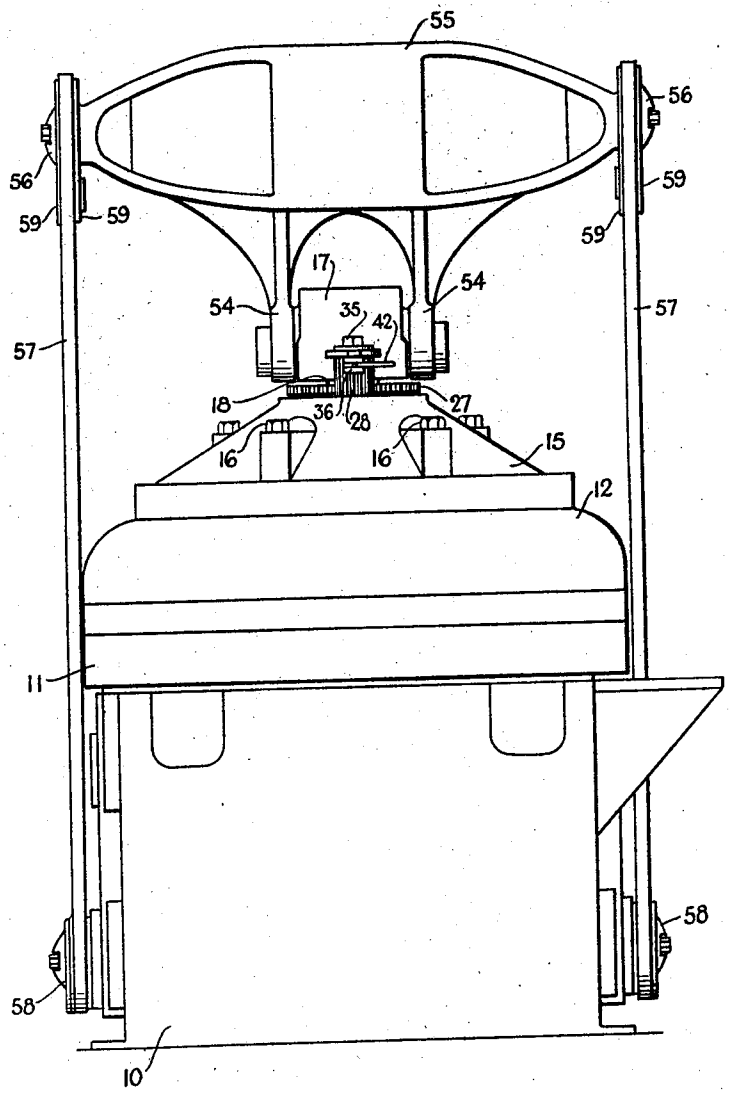
Sept. 19, 1944. L. E. SODERQUIST 2,358,763

VULCANIZING PRESS

Filed Feb. 25, 1943 5 Sheets-Sheet 1

Fig. 1.



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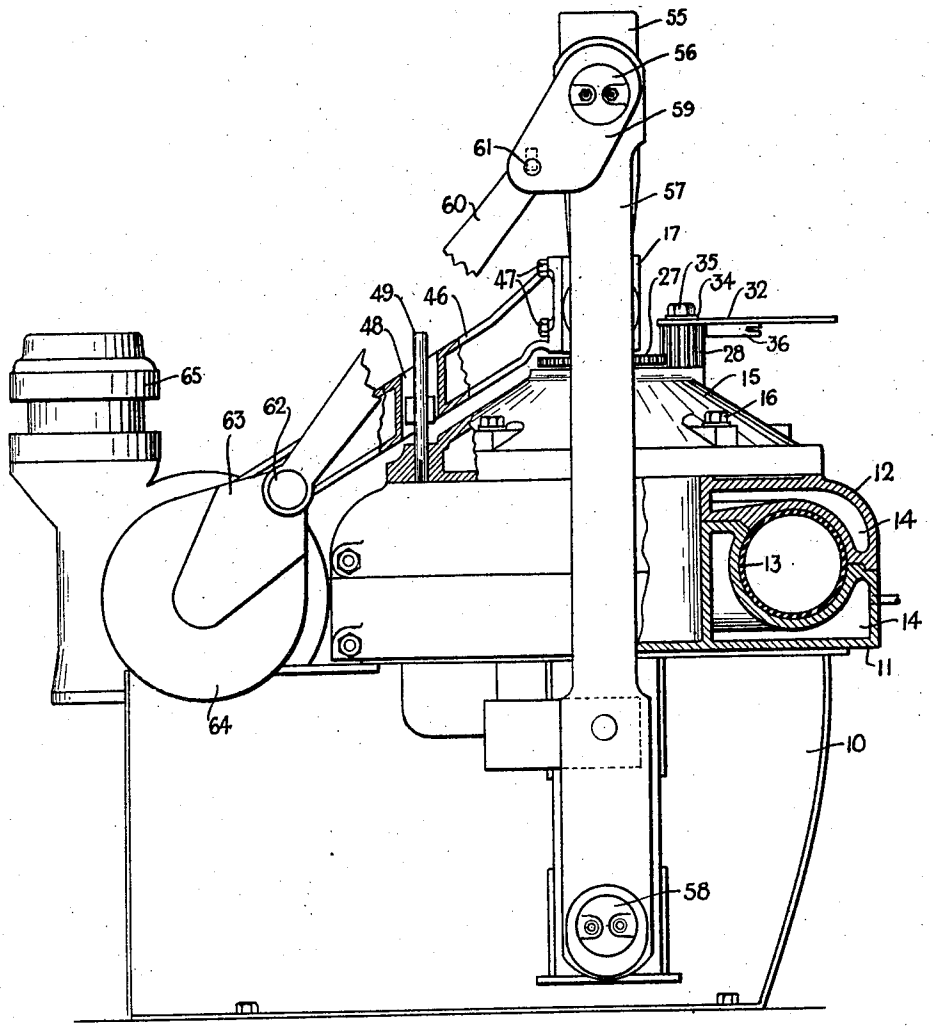
Attorney

Sept. 19, 1944. L. E. SODERQUIST 2,358,763

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Filed Feb. 25, 1943 5 Sheets-Sheet 2

Fig. 2.



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Filed Feb. 25, 1943 5 Sheets-Sheet 3

Fig. 3.

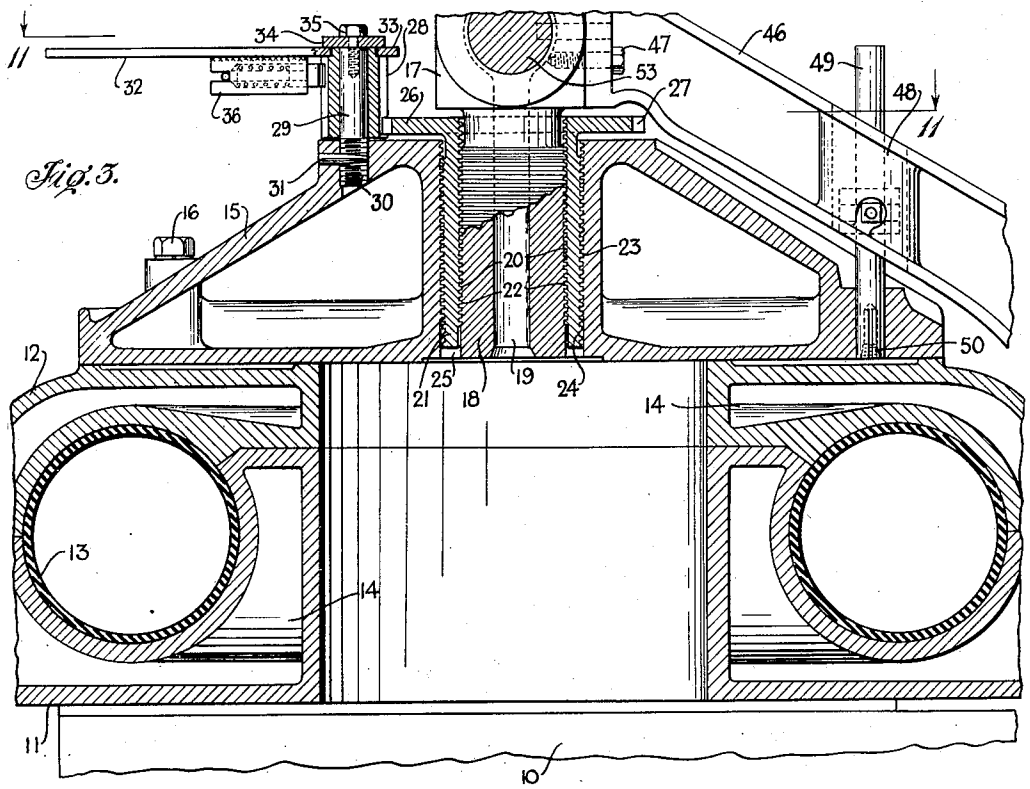


Fig. 4

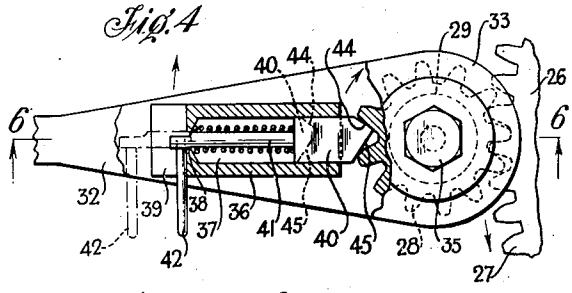


Fig. 5.

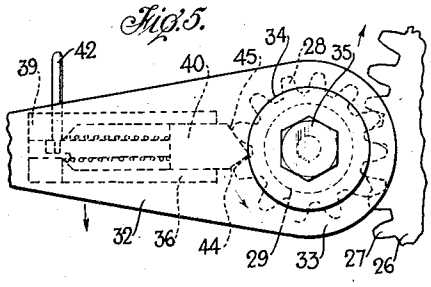


Fig. 6.

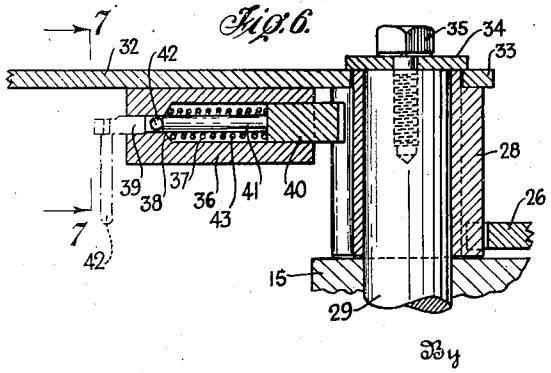
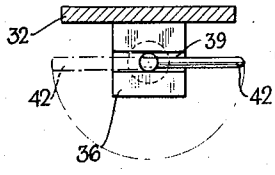


Fig. 7.



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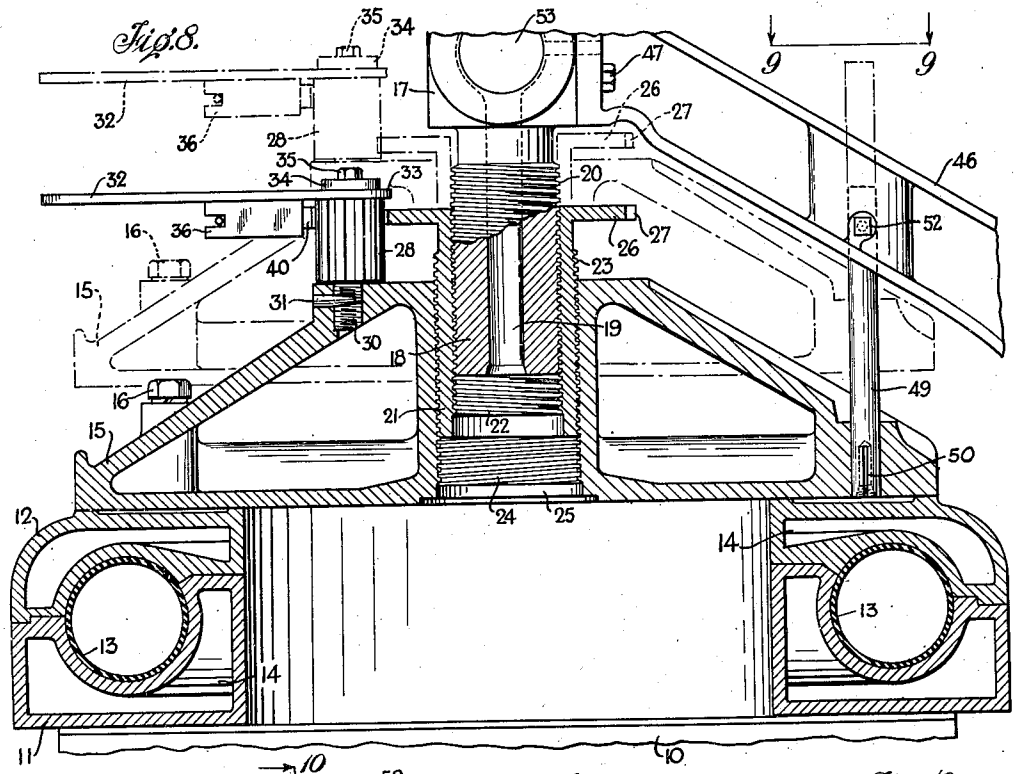
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Filed Feb. 25, 1943 5 Sheets-Sheet 4

Fig. 8.



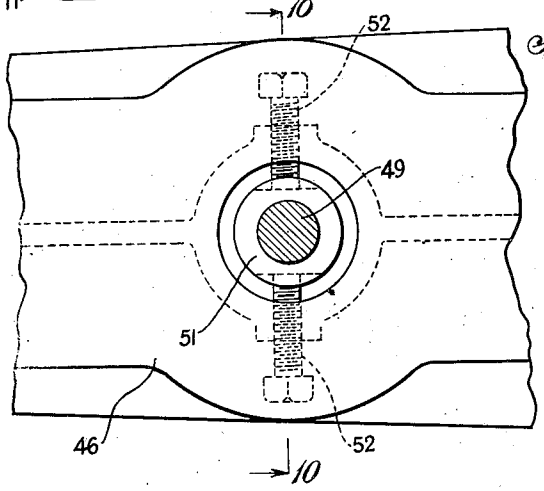


Fig. 9.

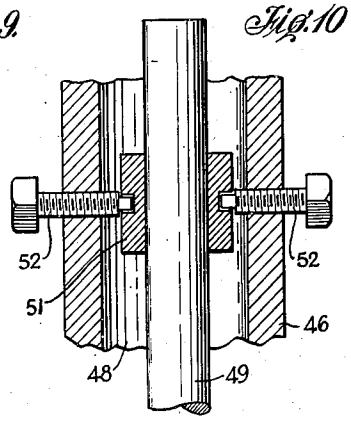


Fig. 10.

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Sept. 19, 1944. L. E. SODERQUIST 2,358,763

VULCANIZING PRESS

Filed Feb. 25, 1943 5 Sheets-Sheet 5

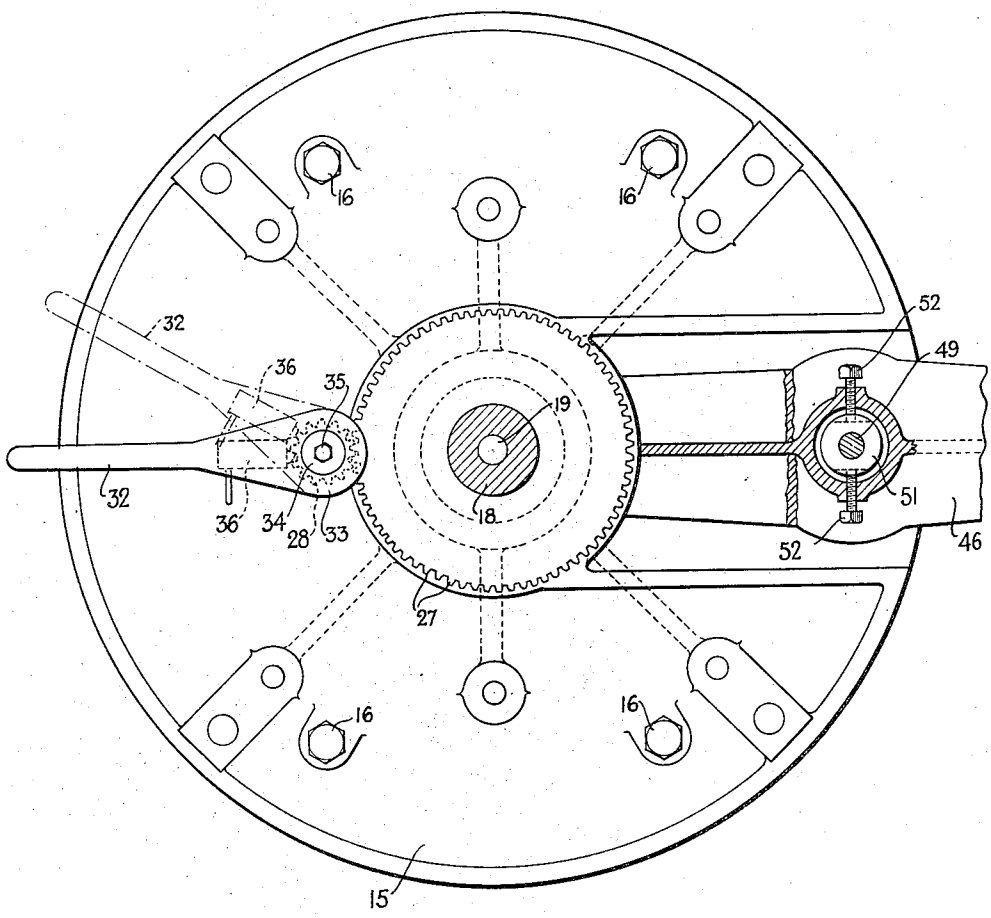


Fig. 11.

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Patented Sept. 19, 1944 2,358,763

UNITED STATES PATENT OFFICE

2,358,763

VULCANIZING PRESS

Leslie E. Soderquist, Akron, Ohio, assignor to The McNeil Machine & Engineering Company, Akron, Ohio, a corporation of Ohio

Application February 25, 1943, Serial No. 477,794

31 Claims. (Cl. 18—17)

The present invention relates to improvements in presses for vulcanizing pneumatic tires and inner tubes for such tires, although it is adaptable for use with other types of presses wherein quick and accurate adjustment is required between the upper platen and the press head.

In presses of this type it is sometimes quite a problem to secure the upper movable mold section and movable upper platen to the press head so as to permit proper adjustment between the press head and these other movable members. This is more particularly true where the press is adapted to receive mold sections of varying sizes and thicknesses whereby a change in mold size may be quickly made without dismantling the press. In the co-pending application of Leslie E. Soderquist and Thomas H. Williams, Ser. No. 429,666, now Patent No. 2,345,838, mechanism is shown for use in large-size presses for accomplishing certain of the purposes of the present invention, but for smaller presses it is more desirable to use the present invention.

It is broadly an object of this invention to provide mechanism which will permit quick and accurate adjustment between the press head and the upper platen when the mold sections are initially placed in the press and when replacements are made with different-sized mold sections.

More specifically, it is another object to provide a rotatable sleeve having right- and left-hand threads on its inner and outer peripheries, respectively, with the inner threads engaging a bolt or screw carried by the press head, and with the outer threads engaging the upper platen whereby rotation of the sleeve will cause relative movement between the platen and press head to effect any desired adjustment.

A further object is to provide a gear-and-pinion arrangement for rotating the sleeve which may be locked at any suitable position so as to prevent accidental rotation of the sleeve.

A further object is to provide means for preventing relative rotation of the platen with respect to the press head.

Other objects and advantages will become apparent from the following description taken in conjunction with the accompanying drawings.

In the drawings:

Fig. 1 is a front elevation of a press embodying the present invention,

Fig. 2 is a side elevation of same with parts broken away and shown in section,

Fig. 3 is an enlarged fragmentary sectional view through the mold sections, the upper platen and part of the press head,

Fig. 4 is an enlarged fragmentary bottom plan view of the pinion and operating mechanism therefor,

Fig. 5 is a similar view of the mechanism shown in Fig. 4, with the pinion operating mechanism reversed,

Fig. 6 is a section through the mechanism shown in Fig. 4, taken substantially on the line 6—6 of Fig. 4,

Fig. 7 is a section taken substantially on line 7—7 of Fig. 6, with some parts shown in elevation,

Fig. 8 is a section similar to Fig. 3 showing reduced molds with broken lines indicating movement of the parts to be adjusted,

Fig. 9 is an enlarged fragmentary view of the parts indicated by line 9—9 of Fig. 8,

Fig. 10 is a section taken substantially on line 10—10 of Fig. 9 with parts shown in elevation, and with the figure turned through an angle of 90°, and,

Fig. 11 is a top plan view of the parts indicated by line 11—11 of Fig. 3 with some parts shown in section.

Referring to the drawings, a vulcanizing press to which this invention may be applied comprises a base 10 which supports a fixed lower section 11 of a vulcanizing mold. An upper mold section 12, complementary to the section 11, is arranged whereby when the mold sections are closed they receive an inner tube 13 or other inflatable member in the usual manner. The mold sections are chambered as at 14 to receive steam or other curing medium and the tube 13 is inflated and deflated in the conventional manner through valves (not shown). The upper mold section 12 is rigidly secured to an upper movable platen 15 by means of spaced bolts 16.

Since the press shown is for vulcanizing inner tubes, the mold sections 11 and 12 could be arranged diagonally, as is well understood in this art. Also these mold sections could be adapted to receive a tire to be vulcanized, in which case the mold sections would contain suitable means to form a tread design on the tire, as is customary.

The upper platen 15 is adjustably secured to a press head 17 substantially centrally of the platen, whereby the distance between the platen and press head can be increased or decreased as desired. As more clearly shown in Figs. 3 and 8, the press head 17 carries a relatively large bolt or screw 18 cast or otherwise formed integral therewith. Bolt 18 and the press head are centrally cored as at 19 to reduce the weight of the

parts, and threads 20 are formed on the outer periphery of the bolt except for a short distance at each end thereof. A sleeve 21 has its inner periphery provided with threads 22 which cooperate with the threads 20 to provide relative turning of sleeve 21 on bolt 18. On its outer periphery the sleeve 21 is formed with threads 23 having threaded engagement with threads 24 formed in the wall of an opening 25 arranged centrally through the upper platen 15. Preferably, threads 22 on the sleeve are right-hand threads, while threads 23 are left-hand threads, and the threads on the bolt 18 and platen 15 are formed to cooperate with the threads on the sleeve. However, it will be apparent that the direction of the threads on the sleeve may be reversed as long as they are oppositely arranged with the threads on the platen and press head changed accordingly.

In its upper end, the sleeve 21 has a preferably integral flange 26 having gear teeth 27 on its outer periphery whereby this flange becomes in effect a ring gear which meshes with the teeth of an elongated pinion 28 rotatably mounted on a stub shaft 29, the lower end of which is threaded into the upper platen 15, as indicated at 30. A locking pin or set screw 31 is utilized to prevent rotation of the stub shaft 29.

Rotation of the pinion 28 and, through it, rotation of the sleeve 21 is preferably accomplished manually by means of a reversible ratchet action. As shown, a ratchet handle 32 has one end 33 arranged around the reduced upper end of pinion 28 so as to rest on top of the teeth of this pinion. A cap or washer 34 is placed over the end of the handle and is secured by means of a bolt 35 threaded into the upper end of stub shaft 29. This bolt 35, when completely tightened, forces the handle, pinion and stub shaft tightly together and prevents any turning of the pinion on the stub shaft. But when bolt 35 is loosened a little, the pinion can turn on the stub shaft and the bolt serves to hold the end 33 of the handle in place on the pinion.

A ratchet housing 36 is formed integral with or otherwise secured to the lower face of handle 32 intermediate the ends thereof, and this housing has a relatively large longitudinal chamber 37 therein extending from the end of the housing nearest pinion 28 for about three-quarters of the housing where it is reduced in size as at 38 and communicates with a transverse opening 39 extending inwardly from the opposite end of the housing. A spring-pressed pawl 40 having a stem 41 is slidably mounted in chamber 37 and a portion of the stem extends into opening 39 where a small handle 42 is connected to the stem and extended at right angles thereto in the opening 39 so that this handle will protrude beyond the sides of the housing. A coil spring 43 surrounds the stem 41 in the chamber 37 and normally urges pawl 40 toward pinion 28 and the extent of movement of pawl 40 toward the pinion is reached when handle 42 is at the inner end of opening 39, as more clearly shown in Figs. 4, 5 and 6.

The head of pawl 40 has two beveled faces 44 and 45 and it will be noted that face 45 is longer and is arranged at a greater angle with respect to the longitudinal axis of the pawl than face 44. Preferably, face 44 is on an angle of about 35° and face 45 is on an angle of about 55° whereby the two faces form substantially a right angle at their meeting edge. However, these faces can be formed on other suitable angles. Face 44 will be referred to as the working face since it determines the direction of movement of the ratchet mechanism to rotate the pinion 28. When the pawl 40 is in the position shown in Fig. 4, movement of the handle 32 in a clockwise direction will turn pinion 28 in the same direction, causing the sleeve 21 to turn in a counter-clockwise direction. After handle 32 has been turned as far as desirable in a clockwise direction, it is brought back to its original position by reversing the direction of its movement, and in doing so, the face 45 of the pawl merely slides over the outer portions of the teeth on pinion 28 without turning the pinion. Clockwise movement of the handle 32 is then repeated and it will be apparent that handle 32 may be operated in the manner indicated until the sleeve 21 has been rotated to the position desired.

To rotate the sleeve 21 in the opposite or clockwise direction, it is necessary to turn the pinion 28 in a counter-clockwise direction and this is accomplished by reversing the action of the pawl 40. As more clearly shown in Figs. 4 to 7, the small handle 42 may be moved longitudinally of the housing 36 until it clears the end of slot 39, thereby moving pawl 40 to the broken-line position shown in Fig. 4. Handle 42 is then turned 180°, as indicated in Fig. 7, and the faces of the pawl will be reversed. The action of spring 43 will urge pawl 40 into engagement with pinion 28 and the arrangement will then be substantially as shown in Fig. 5, with handle 42 being received in the opposite side of slot 39. With pawl 40 in the position shown in Fig. 5, when handle 32 is turned in a counter-clockwise direction, pinion 28 will also be turned in the same direction as indicated by the arrows, and sleeve 21 will be rotated in a clockwise direction. It will be observed that the action of the pawl faces 44 and 45 in response to the movement of handle 32 is the same as in Fig. 4, except that the faces are reversed to turn the pinion 28 in a counter-clockwise direction.

During rotation of sleeve 21 in either direction, means are provided to prevent turning movement of the platen 15 and to insure only vertical movement of this platen. As shown in Figs. 2, 3, 8 and 11, a guide arm 46 has its front end secured to the press head 17 as by bolts 47, while its rear end cooperates with a cam (not shown) carried on a shaft (not shown) at the rear of the press to guide the upper platen 15 and its attached mold during opening and closing of the press. Intermediate its ends, guide arm 46 has a vertical opening 48 through which a rod 49 extends, the lower end of said rod being suitably secured in platen 15, as indicated at 50. As more clearly shown in Figs. 9, 10 and 11, a guide sleeve 51 surrounds rod 49 and is held in place by oppositely arranged screws or bolts 52 which extend through portions of arm 46 and are received in sleeve 51 with what is known as a dogpoint connection. Thus, platen 15 and rod 49 can move vertically in response to rotation of the sleeve 21 and movement of rod 49 will be guided in sleeve 51, but turning movement of platen 15 is prevented.

Referring now to Fig. 8, the features of my improved arrangement are more easily understood. The broken-line position of the platen 15 and the pinion-and-gear mechanism is substantially the same as shown in Fig. 3, while the full-line position of these parts show how the platen 15 and the parts connected thereto may be moved downwardly to accommodate different sizes of

mold sections. Vertical movement of the sleeve 21 is limited to the length of the teeth on pinion 28, since the ring gear on this sleeve can only travel from one end of the pinion teeth to the other. However, by virtue of the oppositely arranged threads on the inner and outer peripheries of sleeve 21, the latter, lower platen 15 and bolt 18 cooperate to double the amount of relative movement between the platen 15 and press head 17. Thus, in Fig. 8, the sleeve 21 has only moved a distance not quite equal to the length of the pinion teeth, but the relative movement between platen 15 and the press head has been twice that distance. Hence, with the arrangement shown, I am able to get a wide range of adjustment while moving the sleeve but half the distance required for the complete adjustment, and this same ratio prevails whether the upper platen and press head are moved toward or away from each other.

In assembling the upper platen 15 and its mold section 12 with the press head 17, a pair of mold sections 11 and 12 would first be laid upon the lower platen 10 and the lower mold section 11 would be secured to the lower platen. Assuming that the upper platen is above the upper mold section, this upper platen may be quickly lowered by properly setting the pawl 40 and manipulating the handle 32. When the platen 15 engages the top of upper mold section 12, the latter may be firmly secured to the upper platen by means of bolts 16. Also, the upper mold section 12 could be initially secured to platen 15 and then lowered with the latter until it properly mated with mold section 11. Obviously, changes in the size of the mold sections may be made with a minimum of time and effort.

The upper mold section 12, platen 15 and the press head 17 are designed to move in unison during the opening and closing of the press, and to this end, the press head has a short shaft 53 journaled therein which carries a pair of spaced arms 54 mounted for rocking movement on the ends of this shaft. Arms 54 are formed integral with a rocking cross beam 55 that has its outer ends 56 suitably journaled in the upper end portions of a pair of side arms 57. The latter arms are pivoted to the base of the press as indicated at 58, and adjacent their upper ends are each provided with a pair of integral lateral extension arms 59. Between each pair of arms 59, one end of a link 60 is pivoted as at 61, while the opposite end of each link is pivoted as at 62 to a crank arm 63 extending outwardly from the side face of a gear wheel 64 keyed to a shaft (not shown) which is suitably mounted for rotation at the rear of the press. The latter shaft is adapted to be driven from a reversing motor 65 so that rotation of said shaft in one direction causes the press to open and be guided during its opening movement by arm 46, while rotation in the opposite direction will close the press. For more specific information as to the opening and closing of a press of this type, reference may be had to the co-pending application Serial No. 429,666, previously referred to.

While I have shown and described the preferred form of my invention, it will be apparent that the invention is not so limited, and modifications may be resorted to without departing from the spirit of the invention or from the scope of the sub-joined claims.

What is claimed is:

1. In a vulcanizing press of the character described having a pair of press sections, at least one of which is movable to open and close the press, a movable press head for supporting said movable press section, means for relatively spacing said press head and said movable press section, comprising a rotatable member having threaded engagement with said press head and with said movable press section, and means for turning said rotatable member, said press head, said movable press section and said spacing means being in axial alignment.

2. In a vulcanizing press of the character described having a pair of press sections, at least one of which is movable to open and close the press, a movable press head for supporting said movable press section, means for relatively spacing said press head and said movable press section comprising a rotatable member having threaded engagement in one direction with said press head and in the opposite direction with said movable press section, and means for turning said rotatable member, said press head, said movable press section and said spacing means being in axial alignment.

3. In a vulcanizing press of the character described having upper and lower press sections, at least the upper of which is movable to open and close the press, a movable press head for supporting said upper press section, means for relatively spacing said press head and said upper press section comprising a rotatable member having threaded engagement with said press head and with said upper press section, and means for turning said rotatable member, said press head, said upper press section and said spacing means being in axial alignment.

4. In a vulcanizing press of the character described having upper and lower press sections, at least the upper of which is movable to open and close the press, a movable press head for supporting said upper press section, means for relatively spacing said press head and said upper press section comprising a rotatable member having threaded engagement in one direction with said press head and in the opposite direction with said upper press section, and means for turning said rotatable member, said press head, said upper press section and said spacing means being in axial alignment.

5. In a vulcanizing press of the character described having a pair of press sections, at least one of which is movable to open and close the press, a movable supporting member for said movable press section, means for relatively spacing said supporting member and said movable press section comprising a rotatable tubular sleeve having threads on both its inner and outer peripheries, one set of said threads having engagement with said supporting member and the other set of threads having engagement with said movable press section, and means for turning said sleeve.

6. In a vulcanizing press of the character described having a pair of press sections, at least one of which is movable to open and close the press, a movable supporting member for said movable press section, means for relatively spacing said supporting member and said movable press section comprising a rotatable tubular sleeve having threads running in one direction on its inner periphery and having threads running in the opposite direction on its outer periphery, one set of said threads having engagement with said supporting member and the other set of said threads having engagement with said movable press section, and means for turning said sleeve.

7 In a vulcanizing press of the character described having upper and lower press sections, at least the upper of which is movable to open and close the press, a movable supporting member for said upper press section, means for relatively spacing said supporting member and said upper press section comprising a rotatable tubular sleeve having threads on both its inner and outer peripheries, one set of said threads having engagement with said supporting member and the other set of threads having engagement with said upper press section, and means for turning said sleeve.

8. In a vulcanizing press of the character described having upper and lower press sections, at least the upper of which is movable to open and close the press, a movable supporting member for said upper press section, means for relatively spacing said supporting member and said upper press section, comprising a rotatable tubular sleeve having threads running in one direction on its inner periphery and having threads running in the opposite direction on its outer periphery, one set of said threads having engagement with said supporting member and the other set of said threads having engagement with said upper press section, and means for turning said sleeve.

9. In a vulcanizing press of the character described having a pair of press sections, at least one of which is movable to open and close the press, a movable press head for supporting said movable press section, means for relatively spacing said press head and said movable press section comprising a rotatable member having threaded engagement with said press head and with said movable press section, a gear carried by said rotatable member, a pinion meshing with said gear, and a reversible ratchet member operable in one position to rotate said pinion in one direction, and when reversed to rotate said pinion in the opposite direction.

10. In a vulcanizing press of the character described having a pair of press sections, at least one of which is movable to open and close the press, a movable press head for supporting said movable press section, means for relatively spacing said press head and said movable press section comprising a rotatable member having threaded engagement in one direction with said press head and in the opposite direction with said movable press section, a gear carried by said rotatable member, a pinion meshing with said gear, and a reversible ratchet member operable in one position to rotate said pinion in one direction and when reversed to rotate said pinion in the opposite direction.

11. In a vulcanizing press of the character described having upper and lower press sections, at least the upper of which is movable to open and close the press, a movable press head for supporting said upper press section, means for relatively spacing said press head and said upper press section comprising a rotatable member having threaded engagement with said press head and with said upper press section, a gear carried by said rotatable member, a pinion meshing with said gear, and a reversible ratchet member, operable in one position to rotate said pinion in one direction and when reversed to rotate said pinion in the opposite direction.

12. In a vulcanizing press of the character described having upper and lower press sections, at least the upper of which is movable to open and close the press, a movable press head for supporting said upper press section, means for relatively spacing said press head and said upper press section comprising a rotatable member having threaded engagement in one direction with said press head and in the opposite direction with said upper press section, a gear carried by said rotatable member, a pinion meshing with said gear, and a reversible ratchet member operable in one position to rotate said pinion in one direction and when reversed to rotate said pinion in the opposite direction.

13. In a vulcanizing press of the character described having a pair of press sections, at least one of which is movable to open and close the press, a movable supporting member for said movable press section, means for relatively spacing said supporting member and said movable press section comprising a rotatable tubular sleeve having threads on both its inner and outer peripheries, one set of said threads having engagement with said supporting member and the other set of threads having engagement with said movable press section, a gear carried by said sleeve, a pinion meshing with said gear, and a reversible ratchet member operable in one position to rotate said pinion in one direction and when reversed to rotate said pinion in the opposite direction.

14. In a vulcanizing press of the character described having a pair of press sections, at least one of which is movable to open and close the press, a movable supporting member for said movable press section, means for relatively spacing said supporting member and said movable press section comprising a rotatable tubular sleeve having threads running in one direction on its inner periphery and having threads running in the opposite direction on its outer periphery, one set of said threads having engagement with said supporting member and the other set of said threads having engagement with said movable press section, a gear carried by said sleeve, a pinion meshing with said gear, and a reversible ratchet member operable in one position to rotate said pinion in one direction and when reversed to rotate said pinion in the opposite direction.

15. In a vulcanizing press of the character described having upper and lower press sections, at least the upper of which is movable to open and close the press, a movable supporting member for said upper press section, means for relatively spacing said supporting member and said upper press section comprising a rotatable tubular sleeve having threads on both its inner and outer peripheries, one set of said threads having engagement with said supporting member and the other set of threads having engagement with said upper press section, a gear carried by said sleeve, a pinion meshing with said gear, and a reversible ratchet member operable in one position to rotate said pinion in one direction and when reversed to rotate said pinion in the opposite direction.

16. In a vulcanizing press of the character described having upper and lower press sections, at least the upper of which is movable to open and close the press, a movable supporting member for said upper press section, means for relatively spacing said supporting member and said upper press section, comprising a rotatable tubular sleeve having threads running in one direction on its inner periphery and having threads running in the opposite direction on its outer periphery, one set of said threads having engage-

ment with said supporting member and the other set of said threads having engagement with said upper press section, a gear carried by said sleeve, a pinion meshing with said gear, and a reversible ratchet member operable in one position to rotate said pinion in one direction and when reversed to rotate said pinion in the opposite direction.

17. A vulcanizing press of the type referred to in claim 13 wherein means are provided to lock said gear, said pinion and said ratchet member against movement of any kind.

18. A vulcanizing press of the type referred to in claim 9 wherein means are provided to prevent turning movement of said movable press section.

19. A vulcanizing press of the type referred to in claim 13 wherein means are provided to prevent turning movement of said upper press section.

20. A vulcanizing press of the character described having upper and lower press sections, at least the upper of which is movable to open and close the press, a movable supporting member for said upper press section, a threaded extension on said supporting member, said upper press section being provided with a threaded opening, a rotatable tubular sleeve having threads on its inner periphery running in one direction and in threaded engagement with said extension, said sleeve having threads on its outer periphery running in the opposite direction and in threaded engagement with the threads in said opening, and means for rotating said sleeve for relatively spacing said supporting member and said upper press section.

21. In a vulcanizing press of the character described having a pair of complementary mold sections, at least one of which is movable to open and closed position, a platen to which said movable mold section is secured, a movable supporting member for said platen, said platen being between said supporting member and said movable mold section, means for relatively spacing said supporting member and said platen, comprising a rotatable member having threaded engagement with said supporting member and with said platen, and means for turning said rotatable member, said platen, said movable mold section, said supporting member and said spacing means being in axial alignment.

22. A vulcanizing press of the type referred to in claim 21 wherein means are provided to prevent rotation of the platen during turning movement of the rotatable member.

23. A vulcanizing press of the type referred to in claim 21 wherein said rotatable member has threaded engagement in one direction with said supporting member and in the opposite direction with said platen.

24. In a vulcanizing press of the character described having upper and lower mold sections, at least the upper of which is movable to open and closed position, a platen to which said upper mold section is secured, a press head for supporting said platen, said platen being between said press head and said upper mold section, means for relatively spacing said press head and said platen, comprising a rotatable member having threaded engagement with said press head and with said platen, and means for turning said rotatable member, said platen, said upper mold section, said supporting member and said spacing means being in axial alignment.

25. A vulcanizing press of the type referred to in claim 24 wherein means are provided to prevent rotation of the platen during turning movement of the rotatable member.

26. A vulcanizing press of the type referred to in claim 24 wherein said rotatable member has threaded engagement in one direction with said press head and in the opposite direction with said platen.

27. In a vulcanizing press of the character described having a pair of mold sections, at least one of which is movable to open and closed position, a platen to which said movable mold section is secured, a movable supporting member for said platen, means for relatively spacing said supporting member and said platen, comprising a rotatable tubular sleeve having threads on both its inner and outer peripheries, one set of threads having engagement with said supporting member and the other set of threads having engagement with said platen, and means for turning said sleeve.

28. A vulcanizing press of the type referred to in claim 27 wherein the threads on the inner periphery of said sleeve run in one direction and the threads on the outer periphery of said sleeve run in the opposite direction.

29. A vulcanizing press of the type referred to in claim 27 wherein the threads on the inner periphery of said sleeve run in one direction and the threads on the outer periphery of said sleeve run in the opposite direction, and means for preventing rotation of the platen during turning movement of the sleeve.

30. A vulcanizing press of the type referred to in claim 27 wherein said last named means comprises a gear carried by said sleeve, a pinion meshing with said gear, and means for rotating said pinion in either direction.

31. A vulcanizing press of the type referred to in claim 27 wherein the threads on the inner periphery of said sleeve run in one direction and the threads on the outer periphery of said sleeve run in the opposite direction, said means for turning said sleeve comprising a gear carried by said sleeve, a pinion meshing with said gear, and means for rotating said pinion in either direction.

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