

(No Model.)

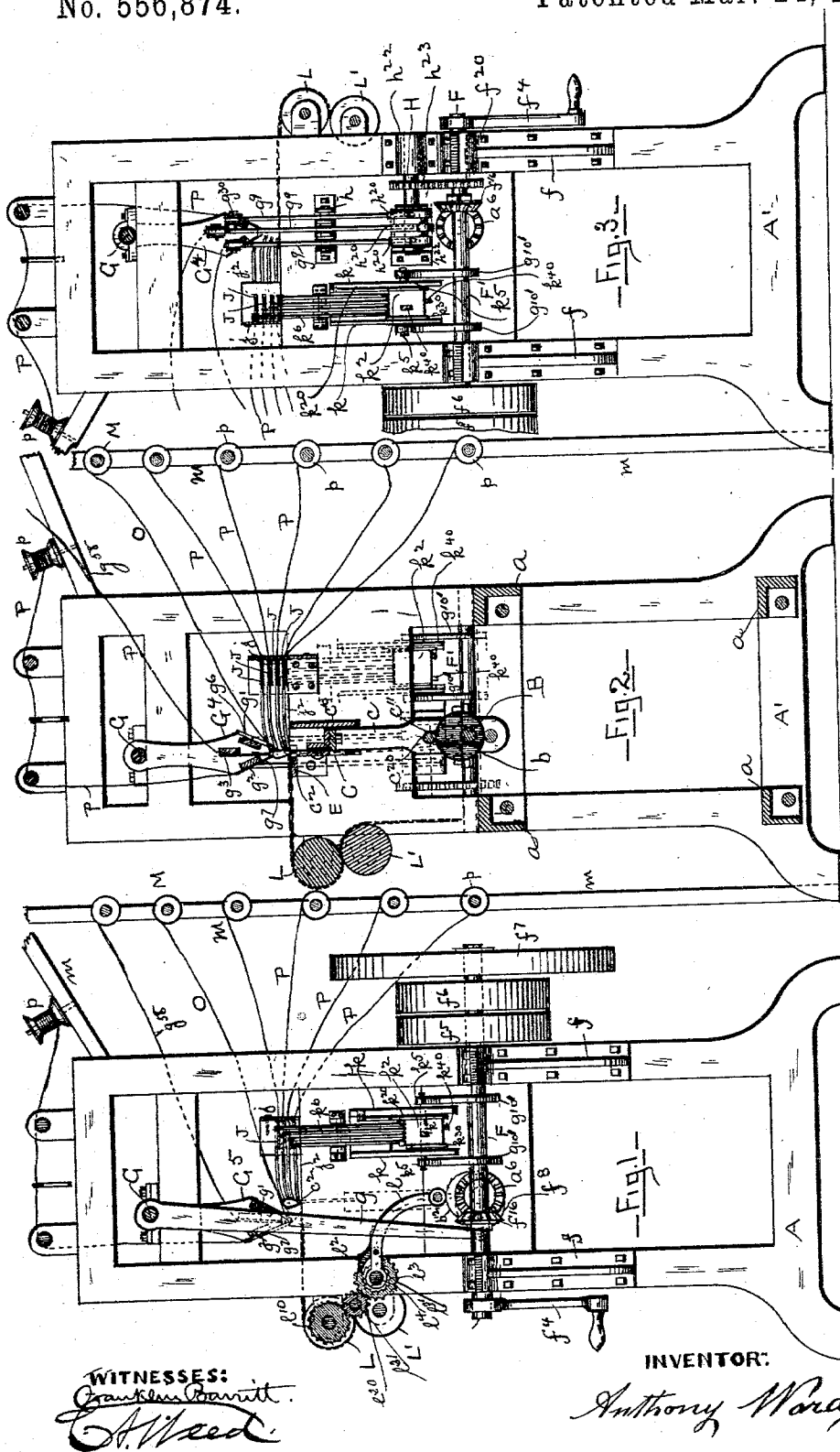
2 Sheets—Sheet 1.

A. WARD.

WARP MACHINE FOR KNITTING TRIMMING.

No. 556,874.

Patented Mar. 24, 1896.



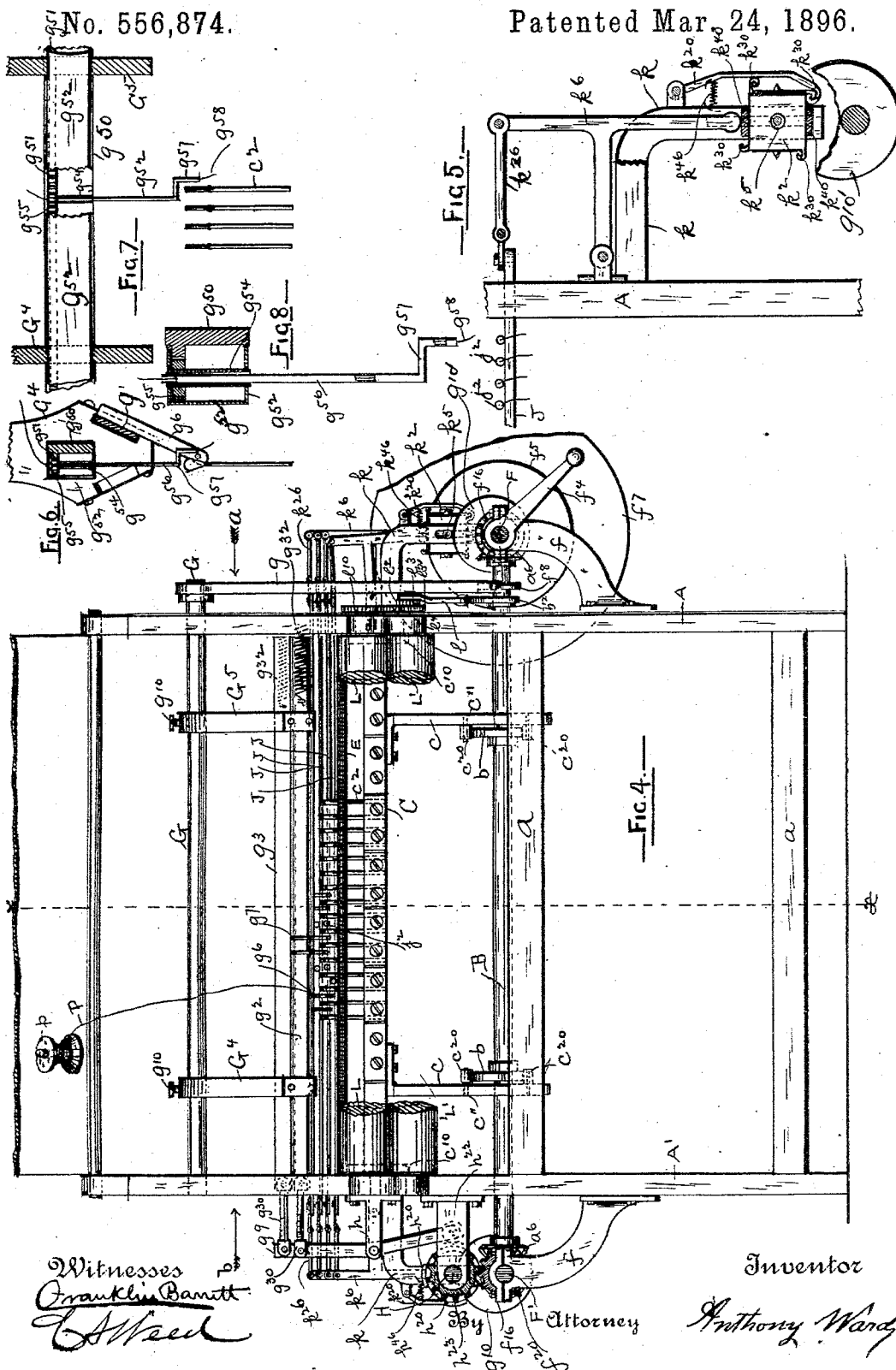
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Witnesses
Franklin Barnett
A. Ward

Inventor
Anthony Ward.

UNITED STATES PATENT OFFICE.

ANTHONY WARD, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO FRANK O. HAUBNER, OF SAME PLACE.

WARP-MACHINE FOR KNITTING TRIMMING.

SPECIFICATION forming part of Letters Patent No. 556,874, dated March 24, 1896.

Application filed February 4, 1893. Serial No. 461,053. (No model.)

To all whom it may concern:

Be it known that I, ANTHONY WARD, a citizen of the United States of America, and a resident of New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Warp-Machines for Knitting Trimming, of which the following is a specification.

The object of my invention is to produce a machine for knitting trimming which is simple in construction, easily operated, and readily changed to produce the required pattern.

In the accompanying drawings, Figure 1 is a side or end view of my improved machine for knitting trimming, looking in the direction of arrow *a*, Fig. 4. Fig. 2 is a sectional elevation on line *x x*, Fig. 4, looking in the direction of arrow *a* of Fig. 4. Fig. 3 is also a side or end view of my improved machine for knitting trimming, looking in the direction of the arrow *b*, Fig. 4. Fig. 4 is a front view of my improved machine, showing the winding-rollers broken away in the center to show the needle-bar. Fig. 5 is a detached enlarged side view of the Jacquard mechanism, the cam-wheel shown partly broken away to more clearly illustrate the device. Fig. 6 is a side view of part of the rocking arm, showing the sliding bar provided with the revolving tubes and the sliding bar with the eye-plates. Fig. 7 is a front view of Fig. 6 with the hood partly broken away to show the interior. Fig. 8 is a detached enlarged sectional view of the sliding bar with hood, cog-wheel, hollow axle, and tube inserted therein.

Similar letters and numerals of reference indicate corresponding parts in the different figures.

The side frames *A A'* of the machine are held together by the cross-pieces *a a*, bolted thereto. These side frames support the driving-shaft *B*, revolving in suitable bearings fastened to said side frames. The outer ends of this shaft are provided with bevel gear-wheels *a⁶*, both of which mesh into similar bevel gear-wheels *f¹⁶* on shafts *F F'*, placed at each end of the machine (see Fig. 4) and supported and revolving in suitable bearing-brackets *f*, secured by bolts to the side frames. (See Figs. 1, 3 and 4.) The shaft

F is provided on one end with a crank-arm *f⁴*, having a suitable handle, and on the other end with two pulleys *f⁵ f⁶* and a fly-wheel *f⁷*.

The usual needle-bar *C* is used, containing any numbers of needles *c²*, secured thereto in any well-known manner. This needle-bar slides up and down in suitable guideways *c¹⁰*, formed on the inside of the side frames. (Shown in dotted lines in Fig. 4.) To the under side of this needle-bar are secured the arms *c c*, each provided with a slot *c¹¹*, through which passes the shaft *B*. (See Figs. 2 and 4.) On the inside of these arms are placed small friction rollers or wheels *c²⁰*, one above the other, and between these friction-rollers revolve the cams *b b*, keyed upon the shaft *B*. (See Figs. 2 and 4.) It is obvious now that when shaft *B* revolves these cams will raise and lower the needle-bar.

The right-hand end of the shaft *B* has securely fastened thereon two cams *b¹²* and *f⁸*. (See Figs. 1 and 4.) The cam *b¹²* operates the lever-arm *l*, fulcrumed on stud *l⁴* and provided at its fulcrumed end with a pawl *l²*, acting upon ratchet-wheel *l³*, said ratchet-wheel revolving on the stud *l⁴*, which is formed or secured on the side of the frame. (See Fig. 1.) This ratchet-wheel is fastened to a gear-wheel *l^{3'}*, revolving on the stud *l⁴*, and the said gear-wheel meshes into a small gear-wheel *l²⁰*, revolving on stud *l²¹*, secured to the frame. This gear *l²⁰* meshes into another gear-wheel *l¹⁰* on the end of the shaft of the winding-roller *L*, said shaft having journal-supports in brackets secured to the said side frame of the machine. (See Figs. 1 and 4.) Beneath the roller *L* is secured roller *L'*. It is obvious that when the cam *b¹²* revolves the rollers will be automatically turned, thus drawing the knitted goods off from the machine.

The cam *f⁸* on shaft *B* operates the long lever-arm *g*, which is secured on the outer end of the shaft *G*, which has journal-supports in suitable bearings on the side frames. This shaft supports two arms *G⁴ G⁵*, (see Figs. 1, 2, 3 and 4,) which are formed at their lower ends in any suitable way, preferably spear-shaped, as shown in said figures, so as to receive the two side sliding bars *g¹* and *g²* and central sliding bar *g³*, located above the bars

g' and g^2 , each having its own guideway or aperture of suitable shape therefor cut in arms G^4 and G^5 and held therein in any suitable manner. (See Figs. 1, 2 and 6.) The sliding bar g' supports on the outside a number of eye-plates or rods g^6 . (See Figs. 2 and 6.) The side sliding bar g^2 and central sliding bar g^3 support a number of tubes g^7 , Figs. 1, 2 and 4. The manner and mode of fastening these plates g^6 and tubes g^7 onto their respective bars is unimportant, as any cheap and serviceable way can be used. The eyes g^6 carry the warp-threads O from reels M on rack m . The tubes g^7 carry the cords P from reels p on rack m . These three sliding bars g' , g^2 and g^3 are moved to and fro on their supporting-arms G^4 and G^5 by three lever-arms g^9 , fulcrumed on a bracket h , secured to the side of the machine A' . (See Figs. 3 and 4.) The lower ends of these levers press on the inside of the raised cams h^{20} on shaft H , having journal-bearings in the brackets h^{22} secured on the side frame A' . (See Fig. 3.) This shaft H is provided with a gear-wheel h^{23} , which meshes into gear-wheel f^{20} on shaft F' . (See Figs. 3 and 4.) The sliding bars g' , g^2 , g^3 are connected to the upper ends of the levers g^9 by pivoted connecting links or arms g^{30} . (See Figs. 3 and 4.) These bars are thrown in the opposite direction or return to their normal position after being drawn outward by the levers by springs g^{32} . (See Fig. 4.) The position of these springs is immaterial. A sinker-bar E is used, similar to those used in machines of this class. It is obvious that when the cam f^8 revolves the shaft G will rock, and when the cams h^{20} on shaft H revolve the sliding bars g' , g^2 , g^3 will move outward and inward by the springs. These movements will throw the warp-thread and cord around the needles when they are raised by the cams on shaft B .

In order to create different designs or patterns, I employ the four tube-supporting-sliding bars J , supported and sliding in suitable guideways formed on the brackets j , secured on the side frames $A A'$. (See Figs. 1, 2 and 3.) The tubes j^2 of these bars are fastened thereto in and suitable manner and may be bent downward to bring the cords nearer the ends of the needles, as shown in Figs. 1, 2 and 3. There is nothing new as to these bars nor as to the tubes or position. These bars are separately moved to and fro from both ends by the four levers k^6 , each fulcrumed to a stud or pin secured on the side frames $A A'$. (See Figs. 1, 2, 3, 4 and 5.) A connecting-link k^{26} joins each lever to a bar. (See Figs. 4 and 5.) These levers are raised by the blocks or cylinders k^2 , (see Figs. 1, 2, 3, 4 and 5,) placed between the bracket-arms k . (See Figs. 1, 2, 3, 4 and 5.) The ends of these blocks are provided with studs which pass through slots in the brackets, (see Fig. 4,) and the outer ends of these studs are provided with sleeves or rollers k^5 . (See Fig. 4.) These slots permit the blocks to be raised or

lowered, which is done by the cams $g^{10'}$ on shafts $F F'$ (see Figs. 1, 2, 3, 4 and 5) acting on rollers k^5 . The ends of each block are provided with four hooks k^{30} , separately fastened thereon or formed on an independent plate secured on said blocks.

k^{30} is a hanging or drop pawl pivoted to the bracket k . (See Fig. 5.) The lower or free end of these pawls is provided with a hook corresponding with hooks k^{30} . When the blocks are raised these pawls, one to each block, catch the hook of said block. (See Fig. 5.) When the block is dropped the pawl will automatically turn the block one square. A spring k^{46} is used to hold the pawl k^{30} in place. The sides of these blocks have secured onto them pieces or blocks k^{40} . (See Figs. 1, 3, 4, and 5.) The thickness of these pieces or blocks will regulate the movement of the slide-bars J . It must be observed that whenever the raised pieces are placed on a block on one side of the machine to move certain bars, the block on the other side of the machine should be free from such pieces or blocks, and vice versa. The principal object of this invention is to operate these tube-bars J from both ends by raising the blocks k^2 provided with pieces or blocks of unequal thickness, and the result obtained thereby is that these bars are more steadily moved and more evenly operated than could be done by a single block with a spring to return them to their proper place, which is quite unsteady and uneven.

The pieces or blocks k^{40} can be placed on a piece of cardboard and the number required laced together after the manner of a Jacquard, and placed over the blocks and held thereto in the same manner by pins on the blocks and holes in the cards.

The machine is started by the crank f^4 on shaft F . Before this is done the machine is harnessed by passing the warp-thread O through eyes g^6 of said bar g' . The cords or threads of various colors intended to be knitted with the warp are unrolled from reels p and passed through the tubes g^7 on bars g^2 , g^3 and through tubes on bars J intended to produce the design. As the machine operates, the needle-bar first rises through cams $b b$, and the shaft G rocks through cam f^8 , and the bars g' and g^2 or g^3 , whichever used, move sidewise by cams h^{20} on shaft H , thus forming loops around the needles. At or about the same time the foregoing movements are accomplished, the tube-bars J are moved to and fro by the revolving blocks k^2 through the cams $g^{10'}$ on shafts $F F'$. As the material is knitted it is rolled off by the rollers $L L'$, actuated by cams b^{12} on shaft F . These movements will continue until the pattern is completed. All the bars g' , g^2 , g^3 , and J can be used, but the number will not effect the working of the device.

It may be necessary at some time to produce a design where the cord is looped or scrolled around one or more needles. A slight

change is necessary to accomplish this. The central bar g^3 is removed and the bar g^{50} substituted. (See Figs. 6, 7, and 8.) This bar is provided with rack-teeth g^{51} . (See Fig. 7.)

5 Over this bar is placed the sliding hood g^{52} which slides through the arms G^4 G^5 , which are provided with suitable ways. One end of this hood is connected to a lever g^9 by a link g^{30} , and the other end has connected
10 thereto a spring 32 to return said hood to its normal position after being drawn outward by the lever g^9 , the same movement taking place in regard to the hood that takes place in regard to the sliding bar g^3 , as heretofore
15 set forth, the hood having been substituted for the bar g^3 , as set forth herein.

The interior of the hood supports the revolving hollow axle g^{54} with pinion g^{55} , which meshes in rack-teeth g^{51} . (See Figs. 6, 7 and
20 8.) Into this hollow axle is inserted the hollow tube g^{56} with right-angle bent lower end g^{57} to enable it to encircle the needles c^2 . As the hood is moved the tube g^{56} will revolve around the needles by reason of the pinion
25 traveling over the rack-bar and thus carry the cord g^{53} passing through the tubes in scroll formation around the needles.

Although one tube is only shown the hood can carry more and the number is governed
30 according to the design.

I claim as my invention—

1. In a machine for knitting trimming, the combination of a bar attached to the machine and provided with a rack, a sliding hood covering
35 said bar and provided with a revolving hollow axle, having a pinion thereon, said pinion meshing with said rack, said hollow axle being adapted to inclose a hollow tube for carrying a cord, and means for moving said
40 sliding hood to cause said hollow tube with its cord to encircle the needles of the machine, substantially as described.

2. In a machine for knitting trimming, the combination of a bar attached to the machine and provided with a rack, a sliding hood covering
45 said bar and provided with a revolving hollow axle, having a pinion thereon, said pinion meshing with said rack, said hollow axle being adapted to inclose a hollow tube for carrying a cord, and means for moving said
50 sliding hood to cause said hollow tube with its cord to encircle the needles of the machine, comprising a lever fulcrumed near the side of the machine, an arm connecting said lever and hood, a cam for operating said lever, means
55 for operating said cam, and means for returning said hood to its normal position, substantially as described.

3. In a machine for knitting trimming, the combination of a shaft provided with supporting-arms, a rack-bar attached to said arms, a hood sliding in suitable guideways of said
60 supporting-arms and over said rack-bar, a revolving hollow axle attached to said hood and having a pinion thereon meshing with said
65 rack-bar, a tube adapted to be inserted into

said hollow axle and adapted to carry a cord, and means for moving said sliding hood to cause said hollow tube with its cord to encircle the needles of the machine, substantially as described. 70

4. In a machine for knitting trimming, the combination of mechanism for revolving tubes carrying cords around the needles, comprising a rack-bar, a hood sliding on said bar,
75 said hood supporting a revolving hollow axle having a pinion thereon adapted to mesh with said rack-bar, a tube adapted to be inserted in said axle for carrying a cord, and means for operating said sliding hood, substantially
80 as described.

5. In a machine for knitting trimming, the combination of mechanism for revolving a tube carrying a cord around the needles comprising a rack-bar, a hood sliding on said bar,
85 said hood supporting a revolving hollow axle having a pinion thereon adapted to mesh with said rack-bar, a tube bent at its lower end into angular form and adapted to be inserted in said axle for carrying a cord, and means
90 for operating said sliding hood to revolve said tube.

6. In a machine for knitting trimming, the combination with a frame, of a sliding tube-supporting bar, a lever connected to said bar at its end, a vertically-sliding block having
95 hooks and adapted to actuate said lever to raise and lower the same, a spring-actuated pawl in position and adapted to engage the hooks of said block when said block is in
100 raised position to rotate said block while being lowered, and a cam for vertically raising and lowering said block.

7. In a machine for knitting trimming, the combination with a frame, of a sliding tube-supporting bar, an angular lever pivoted to
105 said frame and connected to said bar at its end, a vertically-sliding block having hooks and adapted to actuate said lever to raise and lower the same, a spring-actuated pawl in
110 position and adapted to engage the hooks of said block when said block is in raised position to rotate said block while being lowered, a cam for vertically raising and lowering said blocks, and a supplemental block adapted to
115 be secured to said sliding block for regulating the movement of said lever.

8. In a machine for knitting trimming, the combination of a revolving shaft, sliding tube-supporting bars provided with angular levers
120 at their outer ends, a bracket attached to the machine and provided with slots, a block provided with projecting studs adapted to slide in said slots, rollers on said studs, hooks on
125 said block, a pawl attached to said bracket and provided with a hooked end adapted to engage the hooks of the block when said block is in raised position to revolve said block while being lowered, means for raising and
130 lowering said block, comprising cams attached to the revolving shaft and adapted to form contact with the rollers on the sliding

block, and means attached to said block for regulating the movement of the supporting-bars, substantially as described.

9. In a machine for knitting trimming, the
5 combination of a rocking shaft, means for operating said shaft, depending bracket-arms supported on said shaft and provided with guideways, a bar adapted to slide in one of
10 said guideways and adapted to support rods provided with eyes for carrying the warp-threads, a rack-bar attached to the bracket-arms, a hood provided with a revolving hol-

low axle, a pinion meshing with said rack-bar, said hood sliding in the other guideway, a tube adapted to fit into said axle and carrying a cord, and means for moving said bar carrying the rods and said hood back and forth, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand.

ANTHONY WARD.

Witnesses:

FRANKLIN BARRETT,
EDWARD COLLINS.