Jan. 12, 1932. G. HUNT 1,840,814

APPARATUS FOR FINISHING KNITTED HOSE AND THE LIKE

Filed Aug. 31, 1929 2 Sheets-Sheet 1

Fig. 1.

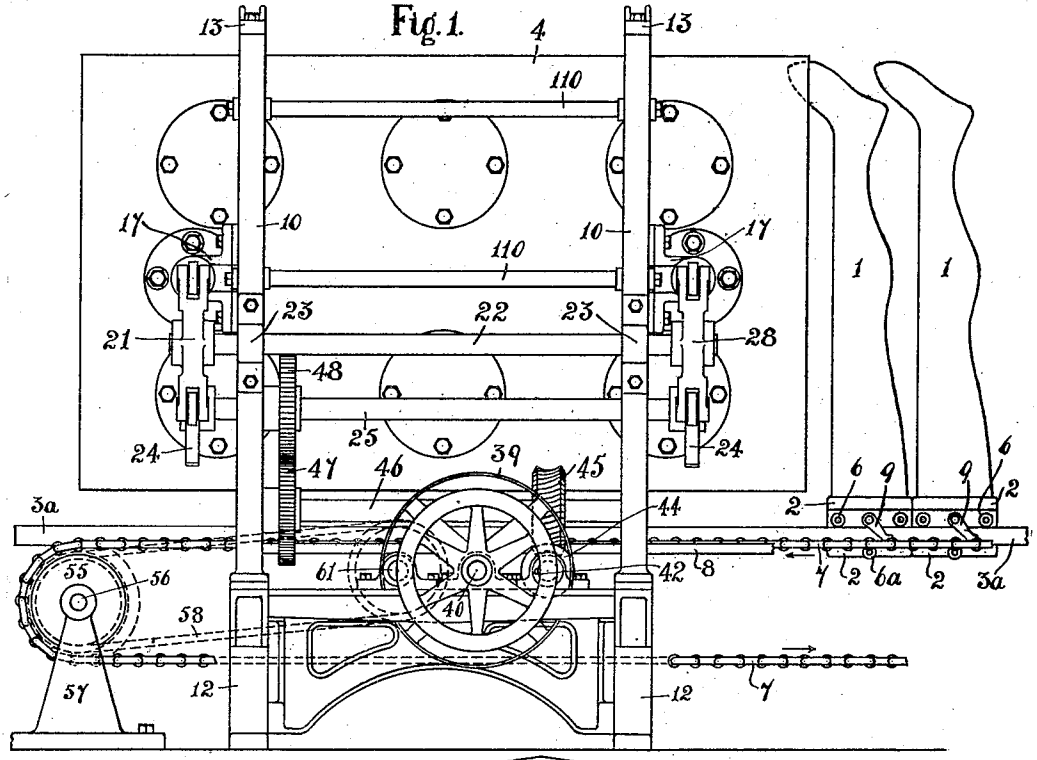
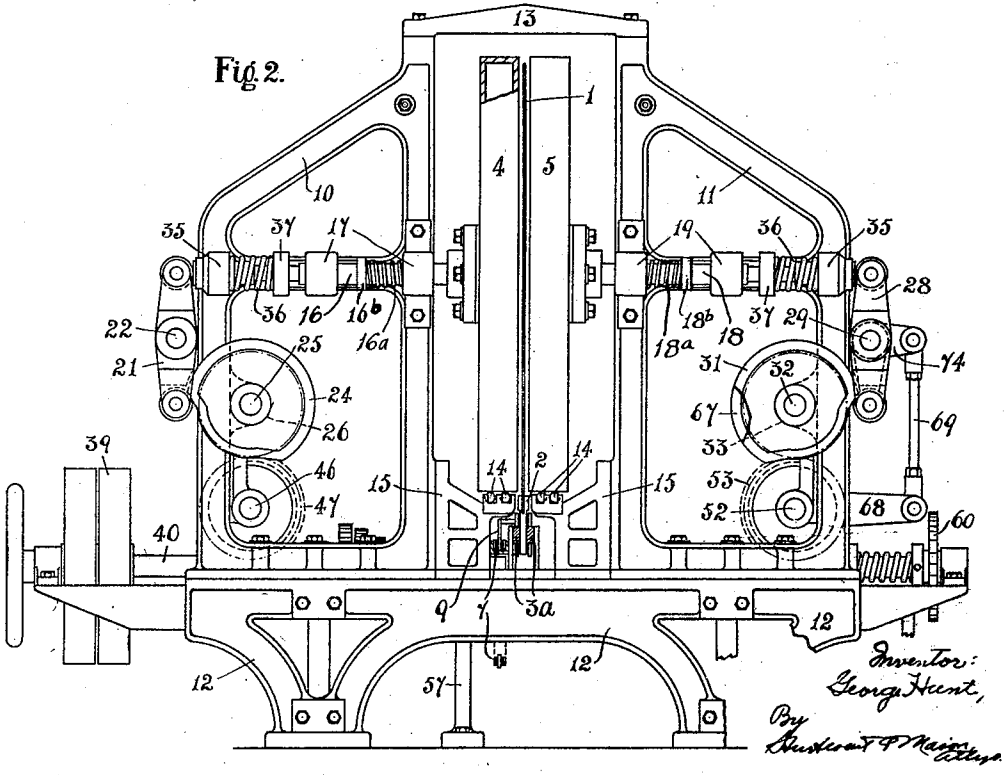


Fig. 2.



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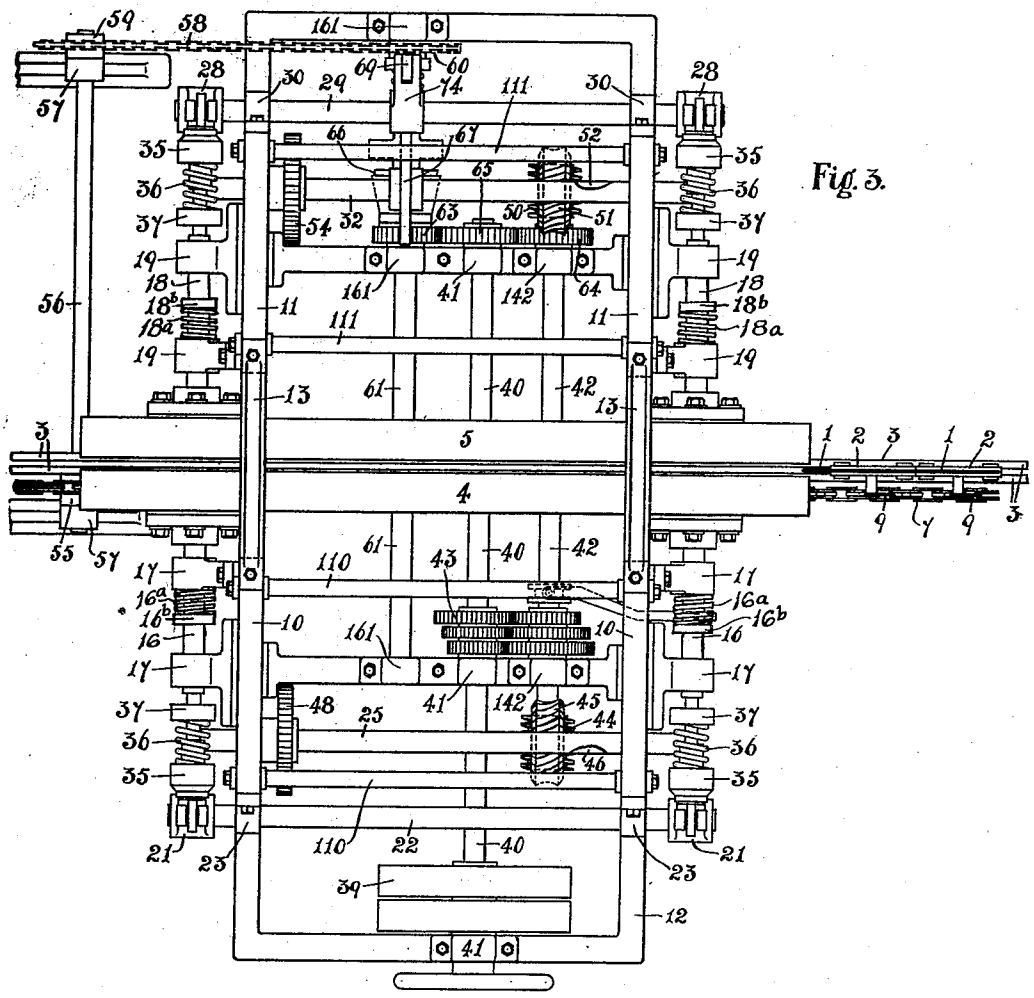


Fig. 3.

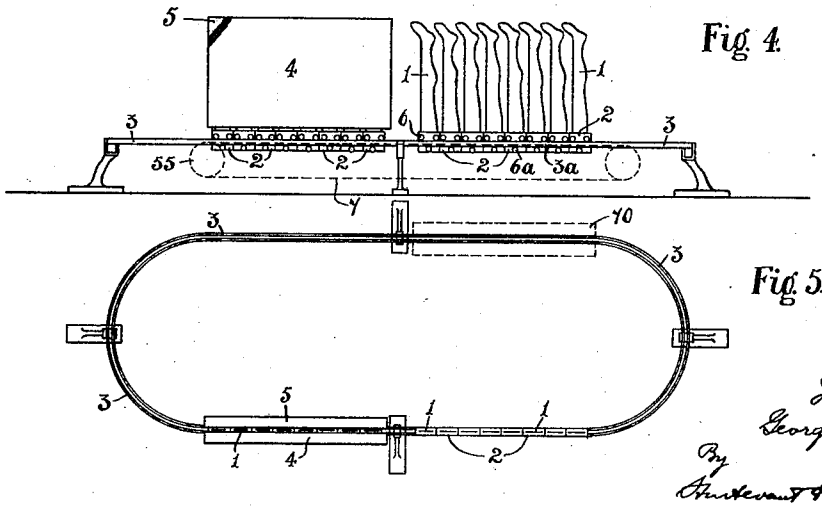


Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR FINISHING KNITTED HOSE AND THE LIKE

Application filed August 31, 1929, Serial No. 389,799, and in Great Britain August 12, 1929.

This invention relates to improvements in apparatus for finishing hose and other shaped articles made of knitted or other textile fabrics which are pressed on formers of the requisite shape, and its object is to provide facilities for carrying on the operation in a more expeditious and convenient manner.

The common practice is to employ a press with horizontal beds one of which is movable on vertical guides secured to the ends of the fixed bed, distribute a certain number of garments which have been previously placed on wooden formers between the heated beds of the said press, then press the whole simultaneously and subsequently withdraw them from the same side as they were inserted. The whole of the work entailed by this method, including the operation of the press itself and the insertion and removal of the garments, is effected by hand. Considerable time is with this method taken up in changing the garments in the press, whilst the time the garments are under pressure varies considerably from time to time, as it depends on the attention of the operator.

According to this invention, the formers carrying the garments are run in on one side of the press, and out at the other side being supported on or in a railway or the like. In order to enable this to be done, the press must be constructed so that there is a clear way through in what may be termed the longitudinal direction, and also one at least of the sides parallel to such direction must be unobstructed, so that the formers which run on or in the railway or the like have a clear passage.

In the preferred form of the invention, the press is operated by power, and the formers with the garments disposed thereon, travel along a railway and are moved into and out of the press by automatic means. Preferably the operation of these automatic means commence conincidently with the opening of the press and stop when it begins to close, and in such case, the time the formers are in the press can be of a definitely set and predetermined period. Also the operation of changing the press contents is speeded up as one set of formers with garments thereon is moved into the press on one side, as the preceding set is moved out on the other side, and no time is thus lost in making the change.

In constructing a press according to this invention, I prefer to arrange the beds in a vertical position, which enables the said beds to be supported with facility, and leaves the bottom of the press unobstructed for the passage of the formers. The vertical position has also other advantages hereinafter referred to. Furthermore, in order to avoid friction as the formers enter the press, both beds are preferably made movable.

Referring to the accompanying drawings which show the preferred way of carrying out the said invention.

Fig. 1 is a front elevation,

Fig. 2 is a side elevation, and

Fig. 3 a plan of a press and the feeding mechanism directly associated therewith, constructed according to my invention.

Fig. 4 is a front elevation, and

Fig. 5 a plan showing the general arrangement,

Figs. 4 and 5 are drawn to a smaller scale than Figs. 1 to 3.

Like numerals indicate like parts throughout the drawings.

In carrying out this invention, the garment formers 1, (see Figs. 4 and 5) are each mounted on a carriage 2, and the latter run on a preferably endless railway 3, which is so disposed relatively to the press beds 4 and 5, that the garment formers 1 can travel along the railway 3, into and out of the space between the press beds 4 and 5.

In what is found to be the most convenient arrangement which is shown in the drawings, the heated beds 4 and 5 which comprise the press, are disposed in a vertical position immediately above a straight portion 3a of the

endless railway 3, the beds 4 and 5 are disposed in vertical planes parallel to that of the railway, and the space between the beds when open is central with the railway track, and is quite clear of obstructions, so that the garment formers 1 which are also vertical, can be run straight into the space between the press beds 4 and 5 on one side, rest there whilst the garments thereon are pressed, and then run out again on the other side.

The former carrying carriages 2 are provided with wheels 6 to run on the top of the rails 3 (see Fig. 1) and with wheels 6*a* to run on the underside and prevent the carriages from being displaced. The garment formers 1 which are disposed vertically on their carriages 2 in the plane of the railway 3, may be composed of either metal or wood. The carriages 2 are of a length that will permit of a gang or train of the same being made-up with the garment formers 1 carried thereby disposed close behind each other as shown in Fig. 4. This train of garment formers can be run-in between the press beds 4 and 5, the garments thereon pressed, and the train then run-out and a following train simultaneously run-in, so that the operation of changing the garments in the press is carried out without any loss of time.

In Figs. 4 and 5 a train of garment formers 1 is shown in the press, whilst a second train is shown on the right which can be run-in as the preceding train is run-out.

After leaving the space between the press beds 4 and 5, the garment formers 1 are run back separately along the return portion of the railway 3, and at this part of the journey, the garments which have been pressed, can be readily removed from the formers 1, and others substituted and adjusted ready for the pressing process.

The carriages 2 might be connected up to form a continuous chain, but in this case, the garment formers 1 when out of the press, would it is considered be too close together for the convenient removal and replacement of the garments thereon, that is, if the maximum number of garment formers is to be accommodated in the press each operation, and in order to obviate this inconvenience, means are provided for automatically running a train of the garment formers into the press close together, and subsequently releasing them so soon as they have been run-out.

At the side of the straight part 3*a* or the railway 3 over which the press beds 4 and 5 are disposed, (see Figs 1 to 3), is an endless conveyor chain 7, the upper length of this chain is supported in a trough 8, and the whole of the carriages 2 are provided with pivoted pawls or catches 9, which are adapted to set up a connection with the chain 7, when they are moved on to the straight part 3*a* of the railway. It will be understood by reference to Fig. 1, that owning to the connection set up by the catches 9, the whole of the carriages 2 run on to the part 3*a* of the railway where the conveyor chain 7 is disposed, will when the latter is moved forward, be carried into the press, then out of the press, and subsequently released when they reach the end of the conveyor chain 7. The garment formers 1 can thus be handled one at a time by the operator after leaving the press, and be passed along the return length of the railway at the same time as the necessary exchange of the garment thereon is being made. When this operation is completed, the garment formers can be moved on to the straight length 3*a* of the railway again, where they are picked up by the travelling chain 7 and again moved into the press.

The endless conveyor chain 7 is not run continuously but intermittently, being advanced to the required extent when the press opens between each of the pressing operations. This is effected as will be hereinafter described.

The press beds 4 and 5 (see Figs. 1 to 3) are located between two front standards 10 connected by cross stays 110, and two rear standards 11 connected by cross stays 111. These standards are secured on a base frame 12, whilst the upper ends of the front and rear standards 10 and 11, are connected by cross stays 13. Both the press beds 4 and 5 are preferably moved in and out so as to provide a clear passage between them for the travelling formers 1, and both press beds are actuated by convenient power driven means.

As shown in the drawings, both the press beds 4 and 5 are partly supported on rollers 14 running on brackets 15 secured to the fixed frame, and just below these brackets is the straight part 3*a* of the railway 3, previously described. The front bed 4 is further supported and actuated by means of two horizontal plungers 16 mounted in bearings 17 on the front standards 10, whilst the rear bed 5 is in like manner further supported and actuated by means of two horizontal plungers 18, mounted in bearings 19 on the rear standards 11. The coil springs 16*a*, 18*a*, surround the respective shafts 16, 18, and operate between one of the bearings 17, 19, and a respective collar 16*b*, 18*b* fixed to the plunger 16 or 18; these springs serve for returning the press beds 4, 5, into open position.

The front press bed 4, is actuated by means of two cam levers 21 disposed on a shaft 22 carried in bearings 23 on the front standards 10, and two cams 24 on a cam shaft 25 carried in bearings 26 in the same standards 10. The upper ends of the cam levers 21 act upon the ends of the plungers 16, whilst their lower ends which are provided with anti-friction rollers, are in contact with the cams 24.

The rear press bed 5 is in like manner actuated by means of two cam levers 28 on a shaft 29 carried in bearings on the rear standards 11, and two cams 31 on a cam shaft 32 carried in bearings 33 in the same standards 11. The upper ends of the cam levers 28 act upon the ends of the plungers 18, whilst their lower ends which are provided with anti-friction rollers, are engaged by the cams 31.

It will be seen more particularly by reference to Figs. 2 and 3, that the ends of the plungers 16 and 18 are fitted with sliding caps 35, and that springs 36 are interposed between these caps and adjustable collars 37 on the plungers 16 and 18, and that the upper ends of the cam levers 21 and 28 act upon these caps 35, and consequently the compressing movement imparted to the press beds 4 and 5, is transmitted through these springs 36, and that as a result of this arrangement, the pressure put upon the garments in the press can be regulated by adjusting the collars 37 on the plungers 16 and 18.

The cam shafts 25 and 32 are geared to the main driving shaft 40, and both are run at the same speed, the press beds 4 and 5 open and close each revolution of the said shafts, and the open period relatively to the closed period, is determined by the shape of the operating cams 24 and 31.

The main shaft 40 which is fitted with driving pulleys 39, is disposed transversely to the press beds 4 and 5, and is carried in bearings 41 on the base framing 12. At the right of it is a countershaft 42 (see Fig. 3) which is carried in bearings 142 on the base framing, and at the left of it is another shaft 61 carried in bearings 161. The shaft 42 is connected to the main shaft 40, preferably by means of a variable speed gear arrangement 43, and to the cam shaft 25 by means of a worm 44 thereon, a worm wheel 45 on a shaft 46, and a gear wheel 47 on the latter engaging with a corresponding wheel 48 on the cam shaft 25.

The countershaft 42 is also geared to the cam shaft 32, by means of a second worm 50 thereon, (see Fig. 3) a worm wheel 51 on a shaft 52, and a gear wheel 53 on the latter engaging with a corresponding wheel 54 on the shaft 32. Both cam shafts 25 and 32 are thus geared to the main shaft 40 and driven at the same speed, which can however be varied by means of the variable gear 43. The latter may be of any well known construction.

The conveyor chain 7 is mounted on sprocket wheels, only one, the driving sprocket 55 of which is shown in Figs. 1 and 3. This driving sprocket 55 is mounted on the front end of a transverse shaft 56 carried in bearings 57, and the rear end of this shaft is connected by means of a chain 58 and sprocket wheels 59 and 60, to the shaft 61 previously referred to and shown on the left-hand side of the main shaft 40 in Fig. 3. This shaft 61 is geared to the countershaft 42 by a pair of gear wheels 63 and 64 on the respective shafts 61 and 42, and an idle wheel 65 on the main shaft 40, whilst the sprocket wheel 60 on the shaft 61 is connected thereto by means of a friction clutch 66.

The clutch 66 is controlled by a cam 67 on the cam shaft 32, through the agency of a cam lever 74 on the shaft 29, a clutch lever 68 mounted on the shaft 52, and a link 69 for connecting said levers. The operating cam 67 is adapted to control the clutch 66, whereby the travelling chain is intermittently actuated, that is, it is started as soon as the press beds open, advances the required distance during this period so as to move a train of formers 1 into the press before the press closes, remains stationary during the pressing operation, and then moves forward again so as to move the train out of the press and the next following train into it.

There is a distinct advantage, other than that previously mentioned, in arranging the press beds 4 and 5 in a vertical position, when they are steam heated, and this advantage lies in the fact that there is no difficulty in this case in maintaining the inner faces of both beds at a fairly even temperature.

When steam heated press beds are disposed in a horizontal position, one above the other, the lower face of the upper bed, is not so easily maintained at the same temperature as that of the upper face of the lower bed, owing to the water of condensation which collects in the lower part of the interior of the upper bed and has to be constantly drained away. This variation in temperature of the external faces of the two beds does not occur when they are vertical, as both then work under the same conditions.

If desired, provision may be made for damping or conditioning the garments ready for pressing, after they have been placed and adjusted on the garment formers, as the said adjustment can be more expeditiously performed when the garments are in a perfectly dry state.

In this case a box or casing 70 is provided above the railway 3 at the point indicated in dotted lines in Fig. 5, this box or casing is preferably fitted with steam jets or inlets, and a passage is left therethrough for the passage of the formers 1. The latter may be carried through this casing by means of another conveyor chain, which is run at a speed which is adjusted to pass the formers 1 through the box or casing 70 in the period of time required to condition them ready for pressing.

If preferred the press beds 4 and 5 may be suspended from the rails 13 which cross connect the front and rear pairs of standards 10 and 11.

In this case the rails 13 are provided with plain horizontal upper surfaces, and wheels

running thereon are carried by axles mounted in brackets secured to the top of the press beds.

This arrangement provides more room below the beds for the garment former railway, and is in this respect more convenient than the arrangements shown.

Although a railway with formers having wheels running on the said railway is the most convenient arrangement, the formers might be made to slide in a groove or the like, or on a surface with guides, or be placed on a moving platform, and I intend all such arrangements to be covered by the expression "railway or the like." The formers may also be on carriages which have projections with or without wheels on both sides of the rails, and this would generally be necessary if horizontal press beds were adopted. Also the formers may be run-in in an inverted position, so that they depend from their carriages, though this arrangement is not in general so convenient.

Other means than those shown may be used for moving the formers into and out of the press, and my invention includes cases where they are so moved by hand.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In apparatus for pressing shaped articles made of knitted or other textile fabric on formers, the combination of a press, means for opening and closing the press, a railway track, carriages adapted to travel along the track and normally disconnected from one another, a plurality of garment formers mounted on said carriages, and means for engaging with a plurality of said carriages and moving them in a train of garment formers and carriages in close order into the press and after the pressing operation moving them out and releasing the carriages comprising each train.

2. In apparatus for pressing shaped articles made of knitted or other textile fabric on formers, the combination of a press, means for opening and closing the press, a railway track, carriages adapted to travel along said track and normally disconnected from one another, garment formers mounted on said carriages, an endless driving chain associated with the track, catches on the carriages for engagement by the chain whereby the carriages are advanced with the chain, and means for intermittently advancing the chain whereby trains of the carriages and formers in close order are moved into the press and then after the pressing operation moved out and disconnected from the driving chain.

3. In apparatus for pressing shaped articles made of knitted or other textile fabric on formers, the combination of a press, means for opening and closing the press, a railway track, wheeled carriages adapted to roll along the track and normally disconnected from one another, a plurality of garment formers mounted on said carriages, and means for engaging with a plurality of said carriages and moving them in a train of garment formers and carriages in close order into the press and after the pressing operation moving them out and releasing the carriages comprising the train.

4. In apparatus for pressing shaped articles made of knitted or other textile fabric on formers, the combination of a press, means for opening and closing the press, an endless railway track associated with the press, carriages adapted to travel along the track and normally disconnected from one another, garment formers mounted on said carriages, and means for connecting a plurality of said carriages with the formers thereon in close order to form a train and to move the said train into the space between the press beds from one side and then out of said space at the other side and thereafter for releasing the carriages and formers so that they can be run around the track ready to enter the press again.

5. In apparatus for pressing shaped articles made of knitted or other textile fabrics on formers, the combination of a press with vertical beds, means for opening and closing the press, a railway track extending beneath the press, carriages adapted to travel along the said track and normally disconnected from one another, garment formers supported in vertical position on said carriages, and means for engaging with a plurality of said carriages to form and move a train of the carriages and garment formers in close order into the press and thereafter to move them out of the same and release them from one another.

6. In apparatus for pressing shaped articles made of knitted or other textile fabrics on formers, the combination of a press with vertical beds, both of said beds being movable, horizontal plungers to which the said beds are connected, cam mechanisms adapted to move the beds in and out through the agency of the said plungers, a railway track running under the said press beds, carriages adapted to travel along the said track and normally disconnected from one another, garment formers mounted vertically on said carriages and carried thereby in a path between the vertical beds, and means for engaging with a plurality of the carriages to form a train of carriages and formers and move the same in close order into the press and then move the same out of the press and release the carriages and formers comprising said train.

7. In apparatus for pressing shaped articles made of knitted or other textile fabrics on formers, the combination of a press, means for opening and closing the press, a railway track associated with the press, carriages

adapted to travel along the said track and normally disconnected from one another, garment formers mounted on said carriages, and means for engaging a plurality of the carriages and forming thereof a train of carriages and garments formers in close order and to move said train into and out of the press, and a driving device connected to said opening and closing means and to said engaging means whereby the movement of the carriages and formers ceases before the press closes and is resumed after the press opens.

8. In apparatus for pressing fabric articles made of knitted or other textile fabrics on formers, the combination of a press, means for opening and closing the press, including a driving shaft, a railway track associated with the press, carriages adapted to travel along the said track and normally disconnected from one another, garment formers mounted on said carriages, an endless driving chain associated with the track and adapted to engage a plurality of the carriages to form a train of carriages and formers in close order and to move the said train into the press and then move it out again and release the carriages and formers constituting the train, means for intermittently advancing the chain including a clutch, and a cam on said driving shaft, and means operated by the cam to control the said clutch.

In testimony whereof I have affixed my signature.

GEORGE HUNT.