Jan. 29, 1935. C. IVERSON 1,989,362

VULCANIZER

Original Filed Nov. 23, 1931 4 Sheets-Sheet 1

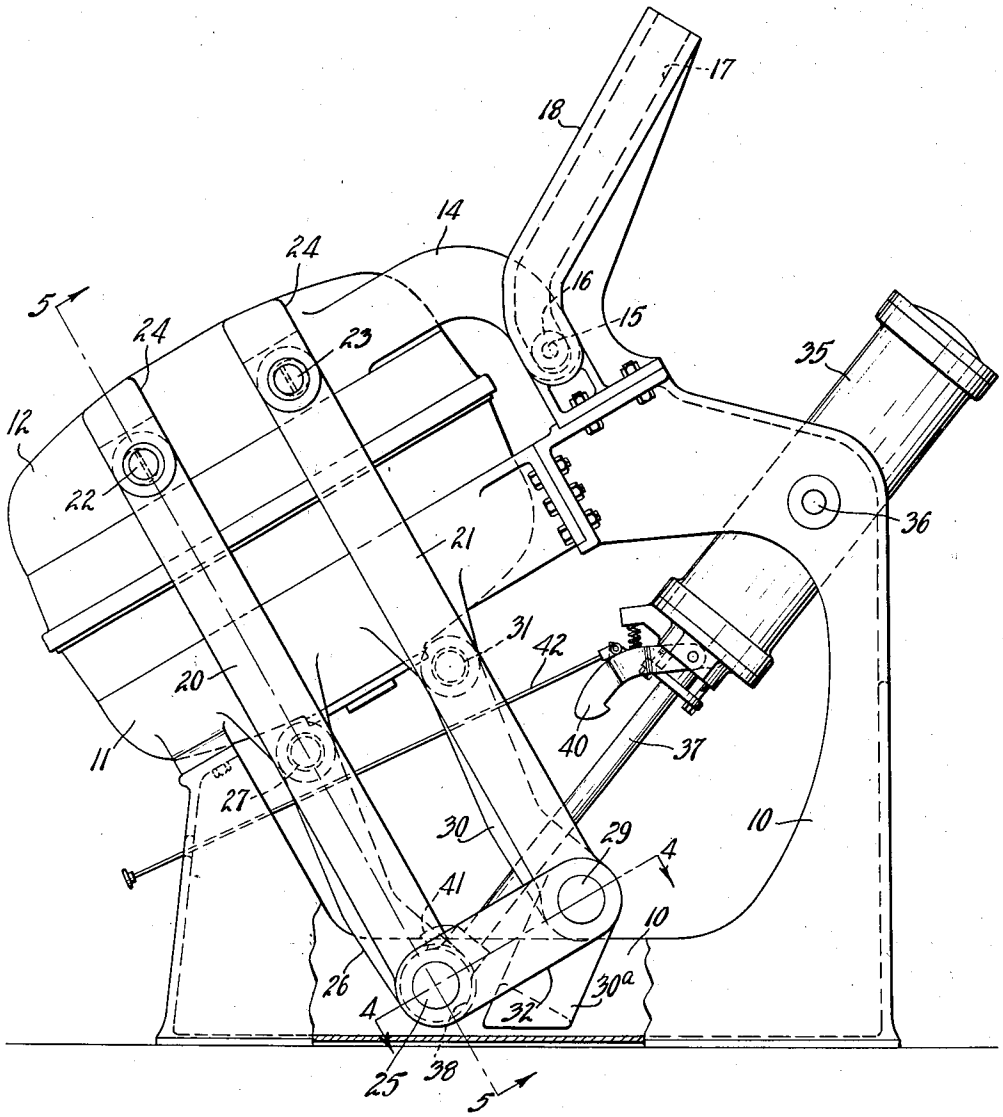


Fig. -1

INVENTOR
CATO IVERSON.

BY Ely & Barrow

ATTORNEYS

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VULCANIZER

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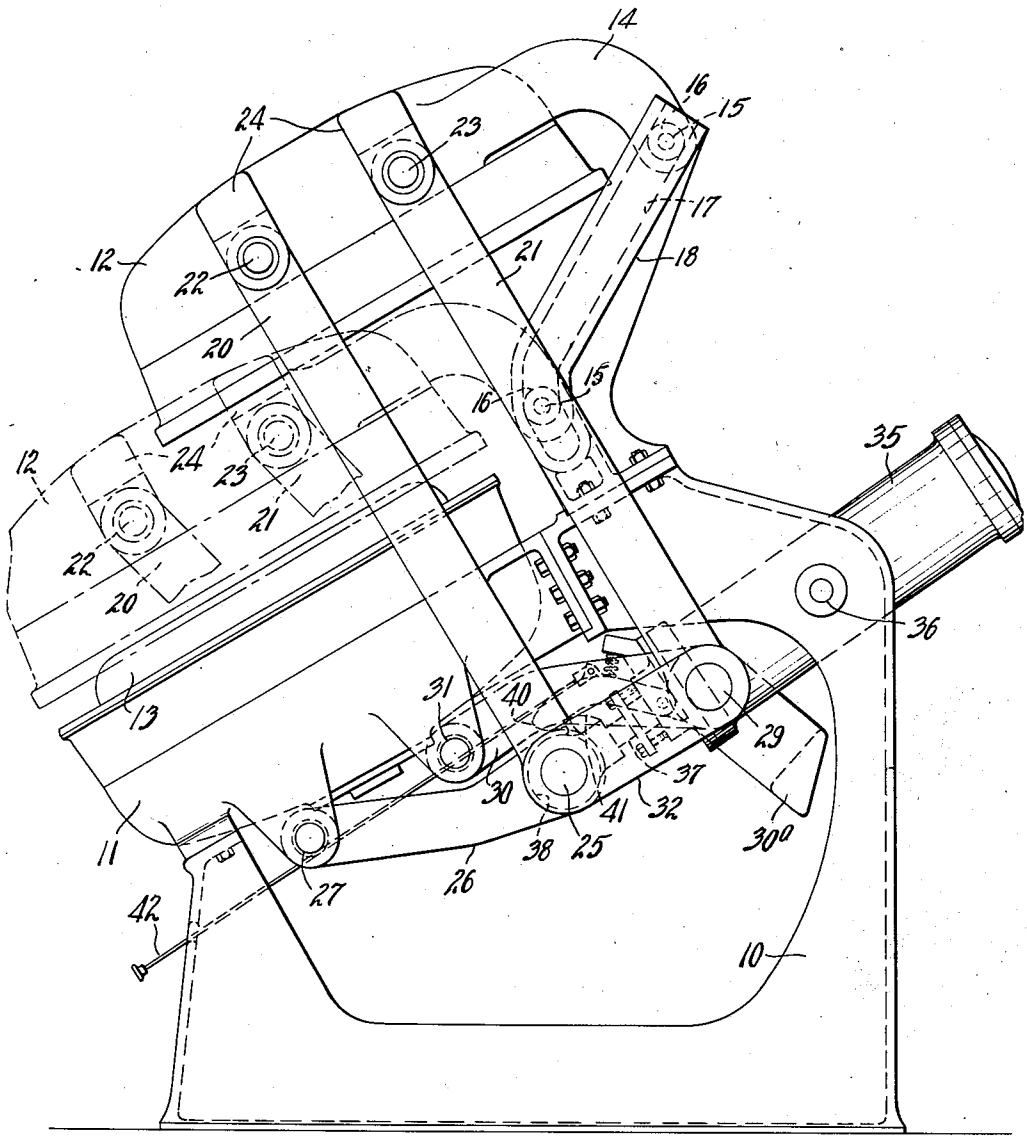


Fig.-2

INVENTOR
CATO IVERSON

BY Ely & Barrow

ATTORNEYS

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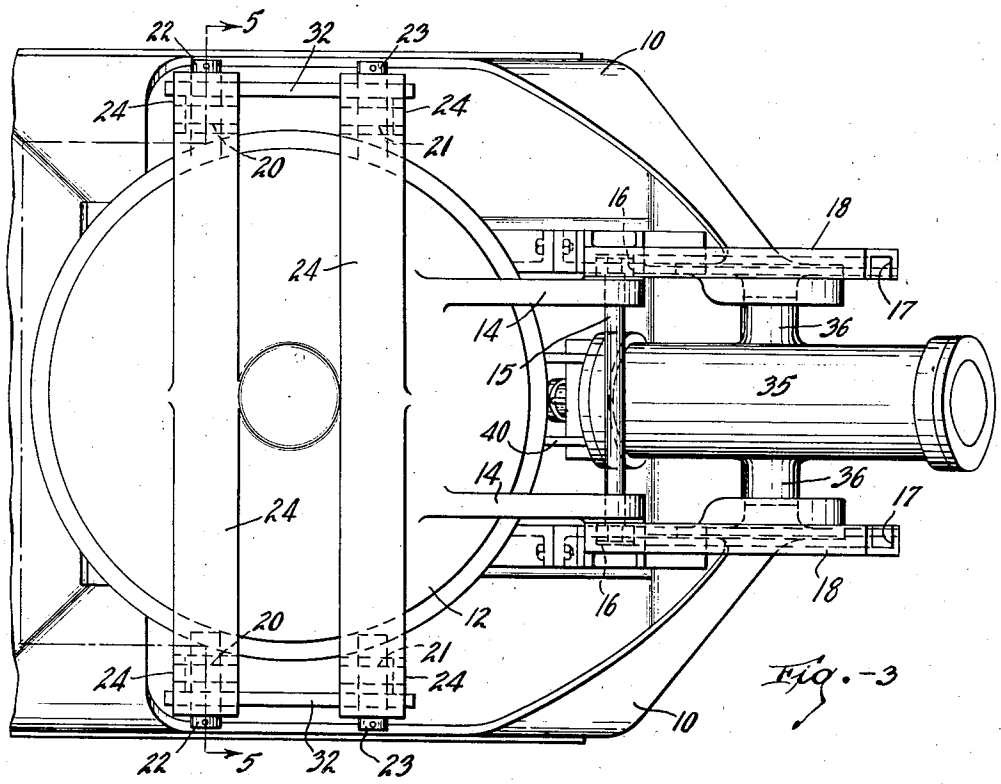


Fig.-3

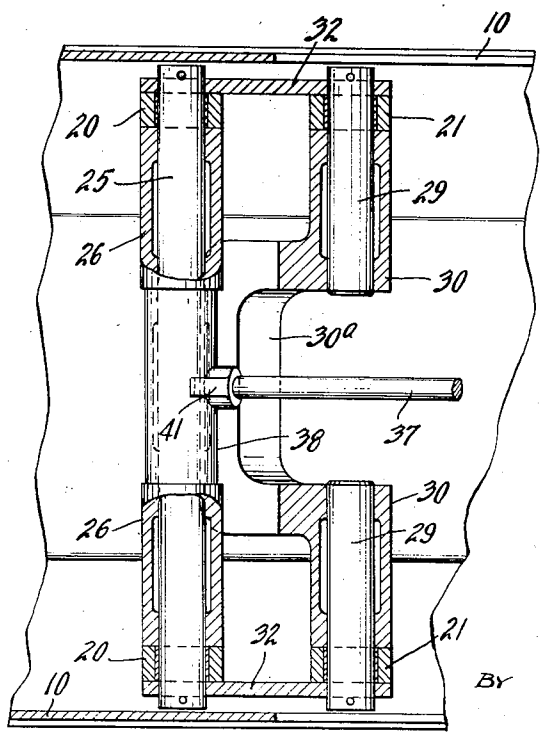


Fig.-4

INVENTOR
CATO IVERSON

BY Ely & Barrow

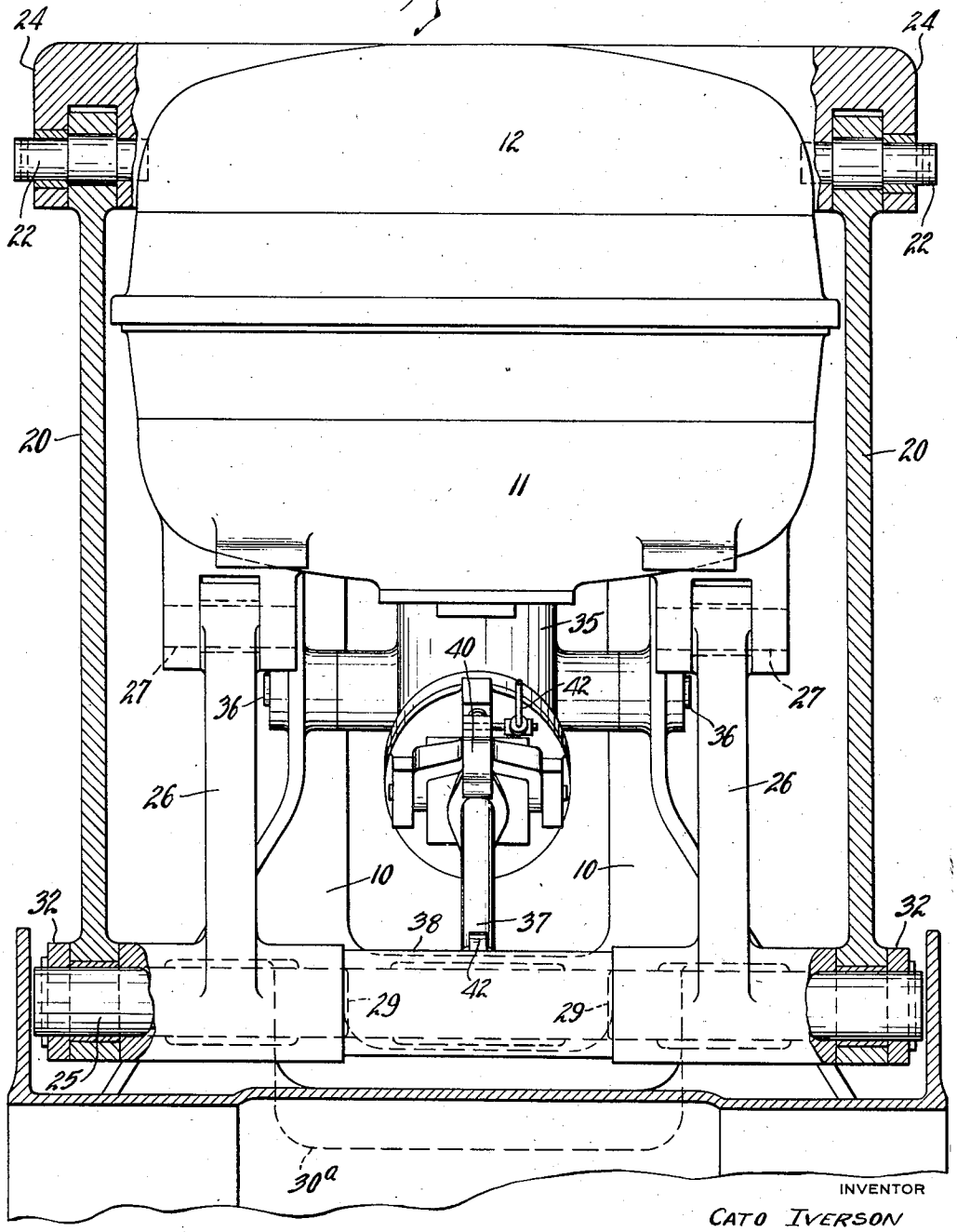
ATTORNEYS

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VULCANIZER

Original Filed Nov. 23, 1931 4 Sheets-Sheet 4

Fig. -5



INVENTOR

CATO IVERSON

BY Ely & Barrow

ATTORNEYS

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UNITED STATES PATENT OFFICE

1,989,362

VULCANIZER

Cato Iverson, Akron, Ohio, assignor to National Rubber Machinery Company, Akron, Ohio, a corporation of Ohio

Application November 23, 1931, Serial No. 576,752
Renewed June 26, 1934

7 Claims. (Cl. 18—17)

This invention relates to vulcanizers, and more especially it relates to vulcanizers of the so-called watchcase type in that it comprises improved means for opening and closing this type of vulcanizer.

Vulcanizers of the character mentioned usually are provided with hinged doors or covers which in closing cause the mold first to engage one side of the article therein, with the result that the article is displaced or distorted.

The chief object of this invention is to provide an improved vulcanizer having a power operated door or cover which in its initial opening movement and final closing movement moves perpendicular to its own plane. Further objects include compactness of structure for the conservation of floor space; the assurance of accurate registry of the molds within the vulcanizer when the latter closes; and the provision of means for forcibly urging the cover onto the vulcanizer to compress the work therein.

Of the accompanying drawings,

Figure 1 is a side elevation of the improved vulcanizer, in its preferred form, in closed or operative position;

Figure 2 is a similar view showing the vulcanizer in open position, and the work therein;

Figure 3 is a plan view of the vulcanizer as it appears axially of the cover;

Figure 4 is a section on the line 4—4 of Figure 1; and

Figure 5 is a section on the lines 5—5 of Figures 1 and 2, the cover and the housing or base member with which it mates being shown in elevation.

Referring to the drawings, 10, 10 are a pair of spaced apart base standards that support the lower half 11 of a two-part vulcanizer of which 12 is the upper half or cover thereof. Within the respective vulcanizer sections 11, 12 are the usual complemental mold sections (not shown) a portion of the work in the lower mold section being shown at 13. The vulcanizer sections 11, 12 are disposed at an angle to the horizontal, being lower at the front than at the rear to facilitate mounting and removal of the work. Suitable conduits (not shown) may be provided for conducting heated vulcanizing fluid to and from the vulcanizer sections.

The opening and closing of the vulcanizer is effected by imparting to the cover section 12 a movement of translation wherein said cover at all times is disposed parallel to the parting plane of the vulcanizer. Thus in opening the vulcanizer the cover first moves axially upwardly perpendicular to the parting plane of the vulcanizer, and then moves obliquely upwardly and laterally. These movements are reversed in the closing of the vulcanizer. For guiding the cover 12 in the movement described, said cover is formed with a pair of rearwardly extending arms 14, 14 the free ends of which carry a shaft 15 that has its respective end portions provided with cam rollers 16, 16 adjacent the outer lateral faces of the arms 14. The cam rollers 16 ride in cam slots 17, 17 formed in the inner faces of a pair of brackets 18, 18 rising from the respective base standards 10 at the rear thereof. The cam slots 17 are so arranged with relation to the vulcanizer as to control the axial and lateral movements of the cover 12 as described.

For raising and lowering the cover 12, and for maintaining it at all times parallel to the parting plane of the vulcanizer, there is employed a parallel motion mechanism comprising two sets of arms 20, 21 that are pivotally mounted on respective pivot pins 22, 23 that are mounted in laterally projecting lugs 24 formed on the cover 12 across the top thereof. The arm 20 of each pair is positioned in front of the arm 21. The arms 20, 21 extend downwardly from the cover 12, and the lower ends of arms 20 are connected by a hinge pin 25 that is supported in the lower ends of a pair of spaced apart arms 26, 26 that are pivotally suspended at 27, 27 from the bottom of the lower vulcanizer section 11.

The lower ends of arms 21 are pivotally connected by respective hinge pins 29, 29 to a pair of arms 30, 30 that are pivotally suspended at 31, 31 from the bottom of the lower vulcanizer section 11. The arms 30 are connected to each other by an integral, downwardly bowed web 30a, which adds rigidity to the structure. A pair of links 32, 32 connect the respective ends of hinge pins 25 to the respective hinge pins 29, thereby serving to maintain the arms 20, 21 in parallelism.

Power means for raising and lowering the vulcanizer cover 12 comprises a double acting fluid pressure operated cylinder 35 that is provided with trunnions 36 and swiveled in the base standards 10 at the rear thereof. The cylinder 35 has the usual fluid inlet and outlet pipes (not shown) and a piston rod 37 that has its outer end connected to a sleeve 38 that is journaled on the hinge pin 25. Mounted upon the front head of the cylinder 35 is a spring pressed latch 40 adapted automatically to engage a lug 41 formed on the sleeve 38 when the front end of the cylinder is fully charged and the piston rod 37 thereof is in fully retracted position, as is most clearly

shown in Figure 2. The arrangement prevents accidental lowering of the cover 12 due to failure or leakage of the pressure fluid supply to the cylinder 35. A push rod 42 extends from the latch 40 to the front of the vulcanizer to permit manual disengaging of the latch 40 from the lug 41 when desired.

In the operation of the vulcanizer, assuming it to be in the closed position shown in Figure 1, the front end of the cylinder 35 is charged with the result that the piston rod 37 is retracted into the cylinder and thereby moves the hinge pin 25 in an arcuate course about pivot point 27 as an axis toward the position shown in Figure 2. Since hinge pins 29 are linked to hinge pins 25, they also are caused to move in a similar course about pivot points 31 as an axis, whereby arms 20, 21 are lifted concurrently and in parallelism. The arrangement is such that the cover 12 is lifted, the cam grooves 17 being so shaped that the cover first rises perpendicularly with relation to the parting plane of the vulcanizer, and then moves laterally and upwardly toward the rear, always maintaining the same angular relation to the stationary half 11 of the vulcanizer. In the open position of the vulcanizer the cover 12 is sufficiently removed to give free access to the interior of the vulcanizer and the finished work may be removed and an unvulcanized article mounted therein.

To close the vulcanizer the push rod 42 is pressed inwardly to disengage the latch 40, and the front end of the cylinder 35 is discharged while its rear end is charged. The movement of the cover 12 towards closed position is the reverse of its opening movement, and it descends perpendicularly upon the work from a position above the same shown in broken lines in Figure 2, thus obviating the possibility of deforming or displacing the work as might occur if the cover first engaged the work on one side thereof. As the parts approach the fully closed position of the vulcanizer, the pivot points 22, 27, 25 and 23, 31, 29, of the parallel motion mechanism move into alignment whereby a powerful leverage is exerted upon the cover 12 so as completely to close it and to apply substantial pressure upon the work. No other means is required for holding the vulcanizer closed even though the work therein is subjected to internal pressure, the pivot points mentioned being on dead center with relation to the direction of movement of the cover 12. The pivot pins 22, 23 may comprise eccentric portions on which the arms 20, 21 pivot, as shown in Figure 5 with relation to pivot pins 22, thereby providing a modicum of longitudinal adjustability in the arms 20, 21 to compensate for wear and to assure perfect closing of the vulcanizer.

The vulcanizer is of relatively simple construction and accomplishes the several objects set out in the foregoing statements of objects. In addition, the opening and closing mechanism constitutes a lock for the vulcanizer in the closed position thereof, thus obviating the use of extraneous mechanism for locking the vulcanizer.

Modification may be resorted to without departing from the spirit of the invention or the scope of the appended claims which are not limited wholly to the specific construction shown and described.

What is claimed is:

1. In a vulcanizer, the combination of a stationary vulcanizer section, a movable vulcanizer section adapted to mate therewith, power means for causing the movable section to move laterally away from the stationary section in parallelism therewith, and cam means controlling the direction of said movement.

2. A combination as defined in claim 1 in which the cam means is so constructed and arranged as to cause the movable section initially to leave and/or finally to approach the stationary section in a direction perpendicular to the parting plane of the sections.

3. In a vulcanizer, the combination of a stationary section, a mating section movable laterally with relation thereto, and means for moving said movable section, said power means comprising parallel motion mechanism connected to the movable section and so arranged as to maintain the movable section always in the same angular relation to the stationary section, and a power member for operating said parallel motion mechanism.

4. A combination as defined in claim 3 including cam means controlling the movement of the movable section.

5. In a vulcanizer, the combination of a stationary section, a mating section movable obliquely with relation to the mating plane of said sections, and power means comprising parallel motion toggle mechanism for moving the movable section in parallelism to the fixed section, said toggle mechanism being connected to the movable section and to fixed points, the pivots at the elbows of the toggle mechanism being on dead center with relation to the direction of initial opening movement of the movable section when the vulcanizer is closed.

6. In a vulcanizer, the combination of a stationary vulcanizer section, a mating vulcanizer section movable both normally to and obliquely with relation to said stationary section, two pairs of arms pivotally connected to the stationary section, hinge pins carried by respective pairs of said arms, power means connected to said hinge pins for swinging said pairs of arms, and parallel arms pivotally connecting said hinge pins with the movable vulcanizer section whereby the movable section is moved relatively of the stationary section in parallelism therewith.

7. A combination as defined in claim 6 including a stationary cam operatively engaging the movable section and guiding the same as it is moved by the parallel arms.

CATO IVERSON.