 18 pivotally supported upon the fixed ram cylinder 11, and consequently fixed with relation to all vertically movable parts. Also that the removable resistance platen 26 is adapted to interlock most effectually with flanges upon the tank rim 37 to insure accurate and uniform pressure upon molds contained within the tank or press body 36, and without the necessity of employing mold trays or equivalent appliances usually interposed between adjacent molds in this class of presses.

It will also be noted that I do not limit myself to the precise arrangement and combination of mechanical elements set forth for accomplishing the objects hereinbefore enumerated, as various changes and modifications will suggest themselves to persons skilled in the art and may be made without departing from the spirit of my invention which will now be set forth in the following claims:

1. In a vulcanizing press the combination

with a fluid pressure ram, of a press tank vertically movable with relation to the ram cylinder, a removable tank cover, and tie rods connected to said ram cylinder whereby the cover aforesaid is engaged and secured in closed position.

2. In a vulcanizing press the combination with a fluid pressure ram, of a press tank vertically movable with relation to the ram cylinder, a removable tank cover, and tie rods pivotally connected to said ram cylinder whereby the cover aforesaid is engaged and secured in closed position.

3. In a vulcanizing press the combination with a fluid pressure ram, of a press tank vertically movable with relation to the ram cylinder, a removable tank cover, provided with retaining lugs, and tie rods pivotally connected to said ram cylinder adapted to engage the lugs aforesaid whereby the tank cover is secured in closed position.

4. In a vulcanizing press the combination with a fluid pressure ram including a fixed ram cylinder, of a press tank vertically movable with relation to said ram cylinder, a removable tank cover, and tie rods pivotally connected to said ram cylinder whereby the cover aforesaid is engaged and secured in closed position.

5. In a vulcanizing press the combination with a fluid pressure ram including a fixed ram cylinder, of a base plate upon which said cylinder rests, a press tank vertically movable with relation to said ram cylinder, a removable tank cover, and tie rods connected to said ram cylinder whereby the cover aforesaid is engaged and secured in closed position.

6. In a vulcanizing press the combination with a fluid pressure ram including a fixed ram cylinder, of a base plate from which said cylinder is suspended, a press tank vertically movable with relation to said ram cylinder, a removable tank cover, and tie rods pivotally connected to said ram cylinder whereby the cover aforesaid is engaged and secured in closed position.

7. In a vulcanizing press the combination with a fluid pressure ram, of a base plate having a raised hollow seat to which the ram cylinder is affixed, a press tank vertically movable with relation to said ram cylinder, a removable tank cover, and tie rods pivotally connected to said ram cylinder whereby the cover aforesaid is engaged and secured in closed position.

8. In a vulcanizing press the combination with a fluid pressure ram, of a base plate having a raised hollow perforated seat to which the ram cylinder is affixed, a press tank vertically movable with relation to said ram cylinder, a removable tank cover, and tie rods pivotally connected to said ram cylinder whereby the cover aforesaid is engaged and secured in closed position.

9. In a vulcanizing press the combination with a fluid pressure ram including a fixed ram cylinder provided with radial lugs, of a press tank vertically movable with relation to said ram cylinder, a removable tank cover, and tie rods pivotally connected to the radial lugs aforesaid whereby the tank cover is engaged and secured in closed position.
  10. In a vulcanizing press the combination with a fluid pressure ram including a fixed ram cylinder provided with equidistant radial lugs, of a press tank vertically movable with relation to said ram cylinder, a removable tank cover, and tie rods horizontally pivoted in the radial lugs aforesaid whereby the tank cover is engaged and secured in closed position.
  11. In a vulcanizing press the combination with a fluid pressure ram including a fixed ram cylinder provided with radial lugs, of a press tank vertically movable with relation to said ram cylinder, a removable tank cover provided with radial lugs mating with the lugs aforesaid, and tie rods each adapted to connect lugs upon both the ram cylinder and tank cover whereby the latter is secured in closed position.
  12. In a vulcanizing press the combination with a fluid pressure ram, of guide posts superimposed with relation to said ram, a press tank vertically movable upon said posts, a removable tank cover, and tie rods pivotally connected to the ram cylinder whereby the cover aforesaid is engaged and secured in closed position.
  13. In a vulcanizing press the combination with a fluid pressure ram, of guide posts superimposed with relation to said ram, a press tank having circumferential perforated lugs movable vertically upon said guide posts, a removable tank cover, and tie rods pivotally connected to a fixed support and adapted to interlock with the tank cover to secure it in closed position.
  14. In a vulcanizing press the combination with a fluid pressure ram, of a press tank vertically movable with relation to said ram, locking flanges upon the interior of said tank at points diametrically opposite, a resistance platen having external flanges adapted to interlock with the tank flanges aforesaid, a removable tank cover, and means whereby said cover is adapted to arrest the tank in its vertical movement.
  15. In a vulcanizing press the combination with a fluid pressure ram, of a press tank vertically movable with relation to said ram, oppositely arranged quarter flanges upon the interior of said tank, a removable resistance platen having circumferential quarter flanges adapted to pass and rotatively interlock with said tank flanges, a removable tank cover, and means whereby said cover is adapted to arrest the tank in its vertical movement.
  16. In a vulcanizing press the combination with a fluid pressure ram, of a press tank vertically movable with relation to said ram, a tank rim having oppositely arranged interior locking flanges, a skeleton resistance platen having external flanges adapted to rotatively interlock with the tank flanges aforesaid, a removable tank cover, and means whereby said cover is adapted to arrest the tank in its vertical movement.
  17. In a vulcanizing press the combination with a fluid pressure ram, of a press tank vertically movable with relation to said ram, oppositely arranged locking flanges upon the interior of said tank, a resistance platen of skeleton form having radial surface ribs and circumferential flanges the latter adapted to rotatively interlock with the tank flanges aforesaid, a removable tank cover, and means whereby said cover is adapted to arrest the tank in its vertical movement.
  18. In a vulcanizing press the combination with a fluid pressure ram, of a press tank vertically movable with relation to the ram cylinder, a tank rim, a removable tank cover surmounting said rim, tie rods pivotally connected to said ram cylinder and adapted to engage said cover to retain it in closed position, and guards slidingly mounted upon the tank rim to retain said tie rods in vertical position.
  19. In a vulcanizing press the combination with a fluid pressure ram, of a press tank vertically movable with relation to the ram cylinder, a tank rim, a removable tank cover surmounting said rim, a packing gland interposed between said rim and cover, tie rods pivotally connected to said ram cylinder adapted to engage and retain said cover in closed position, radial lugs upon said tank rim, and a horizontally movable guard upon each of said lugs for entrapping its respective tie rod and retaining same in vertical position.
  20. In a vulcanizing press the combination with a fluid pressure ram, a press tank, and a cover for said tank, of a ram head sloping downwardly from center to periphery and provided with surface ribs the upper edges whereof are in a common plane.
  21. In a vulcanizing press the combination with a fluid pressure ram, a press tank, and a cover for said tank, of a ram head sloping downwardly from center to periphery and provided with radial surface ribs the upper edges whereof are in a common plane, and lower strengthening ribs also radially arranged.
- In testimony whereof I affix my signature, in presence of two subscribing witnesses.
- ARCHER H. HARRIS.
- Witnesses:
- E. H. ARNOLD,  
C. T. GARRISON.