(No Model.) 3 Sheets—Sheet 1.

J. E. RICHARD.

MACHINE FOR CARDING HOOKS AND EYES.

No. 561,341. Patented June 2, 1896.

FIG:1.

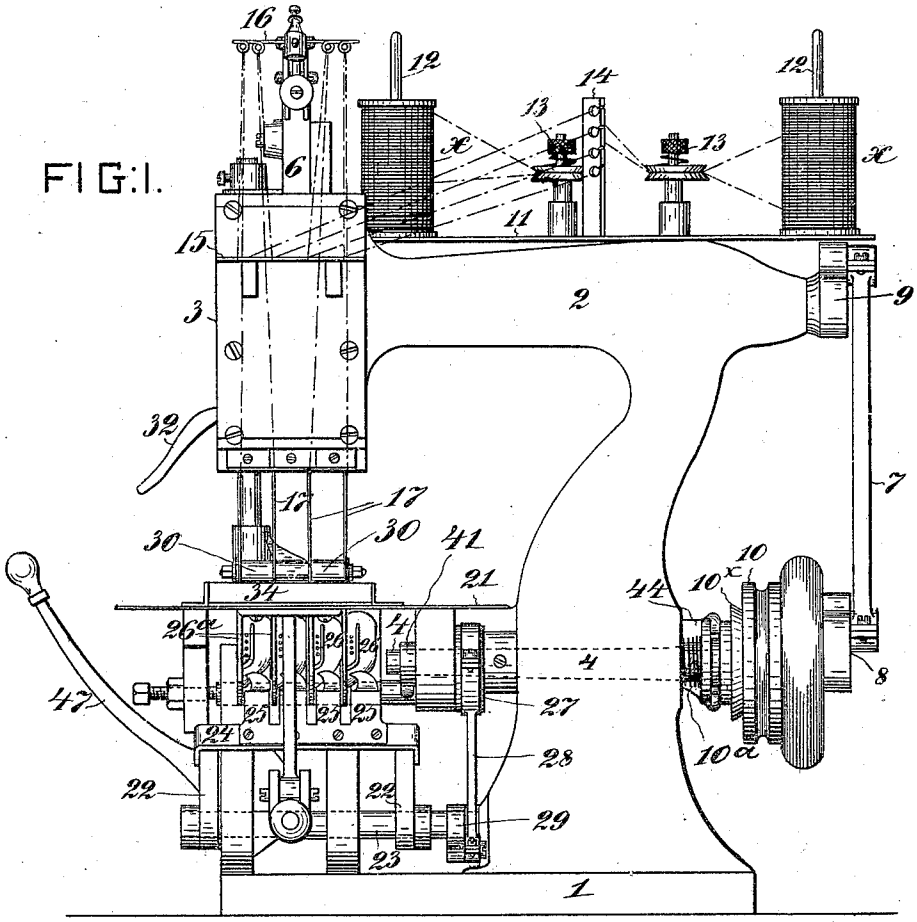


FIG:4.

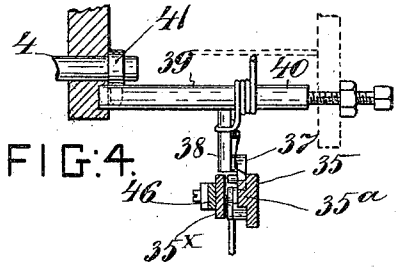


FIG:5.

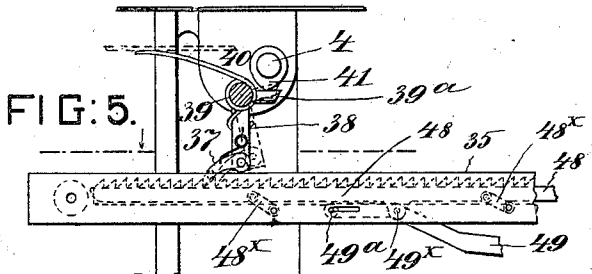


FIG:6

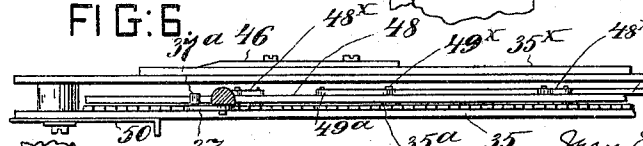
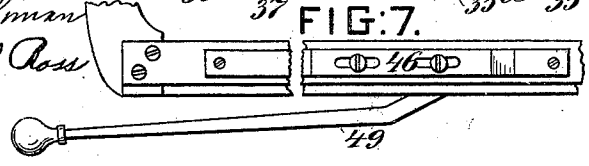


FIG:7.



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(No Model.) 3 Sheets—Sheet 2.

J. E. RICHARD.

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FIG: 9.

FIG: 10.

FIG: 2.

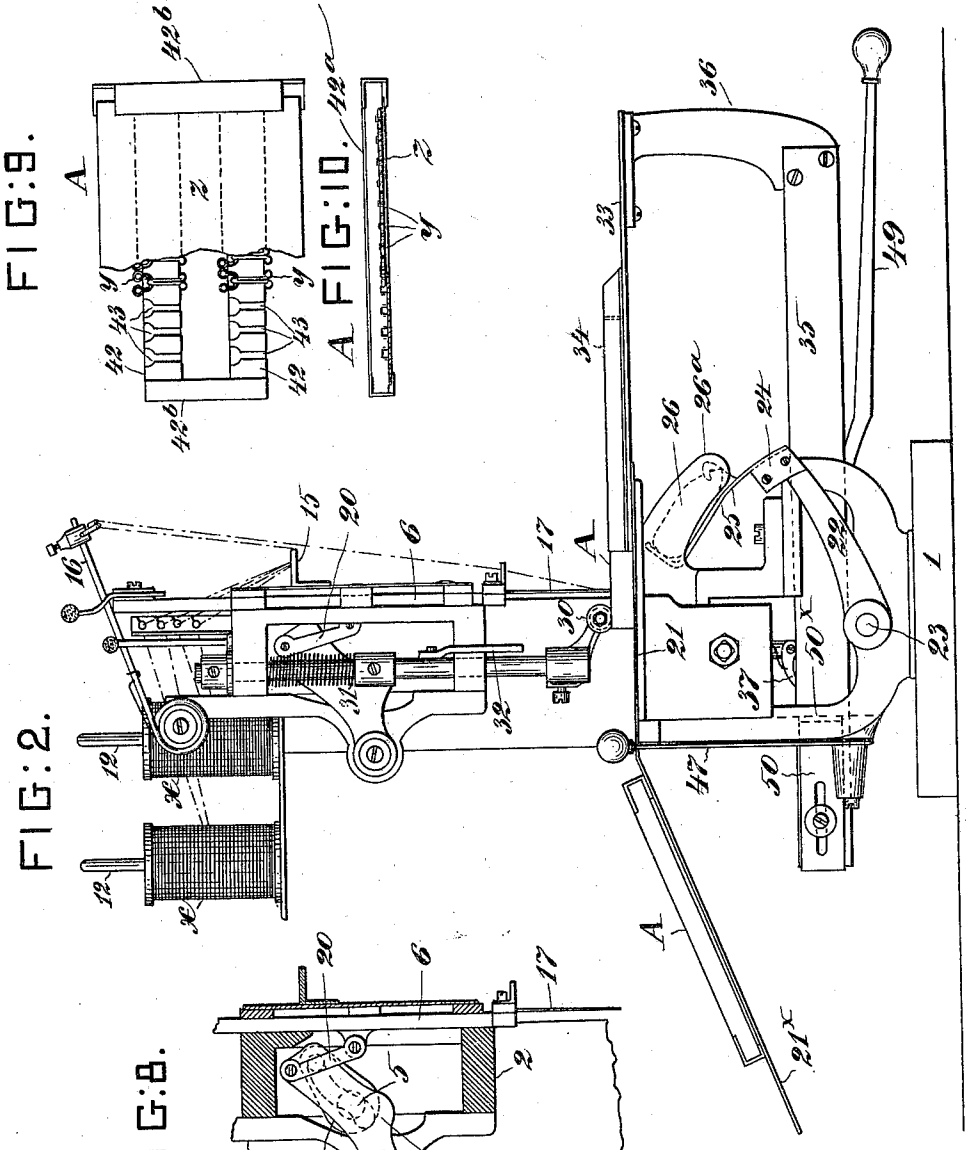
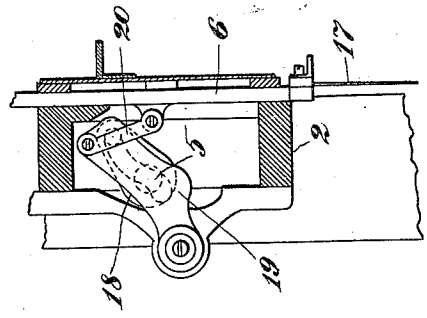


FIG: 8.



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MACHINE FOR CARDING HOOKS AND EYES.

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FIG:3.

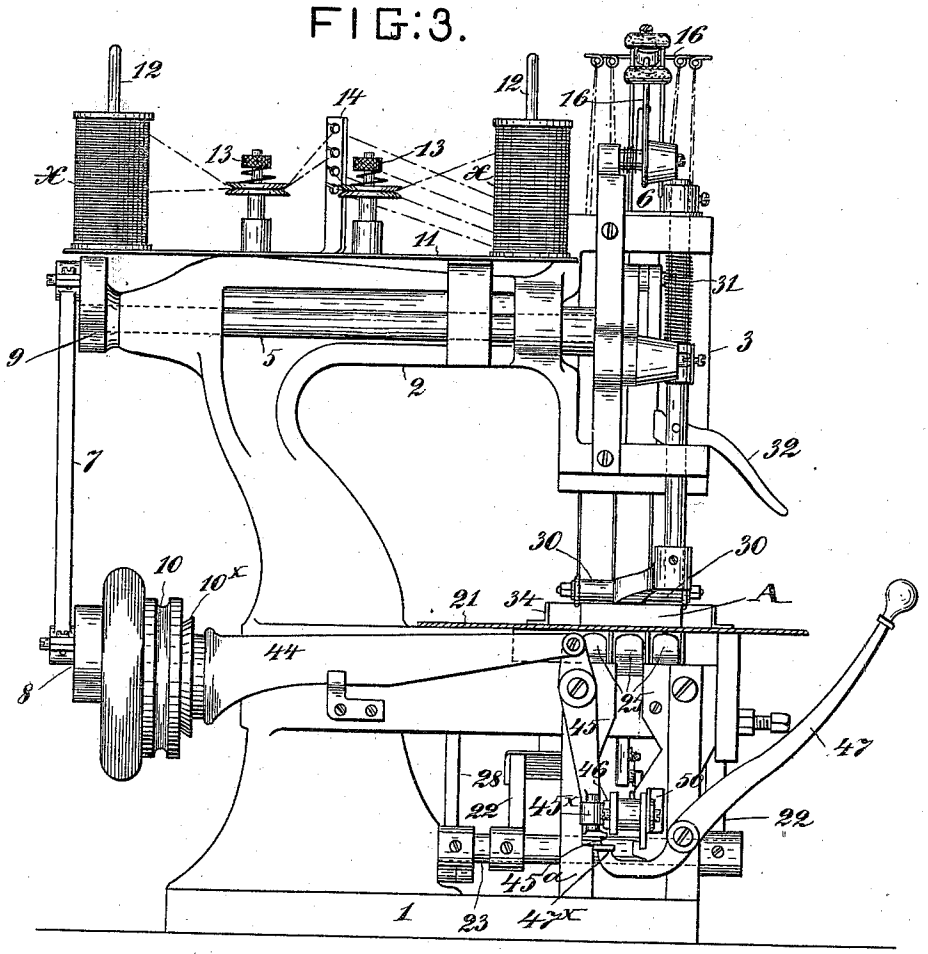

FIG:11.

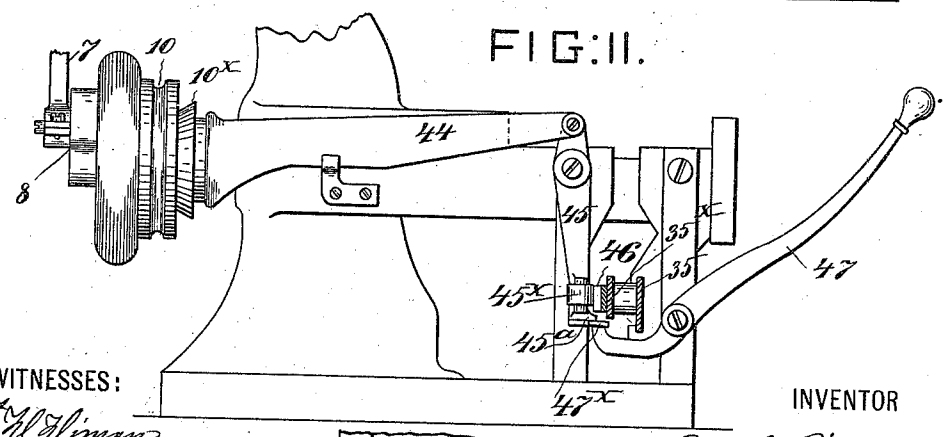

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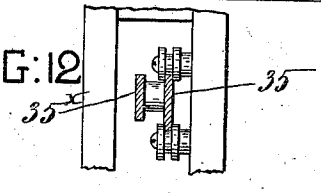
FIG:12



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UNITED STATES PATENT OFFICE.

JEAN E. RICHARD, OF NEW YORK, N. Y.

MACHINE FOR CARDING HOOKS AND EYES.

SPECIFICATION forming part of Letters Patent No. 561,341, dated June 2, 1896.

Application filed May 22, 1895. Serial No. 550,183. (No model.)

To all whom it may concern:

Be it known that I, JEAN E. RICHARD, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Machines for Carding Hooks and Eyes, of which the following is a specification.

My invention relates to a machine, mainly in the nature of a sewing-machine with a gang of needles, for sewing hooks and eyes on cards, that being the ordinary method of mounting such wares for sale.

The invention comprises, as to its general features, a sewing-machine having a plurality of needles and the corresponding stitch-producing mechanisms, a carriage which is advanced or fed along intermittently under the needles, and a holder for the hooks and eyes and the card to which they are to be sewed, which holder is adapted to be mounted removably on the intermittently-moved carriage.

A machine embodying my invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a front elevation of the machine. Fig. 2 is a side elevation of the same, showing the left-hand side; and Fig. 3 is a rear elevation of the machine. The above are the principal views. The other views illustrate details. Fig. 4 is a transverse section of the ratchet feeding mechanism. Fig. 5 is a side view of the same. Fig. 6 is a plan view of the same, and Fig. 7 is a view of the side opposite to that seen in Fig. 5. Fig. 8 is a sectional view of the head of the machine, illustrating the needle-operating mechanism. Figs. 9 and 10 are views illustrating the holder for the hooks and eyes and the card, the former being a plan view with the card partly broken away and the latter an edge or side elevation showing the holder-face down as it rests on the carriage. Fig. 11 is a view similar to the lower part of Fig. 3, illustrating the operation of the automatic stop device of the machine. Fig. 12 illustrates a roller-bearing for the ratchet-bar of the machine.

1 designates the base of the machine, 2 the overhanging arm thereon, and 3 the head.

4 is the main shaft; 5, the auxiliary shaft in the overhanging arm, which shaft operates the needle-bar 6. The shaft 5 is rocked by the main shaft through a connecting-rod 7, coupled at its lower end to a crank 8 on the main shaft and at its upper end to a crank 9 on the shaft 5. On the main shaft is loosely mounted a driving-sheave 10, adapted to be clutched on the shaft by a friction-clutch mechanism to be hereinafter described.

On the arm 2 is mounted a table 11, which bears the spool-holders 12, the tension devices 13 for the upper threads, and a guide-post 14 for the latter. The several threads from the spools x, which threads are here indicated by broken lines, are led from the post 14 to and about a guide-bar 15 on the front plate of the machine-head 3, thence up to and through eyes on the take-up device 16, and thence down through suitable thread-guides to the several needles 17 in the needle-bar 6. As herein shown, there are four needles arranged abreast and properly spaced.

The needle-bar is operated by the crank-pin of a crank 18 on the outer end of the shaft 5, (seen in dotted lines in Fig. 8,) said pin engaging a somewhat S-shaped cam-groove in the face of a lever-rocker 19, pivotally mounted on the head 3, said rocker being coupled to the needle-bar at its front end by a link 20.

Under the cloth-plate or table 21 of the machine is mounted the shuttle-carrier. This device comprises two arms 22, fixed on a rock-shaft 23 in the base of the machine and parallel with the main shaft. These arms carry a tie-plate 24, on which are mounted four like cradles 25, which support the respective shuttles 26. The cradles 25 are curved substantially concentric with the shaft 23, (except where the shuttles lie,) and each has suitable end stops for the shuttle. The walls 26^a of the shuttle-races, against which the flat open sides or faces of the respective shuttles are applied in their reciprocating movements, are formed of thin plates pendent from the cloth-plate. This latter does not serve the purpose of supporting cloth in this machine, but it takes the place of the cloth-plate in ordinary sewing-machines.

The rock-shaft 23, Fig. 1, is rocked through the medium of an eccentric 27 on the main shaft and an eccentric-rod 28, coupled to a crank 29 on the shaft 23.

30 is the roller presser-foot, 31 is the spring

which depresses it, and 32 is the lifting-lever for said foot.

I will now describe the carriage for the holder and the mechanism for feeding the carriage intermittently.

33 designates the carriage as a whole. It rests on and is adapted to move to and fro over the cloth-plate 21 and is provided on its upper surface with a guide-frame 34 to receive the holder. The carriage is provided at its lower part with a ratchet-bar 35, which, as here shown, is connected rigidly to the upper plate of the carriage by a pendent tie-piece 36. The bar 35 has ratchet-teeth on a rib 35^a on its inner face, as seen in Figs. 4, 5, and 6, with which is normally engaged a spring-pawl 37, mounted on an arm 38 on a short rock-shaft 39 in the frame of the machine. The pawl is held normally retracted by a spring 40 about the shaft 39, and the latter is rocked in such a manner as to cause the pawl to advance the ratchet-bar once at each revolution of the main shaft by the impingement of a cam 41 on said shaft on a short arm 39^a on the shaft 39. This construction is clearly illustrated in Figs. 1, 4, and 5. Thus at each rotation of the main shaft a stitch is produced and the carriage 33 is fed or moved forward to the extent of one stitch.

I will now describe the holder for the hooks and eyes and the card. This holder is entirely detached from the machine and forms no part of the operative mechanism thereof, and in the operation of the machine a considerable number of such holders will be required to get the best results from the machine.

Referring to the principal views, in connection with Figs. 9 and 10, the holder, which I will designate as a whole by A, is flat or plane surfaced and comprises, as herein shown, two like bars 42, of soft vulcanized rubber or other like yielding and clasping material, having formed in their lower faces (turned upward in Fig. 9) recesses 43 of the proper shape and depth to receive and hold a hook and eye *y*, coupled together as they usually are when stitched on a card for sale. In Fig. 9, which is an illustration view, the card *z*, to which the hooks and eyes are to be stitched, is partly broken away, and in this view and Fig. 10 some of the hooks and eyes are omitted, the better to show the clasping-recesses 43. When the connected hook and eye are placed by the operator in a recess 43, the soft material of the bar 42 holds them by exterior pressure on the parts thereof in the recess, the loops on the ends of the hook and eye extending beyond the edges of the strips 42. The strips 42 are backed by some thin hard material 42^a, which may be of hard rubber, gutta-percha, celluloid, metal, &c., and are connected at their ends by binding-pieces 42^b. The margins of these binding-pieces overhang to form keepers at each end of the holder to receive the ends of the cards *z*, which is applied over the face of the filled strips 42 and secured by tucking its ends into said keepers.

When the holder shall have been filled as described and the card placed in it, said filled holder is placed face down on the carriage 33 within the guide-frame 34, which registers the holder properly with the needles and compels it to advance step by step with the carriage, the needles passing through the loops of the hooks and eyes and stitching them to the card. The rollers of the presser-foot 30 bear on the reinforcing-plates 42^a on the backs of the strips 42 and press the holder A firmly down upon the carriage, which will be slotted where the needles must pass.

It will be understood that the holder A is fed along under the needles as the stitching proceeds, the lines of stitching securing the hooks and eyes to the card, and when the last stitches are taken the machine is automatically stopped by throwing a friction-clutch out of gear. This device I will now describe.

As stated before, the sheave 10 rotates freely on the main shaft. It has in its face a conical recess forming one member of the clutch, the other member, $10^\times$, being a cone splined on the main shaft and backed, Fig. 1, by a spring 10^a, tending to press said cone into the recess in the sheave 10 as in any friction-clutch. In the boss of the clutch member $10^\times$ is a circumferential groove, with which engages a clutch-rod 44, Figs. 3 and 11, which is coupled at its opposite end to a lever 45, fulcrumed on the machine-frame adjacent to the path of the feeding ratchet-bar. This lever 45 bears at its lower or pendent end a roller $45^\times$, which, when the holder A has been fed forward far enough to complete the stitching, is impinged upon by a cam 46, Figs. 6 and 7, carried by the ratchet-bar and forced back to an extent sufficient to swing back the lever 45 and withdraw the clutch member $10^\times$ out of contact with the other member thereof and thus arrest the motion of the machine. When the lever 45 is thus swung over by the cam, the parts will assume the position seen in Fig. 11, and the lever will be automatically locked in this position by a toe or detent $47^\times$ on a weighted lever 47, Figs. 3 and 4, engaging or entering a rabbet 45^a in the lower end of the lever 45. The lever 47 is fulcrumed on the machine-frame at the back, as clearly shown in Figs. 3 and 11. To start the machine, the carriage 33 is first retracted, then the operator raises the weighted end of lever 47, frees the lever 45, and allows the spring 10^a to put the clutch members into engagement.

I may say here that the ratchet-bar 35, as clearly shown in Fig. 6, is connected rigidly to an auxiliary bar $35^\times$ by distancing-blocks, whereby the two bars form really one bar. It is this bar $35^\times$ which carries the cam 46, the latter being secured adjustably thereto, so that it may be set to stop the machine when the carriage shall have been advanced to the proper point or extent. After the stitching

is completed and the machine stopped the carriage 33 must be drawn back to receive another filled holder, and to do this the pawl 37 must be disengaged from the ratchet-teeth on the bar 35. To effect this, I provide the pawl-lifting devices best illustrated in Figs. 4, 5, and 6.

On the pawl 37 is a laterally-projecting stud 37^a, and coupled to the inner face of the ratchet-bar 35 by short links $48^\times$ is a lifting-rod 48, extending parallel with the bar 35 and situated below the stud 37^a. By raising the rod 48 at any point in the travel of the carriage 33 some part of said rod will take under the stud 37^a and lift the pawl free from the ratchet-teeth, and thus leave the carriage 33 free to be moved forward or back at will. In order, then, to allow the operator to lift the rod 48 conveniently, I provide a lifting-lever 49, which is connected to the ratchet-bar 35 at 49^a in Fig. 5 by a slotted fulcrum connection and couple this lever to the lifter-rod 48 at $49^\times$. By lifting on the forwardly-projecting end of the lever 49 the rod 48 may be lifted at any time to free the carriage.

In order that the operator may be able to draw the carriage back to precisely the proper extent to begin the stitching, the ratchet-bar 35 is provided with an adjustable stop 50, (seen best in Figs. 2, 3, and 6,) which when the carriage is drawn out to the front to receive a filled holder impinges against the frame and stops it at the proper point. In Fig. 2 the head of the stop 50 is shown in dotted lines as impinging against the frame at 50^x.

The holders A may be left connected by the stitching-threads if desired, and be cut apart afterward by severing the threads, or they may be cut away as they pass under the needles. Preferably the cloth-plate 21 will have an incline $21^\times$ at the back of the machine, Fig. 2, to support the connected holders. This incline or chute down which the holders slide after the stitching puts a slight tension on the threads from the needles and facilitates the stitching. One holder will be left connected with the threads at all times by preference, as this will obviate holding the threads by hand in starting.

Fig. 12 illustrates a construction in which the ratchet-bar 35 is mounted in grooved rollers instead of in bearing-grooves in the frame. The construction of Fig. 12 is merely designed to lessen the friction of the parts.

It will be understood that after the motion of the machine is arrested the detent $47^\times$ on the lever 47 holds it arrested until the operator frees the detent. Thus the operator is permitted to move the carriage to and fro at will without setting the machine in motion.

The rollers of the presser-foot 30 have flanges $30^\times$, which embrace the lateral edges of the strips 42, as clearly shown in Fig. 3, and guide the holder in its movements should there be any looseness in the guide-frame. This will insure the needles always passing through the loops of the hooks and eyes in the holder.

The holder A will, as stated, have the strips 42 made from some yielding soft material by preference; but as the main purpose is to hold the hooks and eyes in their recesses by elastic pressure or friction applied to them externally some harder material might be used for the strips and the lateral compressibility and elasticity of the hooks and eyes themselves be relied on wholly or partially as a retaining force. In any case, the width of the recesses will be such that the hooks and eyes will be pressed upon at their opposite lateral edges by the walls of the recesses and the hooks and eyes thus held in place. Where the hooks and eyes are coated with metal likely to be tarnished by the sulfur in the rubber, it will be obvious some other suitable material must be substituted for the same.

I would call especial attention to the fact that my holders A form no part of the machine and bear no part of the feeding mechanism, the latter and the non-detachable carriage being parts of the machine.

I am aware that it is not new in machines for carding hooks and eyes to employ an endless or continuous holder mounted on pulleys like a belt, and this I do not claim. It would not serve my purpose, as I must employ a separate holder for each card. I am aware, also, that it is not new, broadly, to employ separate holders for the cards to which the hooks and eyes are to be sewed, but so far as I am aware these holders have always been provided with ratchet mechanism for feeding and form in substance a part of the machine proper. Moreover, these holders differ from mine in other material respects.

Having thus described my invention, I claim—

1. The combination with a machine for sewing hooks and eyes to a card, of a holder for the hooks and eyes and card, said holder being of soft, elastic material, as rubber for example, provided with recesses to receive the hooks and eyes, and keepers to hold the card in place, said recesses being of such width as to fit and clamp the hooks and eyes laterally and thus hold them in place by elastic pressure on their edges, substantially as set forth.

2. The combination with a sewing-machine, having a plurality of needles, complemental stitch-forming mechanism, a stationary, supporting-plate, a non-detachable carriage having on it suitable guides, and means connected with and forming part of the machine for feeding said carriage under the needles in an intermittent manner, of a holder A, for the hooks and eyes and the card to which they are to be stitched, said holder being wholly independent of the carriage of the machine and provided with means to fit to the guides on the same so that it may be carried under the needles, subtantially as set forth.

3. The combination with a machine for sew-

ing hooks and eyes onto a card, of a holder A for the hooks and eyes and the card, said holder comprising parallel bars of soft, vulcanized rubber, or like elastic material, provided with recesses to receive the hooks and eyes and clasp them laterally and exteriorly, backing-plates on said bars, of some harder material, and keepers at the respective ends of said bars to receive and hold the card, substantially as set forth.

4. In a sewing-machine for sewing hooks and eyes to cards, the combination with the gang of needles, the needle-bar, the complemental stitch-forming mechanism, and the supporting or cloth plate, of the non-detachable carriage for the holder A, provided with a ratchet-bar mounted in bearings in the machine-frame, a vibrating pawl and means to move said bar intermittently for feeding said carriage, a stop mechanism to limit the movement of said carriage when it is drawn back to receive a detachable filled holder, a lifting mechanism, adapted to disengage the pawl so that the carriage may be moved in either direction, and the said holder A, substantially as set forth.

5. In a sewing-machine for stitching hooks and eyes to cards, the combination with the carriage to support the hook-and-eye holder, the ratchet-bar, and the vibrating pawl for operating said bar, of the main shaft, the driving-sheave 10, rotatively mounted on said shaft, a spring-clutch adapted to fix said sheave normally to the main shaft, the pivoted lever 45, connected to one member of said clutch, said lever having a stud or part projecting into the path of a cam carried by the ratchet-bar, the said cam, adapted to displace the lever 45 and disengage the clutch when the carriage reaches the end of its movement toward the rear of the machine, and means, substantially as described for automatically holding said lever in its displaced position, substantially as set forth.

6. In a machine for stitching hooks and eyes to cards, the combination with the non-detachable carriage mounted on and forming a part of the machine, and the ratchet-bar 35, connected therewith, of the main shaft, the cam 41, on the same, the rock-shaft 39, provided with a lateral projection in the path of said cam, with a pawl-arm 38, and with a pawl-retracting spring, the pawl on said arm, the lifting-rod 48, mounted on the ratchet-bar, and the operating-lever 49, coupled to said lifting-rod and fulcrumed on the ratchet-bar, the elongated lifting-bar being arranged under a projection on the pawl, whereby the latter may be lifted out of engagement, whatever position the carriage may be in, as set forth.

7. A sewing-machine having a gang of needles arranged abreast and properly spaced, complemental stitch-forming mechanism, a non-detachable carriage 33, mounted on and forming part of said machine, mechanism for feeding said carriage intermittently at each stitch, said mechanism also forming part of the machine, a stop mechanism controlled by the moving carriage, and means for disengaging said carriage from the mechanism which feeds it, in combination with a holder for the hooks and eyes and the card to which they are to be sewed, said holder being wholly separate from the machine and adapted to rest on the carriage and move with it, as set forth.

8. The combination with a machine for sewing hooks and eyes on a card, of a detachable holder for the hooks and eyes and card, said holder comprising bars having recesses which receive the hooks and eyes and clamp them elastically at their edges with sufficient force to hold them in place, and keepers which receive and hold the card in position, said holder being flat or plane surfaced, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JEAN E. RICHARD.

Witnesses:
HENRY CONNETT,
PETER A. ROSS.