My invention relates to improvements in steam compress heaters, the compresses being for use in the therapeutic treatment of inflammation, and has for an object to provide a chamber wherein a number of said compresses may be retained while being subjected to the moist sterilizing effect of steam at atmospheric pressure.

Another object of my improvement is to provide mechanism within said chamber whereby said compresses may be taken into the chamber one at a time and, after a period of time within the chamber, be ejected one at a time therefrom.

Another object of my improvement is to adapt said mechanism both for continuous automatic action during periods of controllable length and also for controllable single operations.

Other objects of my improvement will appear as the description proceeds.

I attain these and other objects of my improvement with the mechanism illustrated in the three sheets of accompanying drawings in which Figure 1 is a plan view of my heater, Fig. 2 is a plan section thereof on the bent broken line 2—2 of Fig. 4, Fig. 3 is a side elevation of the heater from which a side wall thereof has been broken away, Fig. 4 is a front elevation of the heater from which a portion of the front walls have been broken away, Fig. 5 is a side elevation of a compress drawer, Fig. 6 is an end elevation of Fig. 5, Fig. 7 is a top plan view of Fig. 5, Fig. 8 is a segmented end elevation of the Geneva movement, Fig. 9 is a plan view of a compress drawer carrier and link, Fig. 10 is a side elevation of Fig. 9, Fig. 11 is an end elevation of Fig. 10, Fig. 12 is a side elevation of the slide crank pin drawn on a larger scale, Fig. 13 is a top plan view of Fig. 12, Fig. 14 is a side elevation of the door connecting rod and crank assembly segregated and drawn on a larger scale, Fig. 15 is a bottom plan view of Fig. 14, and Fig. 16 is an end elevation of Fig. 14, and Fig. 17 is a front elevation of the steam dome door.

Similar characters refer to similar parts throughout. Certain parts are broken away to show other parts hidden thereby.

With more particular reference to the designated parts: The walls of a lower chamber are shown at 17 and the table top thereof at 18. A second floor 17 in the lower chamber is used for a base to which are fastened bearing brackets of the mechanism. The walls of a steam dome are joined at the bottom to table top 18. Steam pipe 20 from a source of steam—not shown—is connected into the top of sump 21.

Electric-motor starting and stopping push buttons 21 and 22, respectively, preferably, are placed on the front wall of the lower chamber beneath table top 21 and they operate contact points on the adjacent ends of the electric wires of a cable extended through the interior of the lower chamber into and out of starter 22 in said chamber and connect with the terminals of electric motor 22 which is fastened beneath floor 17 in said chamber. There are electric service wires connected to starter 22 but not shown. Motor shaft 23 has silent chain sprocket 24 fastened thereon.

Drive shaft 27 is mounted in bearings 29, 30, and 31 on brackets 28, 32 and 33 fastened on the top of floor 17 disposing said shaft parallel with motor shaft 23. On shaft 27 is fastened silent chain sprocket 26 aligned with sprocket wheel 24 over both of which is placed silent chain 25 engaged therewith. The construction providing for driving shaft 27 by motor 22.

Bracket 24 is integral with the tops of bearings 29 and 30 and supports bearing 35 at right angles therewith and in which is mounted for revolution a short shaft 63 on the lower end of which is fastened bevel gear 61 and on the upper end of which is fastened the sleeve of crank 63. Crank 63 has a slideway 64 in its top side at its free end having slot 63 in the bottom thereof. Base 65 is mounted for reciprocation in slide way 64 and thereon is fastened wrist pin 65.

Through a hole in base 65 is extended bolt 68 which also is extended through slot 63 to fasten base 65 and crank arm 63 in relative sliding relation. Pin 66 is extended from one end of base 65 to be extended through a hole in lug 68 on arm 63 and on pin 66.
is mounted coil spring 67 to react between said lug and base 65. The construction provides for mounting wrist pin 69 on crank arm 63 allowing for shortening said crank against the resistance of spring 67.

One end of connecting rod 70 is engaged with wrist pin 69 and the other end thereof is engaged with pin 71 fastened on the bottom of door 58. The central portion of connecting rod 70 is expanded by frame 670, aff0, providing an opening through which the ejection arms may pass, as hereinafter to be explained.

In an opening in table top 18 is disposed channel bar 56 midway in front of the steam dome with its inner end fastened to steam dome floor 53 and its outer end fastened to the front wall of the lower chamber 17. The interior of the channel bar is of semicircular cross section and on its exterior wall near each upper edge are two parallel guideway grooves 57, 57. Door opening 19 in the front wall of the dome at the bottom thereof is semicircular and registers with the semicircular channel groove, the two providing a circular entrance into the steam dome. Dome door 58 has an opening 68 therein through which channel bar 56 is extended to mount the door on the channel bar for reciprocation with semicircular door member 68 fitted to the channel groove and lugs 68 on the door engaged in grooves 57 of the channel bar. The construction provides for the reciprocation of the door on the channel bar between its full and dotted line positions at 58 and 55', respectively, by the revolution of shaft 27. And the reaction of spring 67, shown in Fig. 14, tends to retain the door against the dome wall with resilient pressure.

Fastened to the end walls of dome 19 are upright frame members 42, 42 which provide bearings for lower sprocket wheel shaft 41 near their lower ends and slideways for reciprocative bearing blocks 44 at their upper ends. Coil springs 45 are disposed to react between the frame members 42 and the bottoms of bearing blocks 44 to retain the bearings in upper positions of reciprocation by resilient pressure.

Lower sprocket wheels 46, 46 are fastened on lower shaft 41 for revolution therewith. Upper sprocket wheels 47, 47 are fastened on shaft 43 for revolution therewith in chain relation with lower sprocket wheels 46. A chain is placed over said two sets of sprocket wheels consisting of a number of tray-carrier links 48. These tray-carrier links consist of a semicircular body having a pair of lugs 50, 50 projecting from each side thereof with aligned holes near the ends thereof. The lugs are relatively disposed to cause the adjacent lugs of adjacent links to bear on each other flatwise when the links are in line laterally and the said adjacent lugs are fastened together loosely with rivets providing an endless chain of said tray carriers referred to above. The teeth of sprockets 46 and 47 are shaped to engage this chain as clearly shown in Fig. 4. On the interior wall of each of carrier links 48 near the edges thereof are slideway grooves 49 in elements of said cylinder. Lower sprocket shaft 41 at one end is extended through an opening in the rear wall of the steam dome and has silent-chain sprocket wheel 641 fastened thereon.

Counter shaft 36 is mounted for revolution in bearings 34 and 35 in the lower chamber and has one end extended through the rear wall of the chamber on which is fastened silent-chain sprocket wheel 39 aligned with sprocket wheel 641. Shafts 27, 26, and 41 are parallel. An endless silent chain 40 is placed over sprocket wheels 39 and 641 engaged therewith. The star wheel 38 of a Geneva movement is fastened on counter-shaft 36 for revolution therewith within the lower chamber. The locking disc 37 is fastened on shaft 27 aligned with the star 38 disposed in turn to contact with and pass the concave peripheral walls 355, 355, 355, 355 of said star and retain the star at rest during the remaining portion of the disc revolution. Geneva crank 81 is fastened on shaft 27 and is disposed to cause pin teeth 82 therein to engage in one of the star slots 355 while the disc engages in one of the star arcs 355, and arcuate notch 357 in the disc provides space for the star while the same is being revolved by crank 81. The construction provides for a quarter of a turn of the shaft 36 and a period of pause thereof during each complete revolution of shaft 27. Shaft 26 drives the chain of tray carrier and, by construction, said chain is moved the space of one of said links 48 during a quarter-revolution of shaft 27 and said chain remains at rest during the remaining three-quarters of said shaft revolution.

In the description given above of the reciprocative movement of door 58 certain details thereof, which now will be given, were purposely omitted. Bevel gears 60 and 61 are, by construction, of equal diameter. Each complete revolution of shaft 27 causes one quarter to complete out and return movement of the door. However, there is a period of pause at each end of door travel greater than the normal pause due to change in direction of movement. This period is caused by slot 633 in crank 63 which also limits the length of said pause. When the door is in its solid-line position and also when the same is in its dotted-line position at 58' bolt 68 in said slot is spaced from the outer end of said slot and wrist pin 69 must be moved through an arc, determined by the length of said slot, before connecting rod 70 can operate to move the door, and during this time the door remains at rest under resilient pressure of spring 67.
Each of the tray carrying links 48 is provided with a compress drawer or tray 51. Each of these trays consists of a semi-cylindrical body with ribs 53, 55 on the exterior at the edges thereof and ends 52, 52 circular in shape. When the tray is in operative position in the carrier ribs 53, 55 engage in grooves 49, 49 in the carrier for reciprocation. The carrier and tray together form a cylinder as clearly shown in Fig. 4. On the exterior in the bottom of the tray near the front end thereof is arcuate notch 55 concentric with the center of shaft 41 when its carrier is seated in sprocket wheel 46. On the inside of door 58 is fastened hook 59 disposed to engage notch 55 in each tray, when the door is closed and said tray enters its lowest position aligned with door opening a19. In said position the tray comes to rest and, by construction, at this time, the door moves forward under the action of connecting rod 70, and carries said tray with it out into channel 56 where it comes to rest at 51', 62' during the period while the door remains in its position at 58' because of slot d66 in crank 68, as above explained.

A pair of ejector arms a78, a78 unite in bearing lug b77 which is pivoted for oscillation on pin 76 in bearing bracket 77. Each of arms a75 terminates in an arcuate fore-arm 78 concentric with pin 76. Crank 78 is fastened to lug b77 and is disposed between said arms. Lever 72 is fulcrumed on pin 71 in bracket a28 and its upper end is pivoted to one end of link 79 the other end of which is pivoted to the end of arm crank 75. On lever 72 is mounted roller 73 for revolution adjacent shaft 27. On shaft 27 is fastened cam 74 disposed to bear on roller 73 during each forward revolution of shaft 27 forcing lever 72 to swing outward to occupy its extreme position shown in dotted lines at 72' also forcing arms a78, 78 upward to a78', 78'. In both their solid and dotted-line positions arms a78, 78 are at one side of their pivoted bearing 76 and tend to return by gravity from their said dotted-line to their solid-line position, thus lever 72 will follow cam 74 as it revolves and return to its full-line position following a brief period of pause in its dotted-line position.

Channel bar 56 has two transverse openings a66, a66 in the bottom thereof and tray 51 has two similar and equally spaced transverse openings 54, 54 in its bottom and the said four openings register in pairs when the tray is in its most forward position at 51'. Said pairs of openings and arcuate arms 76, 78 are relatively disposed so that the arms are extended through the openings when said arms are in their upper positions at 78'.

A partition 88 separates the steam dome from the lower chamber. This is preferably a casting and is shaped to avoid the mechanism and provide a sump at one side of the structure. The sump is shown at a83 and may be drained by pipe 84 which is provided with a stop cock a84.

In operation: Assume that the motor 22, under control of the push buttons 21 and a21, slowly drives the shaft 27 in a forward direction, as viewed as in Fig. 4. The continuous revolution of shaft 27 causes alternating movements and periods of pause of tray carriers 48, with the periods of pause about three times the length of the periods of movement and one period of pause and one period of movement during each complete revolution of the shaft 27. Each movement of door 58 also depends on the revolution of shaft 27; there being a complete reciprocation, that is one complete out movement, a period of pause, one complete in movement and a period of pause of said door during each revolution of the shaft. The door movements are timed relative to the said carrier movements to dispose the door in its closed position, illustrated in solid lines, at all times except during the central portion of the period of pause of each of the tray carriers in its lowest position; during which fraction of time the door and tray engaged thereby move out to their farthest out positions in reciprocation, remain out in a period of pause and then return to their inner positions illustrated in solid lines. So that hook 59 is engaged by notch 55 as each tray comes to its lowest position in the dome behind door opening a19. When the door is moved from its closed position the tray is taken thereby to be returned when the door is returned, and when the tray carrier is moved following the completion of its period of pause, notch 55 moves out of engagement with hook 59 to be followed by a similar notch in the next tray which engages with the hook and then this tray is moved out into channel bar 56, remains out a brief period and returns within its carrier while the latter pauses in its lowest position. Preferably the inner end of each tray is never entirely withdrawn from its carrier.

Arms a78, 78 move up and down once during each revolution of shaft 27 being carried upward by said revolution and returning by gravity. The upward movements of the arms are timed to occur while a tray 51 is outside in channel bar 56 so that said arms may pass through the two pairs of openings a56 and 54 in said channel bar and tray and through expanded rod 70 during the period of pause of the tray in the channel bar. From which it follows that by pressing button 21 a tray is projected from the bottom of the steam dome on to the table and, while there, two arms are extended upward through its bottom only to disappear downward through the same when the tray returns into the dome and the opening through which it passed is closed. These related operations...
continue in the same order till button a21 is pressed when they cease.

Assume that steam enters the steam dome through pipe 20, and that a wet compress A occupies each of the combined tray and carriers. These compresses are maintained hot and sterile. A nurse comes to the heater with a cold compress desiring to exchange it for a hot one. The button 21 is pressed and a tray containing a hot compress is projected on the table and the compress therein is ejected as at A' to fall on the table. The nurse places the cold compress in the emptied tray and takes the hot one. The tray with the cold compress disappears into the steam dome. If another hot compress is required at once, it soon appears and is ejected as was the other. Its place is taken by a cold compress and the operation continues. If no more hot compresses are needed for a time, button a21 is pushed and the machinery ceases to operate while the compresses in the steam dome are maintained hot and sterile. In this manner hot compresses are available at any time in quick succession.

When desired, steam connections are not made through pipe 20 and the required steam is generated by an electric heating element placed with water in sump 65.

Having thus disclosed my invention, what I claim as new therein and desire to secure by Letters Patent is—

1. In apparatus of the kind described, a steam dome, an endless conveyor of compress-tray carriers mounted for operation in said steam dome, power means for operating said conveyor in recurrent periods of movement and pause, a compress tray engageable in each of said tray carriers, and automatic means to project one of said trays at a time from said steam dome and to withdraw said tray into said dome during a said period of pause in said conveyor operation.

2. In apparatus of the kind described, a steam dome having an opening therein, a door to close said dome opening, an endless conveyor of compress-tray carriers mounted for operation in said dome, power means for operating said conveyor in recurrent periods of movement and pause, a compress tray engageable in each of said tray carriers, and automatic means being operable to open said door to project one of said trays at a time through said door opening outside of said dome to withdraw said tray into said dome and close said door during a said period of pause in said conveyor operation.

3. In apparatus of the kind described, a steam dome, an endless conveyor of compress-tray carriers mounted for operation in said dome, power means for operating said conveyor in recurrent periods of movement and pause, a compress tray engageable in each of said tray carriers, automatic means being operable to project one of said trays at a time from said steam dome and to withdraw said tray into said dome during a said period of pause in said conveyor operation.