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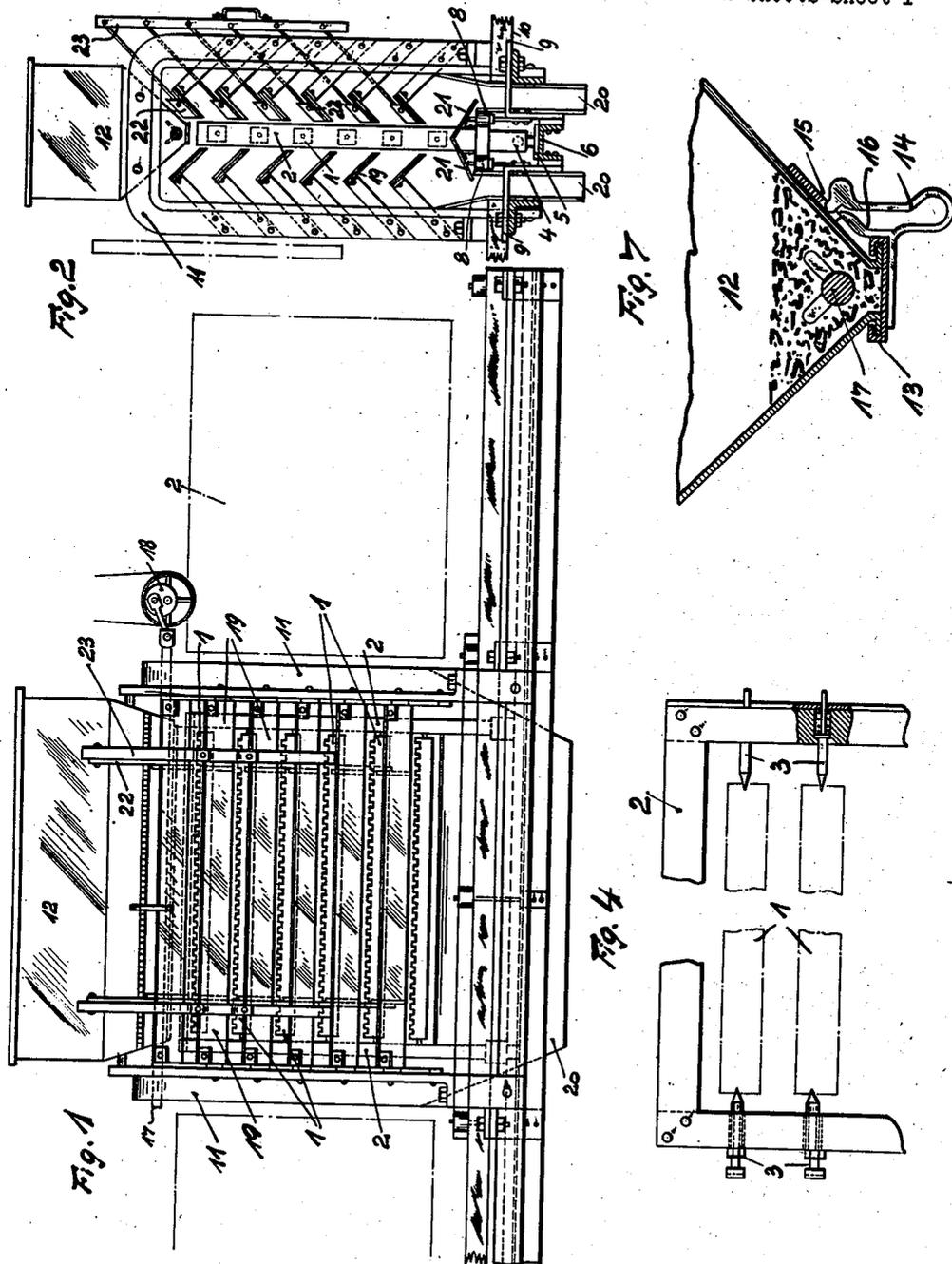
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DEVICE FOR THE MANUFACTURE OF SLIDING CLASP FASTENINGS

Filed Jan. 22, 1934

2 Sheets-Sheet 1



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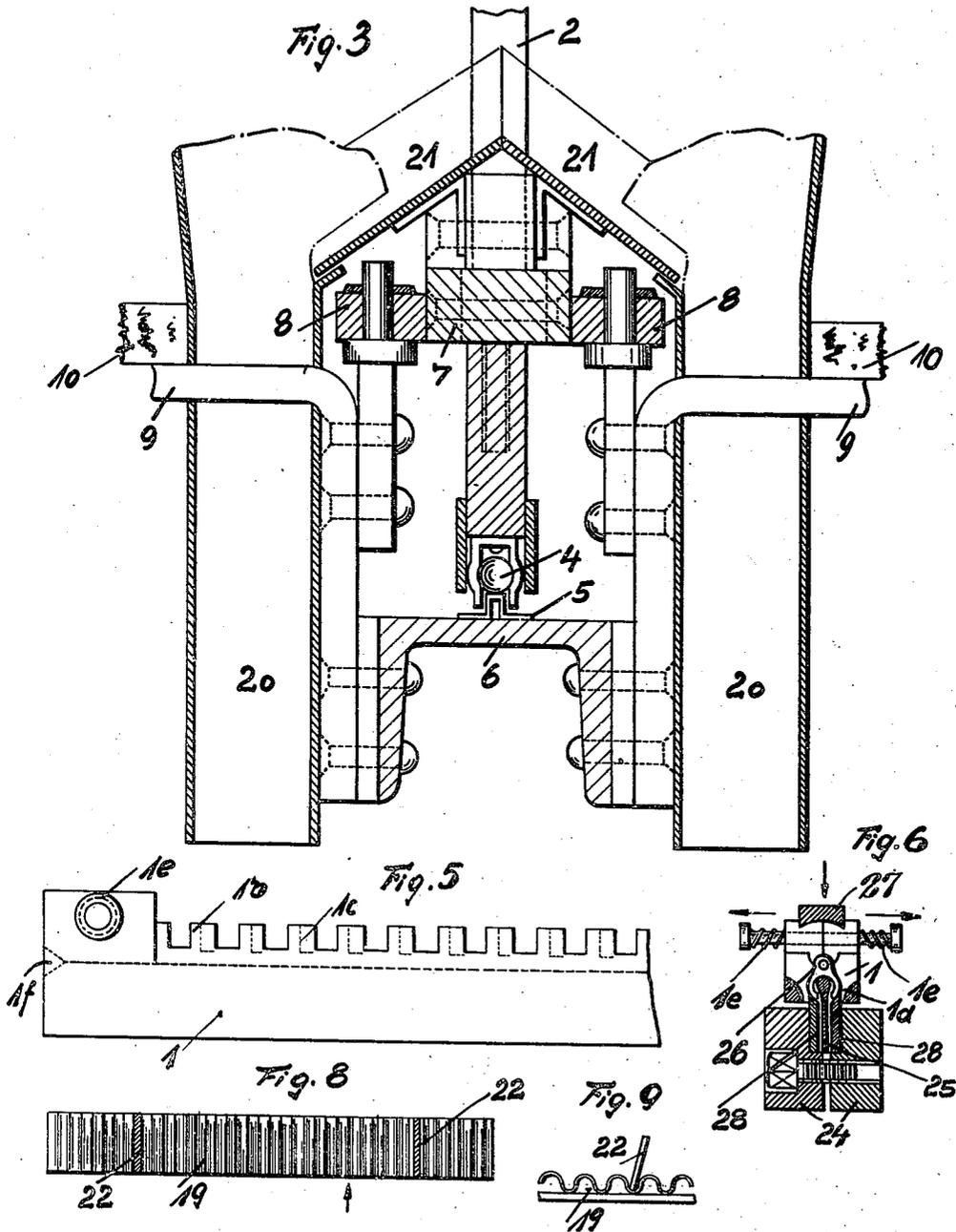
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# UNITED STATES PATENT OFFICE

2,017,814

## DEVICE FOR THE MANUFACTURE OF SLIDING CLASP FASTENINGS

Hugo Henkels, Wuppertal-Elberfeld, Germany

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13 Claims. (Cl. 153-1)

In order to avoid in the manufacture of sliding clasp fastenings the laborious and comparatively expensive manual insertion of individual members of a fastening upon a stringer, it has been proposed by me in U. S. A. Patent No. 1,889,803 to employ an auxiliary device which is mechanically charged from a storage receptacle with members in such a manner that the members are placed in the auxiliary device at the same distance apart and in exactly the same position which they have to assume subsequently upon a stringer, and by means of which auxiliary device the members are subsequently inserted upon a stringer.

This known auxiliary device consists of a rack-like bar with teeth and notches, which is provided with recesses in the teeth for the reception of the projecting coupling parts of the fastening members. This bar is provided in its centre with a longitudinal groove extending from the underside of the bars to the roots of the teeth, and is divided by a longitudinal cut through the centre of the longitudinal groove and the teeth into two halves which are normally firmly held together, so that the bar can be put upon a stringer together with the members the legs of which extend into the longitudinal groove, whereupon the members which engage the stringer with their legs can be released from the collector bar by moving the two halves of the bar apart. For charging this auxiliary device with fastening members, the device must be inserted into a rotating drum or moved through a drum filled with fastening members which are raised by ribs within the drum and are poured over the collecting device. During this flooding of the auxiliary device, suitably disposed fastening members are caught in the gaps between the teeth of the auxiliary device and gradually fill the device. Obviously, only a comparatively small percentage of fastening members meets the collecting device in the right position to be caught in the gaps between the teeth.

In order to increase the efficiency of the arrangement, a considerable number of collector bars is located according to the invention, one bar below another, between two sets of inclined feeding plates or chutes so that each collector bar is fed with fastening members from two sides by corresponding inclined feeding plates or chutes. The fastening members which during the flooding of the device are not caught in the gaps of the uppermost collector bar, drop upon the two following inclined plates and are guided by them to the next following collector bar. The

feeding plates preferably have undulating upper surfaces, the elevations and depressions of the undulations extending at right angles to the collector bar, and each depressed portion of an undulation opening at the gap of the bar. Owing to the undulating shape of the plates, the fastening members dropping upon the plates are so directed that they assume a position which enables them on sliding down the plates to be caught in the gaps of the collector bars. In order to attain as far as possible an uninterrupted operation, two frames with collector bars mounted therein are preferably arranged in line with one another so that whilst one frame is being charged the other frame is outside the charging zone and can be discharged. The transfer of the fastening members contained in a collector bar to stringers, can be substantially simplified by pivotally mounting the individual frames so that they can be tilted from a vertical into a horizontal plane, whereby the collector bars which are swingably suspended adjust themselves automatically in such a manner that the fastening members stand at right angles to the horizontal plane, and can be directly inserted upon stretched stringers without the necessity of removing the bars from their frame. To facilitate the transfer of the fastening members from the bars to the stringers, the two parts of the bars are resiliently movable so that the fastening members can be freed by means of a suitably shaped die, out of the bars, upon being placed upon the stringers. It is not absolutely necessary to use with the above described apparatus a drum of the kind described in Patent No. 1,889,803 which lifts fastening members collected upon its bottom and causes them to flow into the apparatus. Instead of a rotating drum, a stationary container may be used which is arranged above the frames and from which the fastening members flow over the top collector bar.

A constructional form of the apparatus is shown by way of example in the drawings:

Fig. 1 shows an elevation of the device,  
Fig. 2 shows an end view of the device,  
Fig. 3 an elevation partly in section of the lower portion of the device,

Fig. 4 details of the suspension frame,  
Fig. 5 an elevation of an auxiliary device or collector rod,

Fig. 6 a cross section of Fig. 5 and also the method of transferring the fastening members to a stringer,

Fig. 7 a cross section through a storage receptacle,

Fig. 8 a top view of a feeding plate, and

Fig. 9 a corresponding side view.

1 designates a known auxiliary device or collector bar which serves for placing fastening members flowing over the device into a required position and at even distances apart. This auxiliary device 1 is constituted by a rack-like bar provided with teeth 1b, every alternate tooth face being provided with a recess 1c in which fastening members entering notches or gaps between the teeth are caught with their coupling projections. The bar is provided opposite to the teeth with a continuous longitudinal groove 1d which extends up to the notches, and consists of two halves which are connected together by spring bolts 1e. 2 indicates two frames arranged in line with one another and located in a vertical plane, which are provided upon their vertical members with a number of pins 3. These pins 3 extend in a vertical plane and are so arranged that each pin of one side member of the frame is coaxial with a corresponding pin of the other side member of the frame. Of two pins located in one axis, one pin is resiliently movable in the direction of the axis, whilst the other pin is provided with screw threads and can be adjusted in the axial direction by turning. The pins 3 are provided upon their adjacent ends with points and serve for holding a collector bar 1 in the frame 2. The bars 1 can therefore swing in the frames 2, the centering recesses 1f being so arranged that the bars 1 tend, owing to the arrangement of their centres of gravity to assume a certain position in which the gaps are uppermost.

The vertical members of the frame 2 are downwardly extended beyond the frame and carry each at its end a ball 4 in a cage. By means of these balls the frame slides upon a horizontal rail 5 which is in turn supported by a U-rail 6. The ends of the vertical frame members which project beyond the frame proper are connected by a rail 7 mounted between stationary roller pairs 8. These roller pairs 8 with the rail 7 hold the frame in accurately vertical position, to permit of an easy displacement of the frame in its plane.

The U-rail 6 as well as the roller pairs 8 are fixed by means of an angle iron 9 to a table 10 provided with a longitudinal slot, above which the frame 2 moves. Upon the table 10 are fixed two U-shaped yokes 11 at a distance exceeding somewhat the length of a frame 2, in such a manner that the plane constituted by each yoke is at right angles to the table 10 and is also at right angles to the plane constituted by the frame 2. The two yokes 11 carry in their upper part a receptacle 12 serving for the reception of fastening members, which tapers downwardly in the shape of a funnel, and has an opening extending nearly from one yoke 11 to the other yoke. This opening can be more or less covered by two slides 13 slid inwards from the two ends. The slides 13 may be locked in any position by means of resilient tongues 14 provided thereon, a tooth provided upon a resilient tongue 14 engaging a gap of a toothed rack 15 mounted upon the side of the receptacle 12. A pointer 16 provided upon the slide 13 indicates upon a scale the size of the opening provided at the time being.

In the storage receptacle 12 is mounted close above the discharge opening a longitudinally extending rod 17 provided with fingers, by the to-and-fro movement of which the fastening members contained in the receptacle 12 are continuously moved so that the discharge opening cannot become blocked. The to-and-fro movement

of the rod 17 is obtained from a flanged disc 18 driven in a suitable manner. From the vertical members of one yoke extend towards the corresponding members of the other yoke 11 parallel feeding plates or chutes 19 which are downwardly inclined towards the median plane of the whole apparatus. Each feeding plate 19 on one side of the apparatus constitutes with a plate located at the same level upon the other side of the apparatus a funnel open at the bottom. The space between the plates on one side and those on the other side, is so large as to enable the frame 2 to be slid between the two sets of plates 19. The relative positions of the plates 19 and the bars 1 in frame 2 are such that when the frame 2 is placed between the two sets of plates, a collector bar 1 is positioned close below the bottom edges of two corresponding plates 19 which constitutes a funnel feeding the collector bar.

The fastening members falling down from the storage receptacles 2 meet the uppermost collector bar 1 of the frame 2, or the uppermost plates 19 and slide then upon the latter under their own weight to the uppermost bar 1. The fastening members which are not caught in the top bar 1, shoot beyond the bar and reach the second pair of plates 19 which in turn conveys the fastening members to the second bar 1. In this manner fastening members gradually reach all the collecting bars 1 of the frame 2. Fastening members which have not been caught in the last collecting bar 1 reach through conduits 20 a collecting receptacle placed below, from which they can be brought from time to time back to the storage receptacle 12. A roof-shaped plate 21 arranged in the lower part of the frame 2 guides the excess fastening members into the conduits 20 and thus prevents the fastening members from dropping upon the parts which serve for guiding the frame.

The plates 19 preferably have upon their upper sides an undulating shape or are covered with corrugated iron, the raised portions and the depressions running at right angles to the longitudinal direction of the plates and consequently towards the collecting bar 1. By the choice of a suitable pitch and if necessary by staggering the two plates or sheets relatively to each other, provision is made that each depressed portion of the undulating surface opens into a notch or gap of the collecting bar 1. By the undulating shape of the upper surface of the plates, a directing or positioning action is exerted upon the fastening members sliding upon the plates so that the members assume the position which is required for engagement by the gaps or notches of the collecting bar 1.

Sliding clasp fastenings are, of course, made in various lengths. According to the length of the fastening to be made, the collector bars 1 have to be charged with fastening members upon a corresponding portion of their length. By corresponding adjustment of the slides at the discharge of the storage receptacle 1, the length upon which the collector bars 1 are to be charged with fastening members, cannot, of course, be accurately adjusted, as the flow of the members which drop out, has the tendency to widen downwardly after the shape of a cone. For the above reason a separate screening device is provided which prevents the widening of the flow of the fastening members. This screening device consists of a pair of plates 22 for each plate 19. These plates or stops are substantially at right angles to the plates 19 and engage with their

ends into a depression of the plates. They may be somewhat inclined to the longitudinal axis of the plates 19, in order to engage better the flowing down fastening members. The distance between two plates 22 bearing upon a plate 19 determines the length upon which the collecting bar 1 corresponding to this particular plate 19 will be charged with fastening members. The plates 22 located directly below each other are fixed to an upright 23. When a fresh adjustment is to be made, the uprights 23 are removed from the plates 19 and are replaced upon the plates 19 at a reduced or increased distance from each other.

After the collector bars 1 mounted in a frame have been filled, which, as a rule, takes hardly a minute, the frame is shifted in such a manner with regard to the feeding plates that the frame with the charged collector bars 1 is moved outwards from between the feeding plates, whilst the other frame having unfilled collector bars 1 moves between the feeding plates. The filled collector bars 1 can now be removed from the frame in order to apply the fastening members supported by the bars to the stringers. In order to obviate the removal of the collector bars 1 from the frame 2, the frame may be made tiltable about a horizontal axis so that the frame can be tilted parallel to table 10. The pivotally suspended collector bars 1 then adjust themselves under their own weight so that the fastening members will stand at right angles to the plane determined by the frame 2 and consequently to the table 10. Consequently it is possible to place directly upon the table 10 stringers 25 clamped in clamping rails 24, and during the tilting movement of the frame, the legs of the fastening members 26 held by the collector device 1 will be inserted astride upon the stringers. As the two halves of the collector bars 1 are resiliently movable with regard to each other, the fastening members 26 can be pressed by means of a comb-shaped die 27 out of a collecting bar 1, by forcing apart the two halves of the rod, and can be directly pressed upon a stringer (see Fig. 6). Combs 28 arranged on both side of the stringer 25 in the clamping device 24 serve during the pressing of the fastening members upon the stringer, to prevent any alteration in the relative position of the fastening members.

In order to avoid the necessity of continuously pouring by hand the fastening members which have dropped down into the collecting receptacle provided below the fan-light shutters back into the storage receptacle 12, an automatic device may be provided which automatically returns fastening members which have dropped through, to the storage receptacle 12.

I claim:

1. In an apparatus of the kind referred to for charging with fastening members a rack-like collector bar having teeth and notches for catching and positioning the fastening members, the combination of: a plurality of parallel rack-like collector bars located above each other in a substantially vertical plane; two sets of inclined feeding plates located one on each side of said collector bars, two corresponding plates of said two sets of plates being adapted to feed one corresponding collector bar; and means for feeding fastening members to the top collector bar, substantially as described.

2. In an apparatus of the kind referred to for charging with fastening members a rack-like collector bar having teeth and notches for catch-

ing and positioning the fastening members, the combination of: a vertically disposed frame; a plurality of substantially horizontal rack-like collector bars having teeth and notches for catching and positioning the members arranged above each other in said frame and pivotally suspended therein; two sets of inclined feeding plates located one on each side of the said frame, two corresponding plates of two sets of plates being oppositely inclined and adapted to feed one corresponding collector bar; and means for feeding fastening members to the top collector bar, comprising a storage receptacle, substantially as described.

3. In an apparatus of the kind referred to for charging with fastening members a rack-like collector bar having teeth and notches for catching and positioning the fastening members, the combination of: a vertically disposed frame; a plurality of substantially horizontal rack-like collector bars arranged above each other in said frame and pivotally suspended therein; two sets of inclined feeding plates located one on each side of said frame, two corresponding plates of two sets of plates being oppositely inclined and adapted to feed one corresponding collector bar; means for feeding fastening members to the top collector bar; said vertically disposed frame being horizontally slidable between said two sets of feeding plates and being also tiltable about a substantially horizontal axis, substantially as described.

4. In an apparatus of the kind referred to for charging with fastening members a rack-like collector bar having teeth and notches for catching and positioning the fastening members, the combination of: a vertically disposed frame; a plurality of substantially horizontal rack-like collector bars arranged above each other in said frame and pivotally suspended therein; two sets of inclined feeding plates located one on each side of said frame, two corresponding plates of two sets of plates being oppositely inclined and adapted to feed one corresponding collector bar; means for feeding fastening members to the top collector bar; said frame being double the length of the feeding plates, being slidable horizontally between the feeding plates, and being also tiltable about a horizontal axis located near the lower edge of the frame, substantially as described.

5. In an apparatus of the kind referred to for charging with fastening members a rack-like collector bar having teeth and notches for catching and positioning the fastening members, the combination of: a vertically disposed frame; a plurality of substantially horizontal rack-like collector bars arranged above each other in said frame and pivotally suspended therein; two sets of inclined feeding plates located one on each side of said frame, two corresponding plates of two sets of plates being oppositely inclined and adapted to feed one corresponding collector bar; means for feeding fastening members to the top collector bar; said frame being double the length of the feeding plates, being slidable horizontally between the feeding plates, and being also tiltable about a horizontal axis located near the lower edge of the frame; and means for guiding said frame comprising a stationary supporting rail and ball bearing means between said stationary supporting rail and the base of the vertical frame, and lateral guide rollers on both sides of the lower portion of the frame, substantially as described.

6. In an apparatus of the kind referred to for charging with fastening members a rack-like collector bar having teeth and notches for catching and positioning the members, the combination of: two vertically disposed frames simultaneously slidable in a substantially horizontal direction, each frame being independently tiltable about a horizontal axis; a plurality of substantially horizontal rack-like collector bars located above each other in each frame and pivotally mounted therein; two sets of inclined feeding plates of substantially the same length as the collector bars, located one set on each side of one frame, two corresponding plates of said two sets of plates being oppositely inclined and adapted to feed one corresponding collector bar; and means for feeding fastening members to the top collector bar, substantially as described.

7. In an apparatus of the kind referred to for charging with fastening members a rack-like collector bar having teeth and notches for catching and positioning the fastening members, the combination of: a collector bar divided in the longitudinal direction into two halves resiliently connected with each other, and a comb-like die for pressing apart the two halves of the collector bar and simultaneously pressing out fastening members mounted in the collector bar, substantially as described.

8. In an apparatus of the kind referred to for charging with fastening members a rack-like collector bar having teeth and notches for catching and positioning the members, the combination of: a vertically disposed frame; a plurality of rack-like collector bars located above each other in the said frame; two sets of inclined feeding plates located one on each side of the said frame; two corresponding plates of said two sets of plates being oppositely inclined and adapted to feed one corresponding collector bar; means for feeding fastening members to the top collector bar; means for horizontally guiding said frame into working position between said feeding plates, said guiding means being located under the lowest collector bar; and means for discharging fastening members located in the frame under the lowermost collector bar above said guiding means, substantially as described.

9. In an apparatus of the kind referred to for charging with fastening members a rack-like collector bar having teeth and notches for catching and positioning the fastening members, the combination of: a vertically disposed frame; a plurality of rack-like collector bars having teeth and notches for catching and positioning fastening members located above each other in said frame; two sets of inclined feeding plates located one set on each side of said frame, two corresponding plates of said two sets of plates being oppositely inclined and adapted to feed one corresponding collector bar, said feeding plates being provided with undulating surfaces; and means for feeding fastening members to the top collector bar, substantially as described.

10. In an apparatus of the kind referred to for charging with fastening members a rack-like collector bar having teeth and notches for catching

and positioning the fastening members, the combination of: a rack-like collector bar having teeth and notches for catching and positioning fastening members; two oppositely inclined feeding plates one on each side of said collector bar, said plates having undulating surfaces, the raised portions and the depressions of the undulations running at right angles to the longitudinal direction of the collector bar, the depressed portions of the undulating surfaces opening into notches of the collector bar, substantially as described.

11. In an apparatus of the kind referred to for charging with fastening members a rack-like collector bar having teeth and notches for catching and positioning the fastening members, the combination of: a plurality of parallel rack-like collector bars located above each other in a substantially vertical plane; two sets of inclined feeding plates located one on each side of said collector bars, two corresponding plates of said two sets of plates being adapted to feed one corresponding collector bar; means for feeding fastening members to the top collector bar; and means for limiting the flow of the fastening members, comprising adjustable plates disposed substantially edgewise upon the feeding plates.

12. In an apparatus of the kind referred to for charging with fastening members a rack-like collector bar having teeth and notches for catching and positioning the fastening members, the combination of: a plurality of parallel rack-like collector bars located above each other in a substantially vertical plane; two sets of inclined feeding plates located one on each side of said collector bars, two corresponding plates of said two sets of plates being adapted to feed one corresponding collector bar; means for feeding fastening members to the top collector bar; and means for limiting the flow of the fastening members, comprising adjustable plates disposed substantially edgewise upon the feeding plates, said adjustable plates being arranged on a common support for simultaneous horizontal movement.

13. In an apparatus of the kind referred to for charging with fastening members a rack-like collector bar having teeth and notches for catching and positioning the members, the combination of: a stationary casing comprising a table and front and rear U-shaped yokes fixed upon the table; a vertically disposed frame horizontally movable in said stationary casing; a plurality of rack-like collector bars mounted above each other in said vertical frame; two stationary sets of inclined feeding plates mounted in said stationary casing, one on each side of said movable frame; two corresponding plates of said two sets of plates being oppositely inclined and being adapted to feed one corresponding collector bar; a storage receptacle for fastening members mounted in said casing above said vertical frame for feeding fastening members to the top collector bar; and means for horizontally guiding said frame in said casing for movement into and out of working position, substantially as described.

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