No. 724,231. PATENTED MAR. 31, 1903.

E. F. ABBEY.

BRUSH MACHINE.

APPLICATION FILED AUG. 8, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

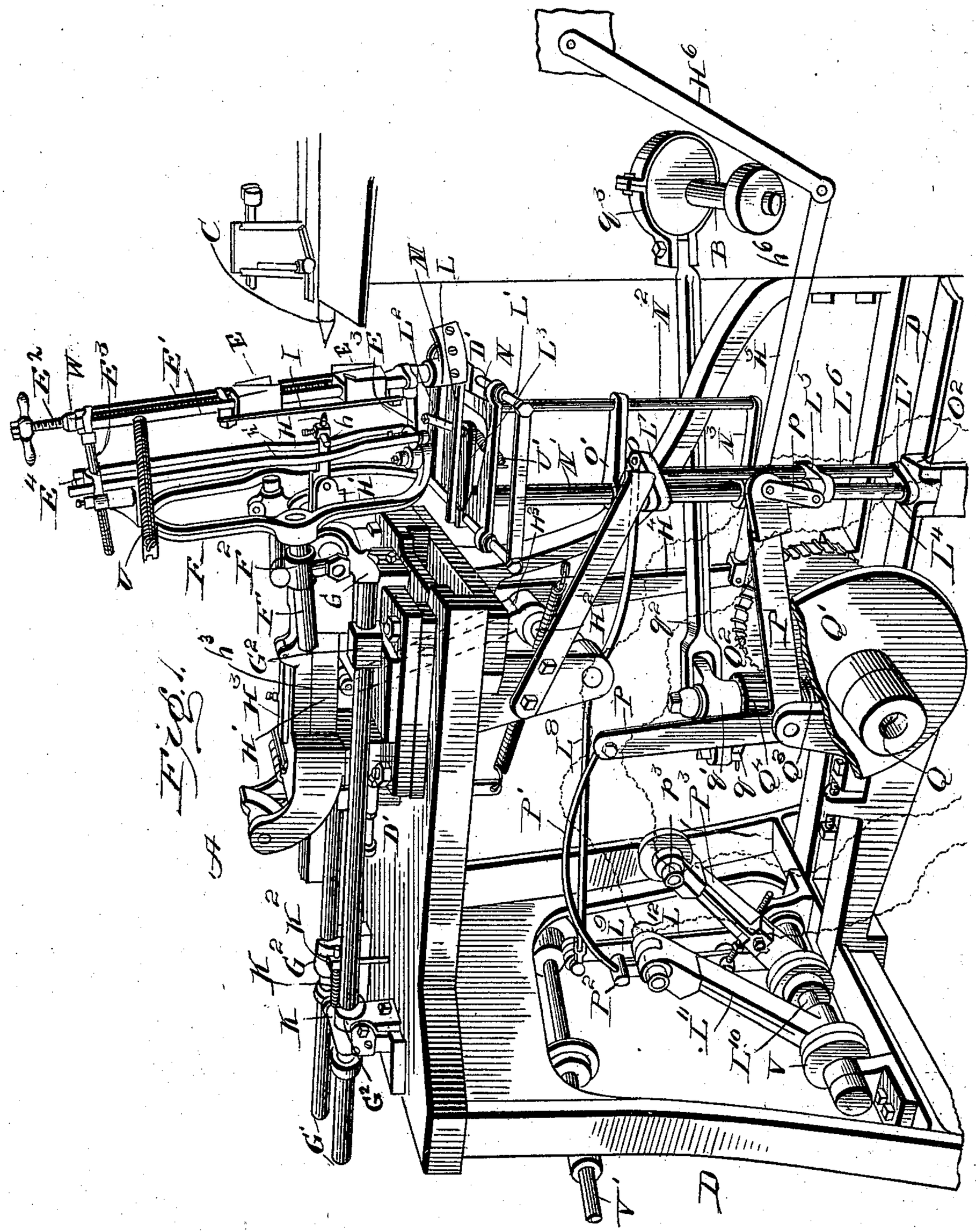

Fig. 1.

Witnesses
J. McFowler Jr.
Thomas Durant

Inventor
Edward F. Abbey.
by Church & Church
his Attorneys.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.

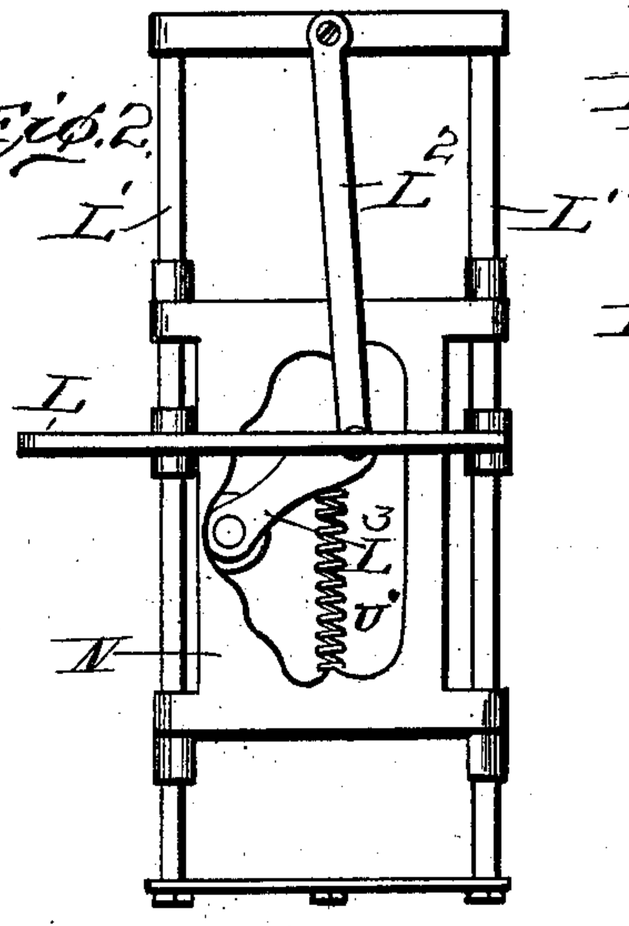


Fig. 3.

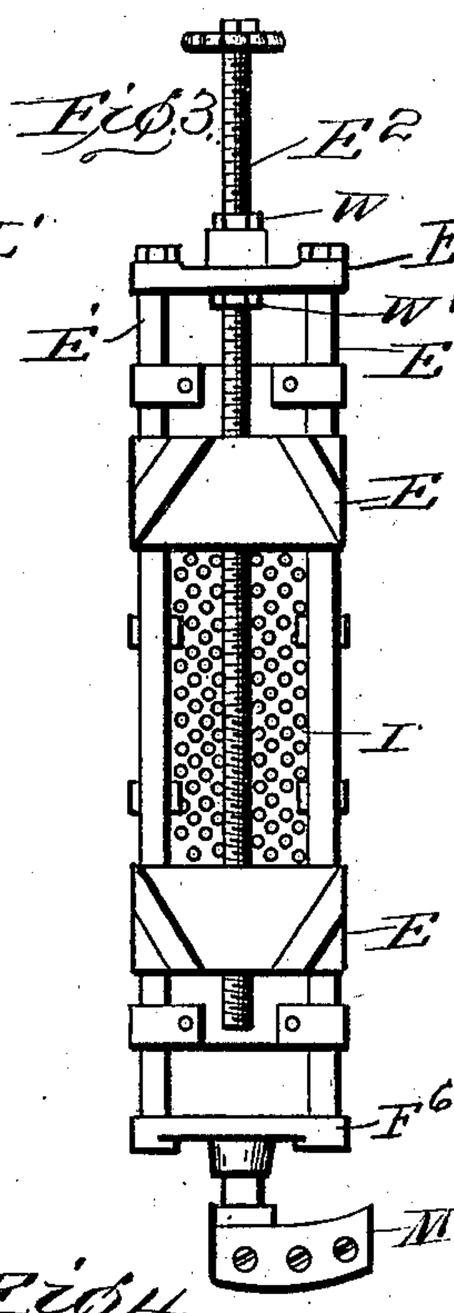


Fig. 6.

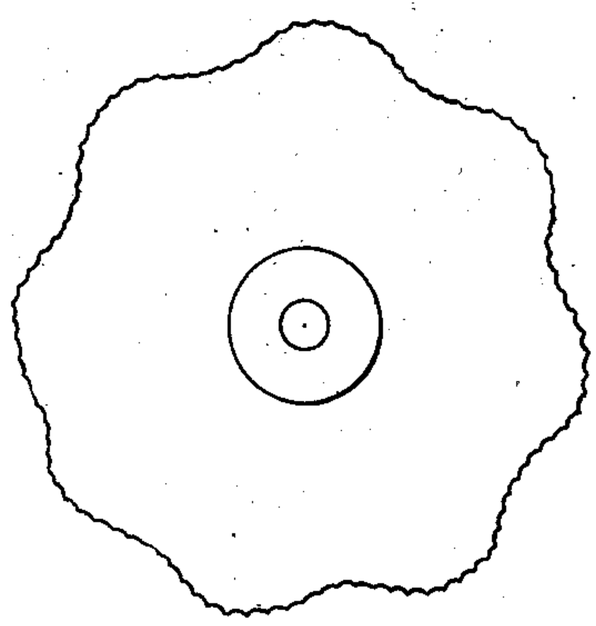


Fig. 8.

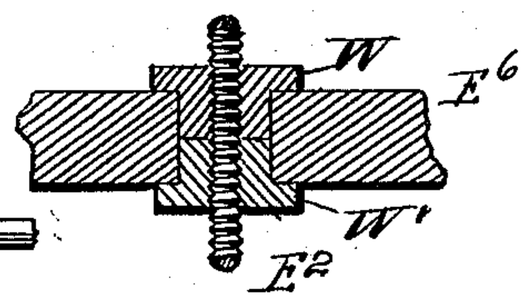
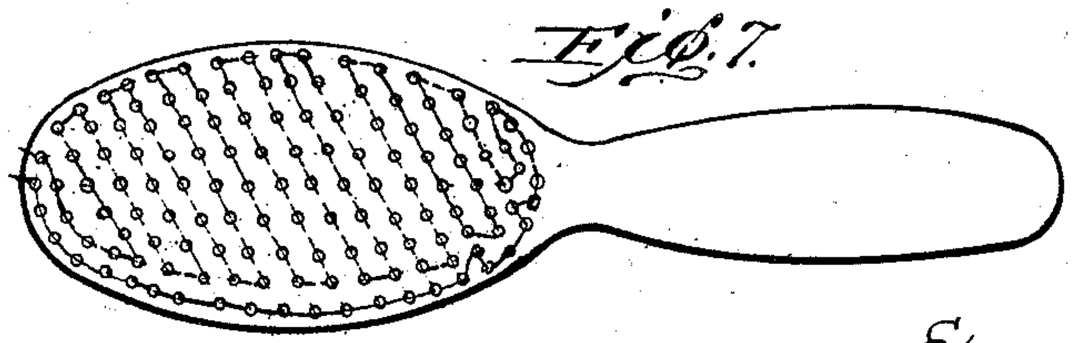


Fig. 4.

Fig. 5.

Fig. 7.



Witnesses
Thomas Durant
Elizabeth Ruffett

Inventor
Edward F. Abbey,
by Church & Church
his Attorneys.

No. 724,231. PATENTED MAR. 31, 1903.

E. F. ABBEY.

BRUSH MACHINE.

APPLICATION FILED AUG. 8, 1902.

NO MODEL. 3 SHEETS—SHEET 3.

Fig. 9.

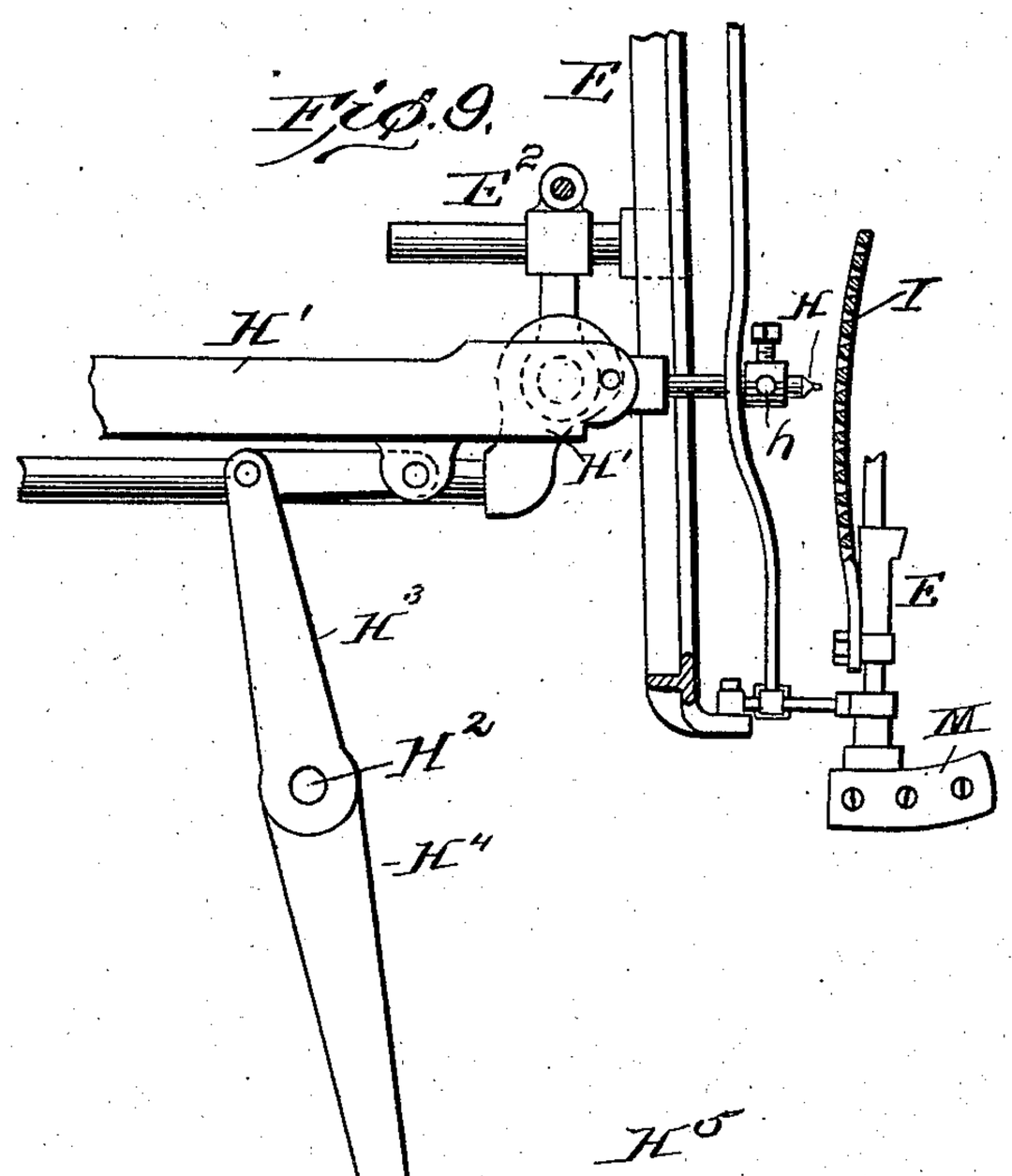


Fig. 10

Witnesses
J. M. Fowler Jr.
Alexander D. Stewart.

Inventor
Edward F. Abbey
by Church & Church
his Attorneys

UNITED STATES PATENT OFFICE.

EDWARD F. ABBEY, OF TOLEDO, OHIO.

BRUSH-MACHINE.

SPECIFICATION forming part of Letters Patent No. 724,231, dated March 31, 1903.

Application filed August 8, 1902. Serial No. 118,911. (No model.)

To all whom it may concern:

Be it known that I, EDWARD F. ABBEY, of Toledo, in the county of Lucas, State of Ohio, have invented certain new and useful Improvements in Brush-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

The present invention relates to improvements in machinery used in the manufacture of brushes, and more especially to improvements in that class of machinery designed for the manufacture of brushes having what are known as "solid backs"—that is to say, brushes having backs in which sockets are drilled or similarly formed at proper distances apart and at proper relative angles for the reception of the bristles or tufts of bristles and the bristles are subsequently inserted in said sockets and held therein by suitable anchors—although the improvements contemplated in the present application are capable of a wide range of usefulness and may be employed to advantage in connection with any desired type of machine wherein it may be found advantageous to position a block automatically and in accordance with a previously-designed system either for the insertion of the bristles or for the formation of the sockets for the reception of the bristles.

In illustrating the present improvements they have been shown in connection with a machine for inserting bristles commonly known as a "filling-machine," the mechanism illustrated for performing the actual filling operation aside from the positioning of the block being a well-understood type of machine now in common use and known as the "Gane filling-machine," said machine being well illustrated in United States Patent to J. V. Gane, No. 378,130, dated February 21, 1888.

The present invention consists in certain novel details of construction and combinations and arrangements of parts, all as will be hereinafter described, and pointed out particularly in the appended claims.

In the accompanying drawings, Figure 1 is a perspective view of a machine embodying the present improvements, the pattern-cams being removed, but indicated in dotted lines, and certain portions being broken away in order to show more clearly parts which would otherwise be concealed thereby and the filling mechanism proper being indicated in outline only in order that its relation to the mechanism constituting the present invention may be clearly understood. Fig. 2 is a plan view of the adjustable controlling-guide for the brush-block carrier. Fig. 3 is an elevation of a block-carrier, showing the adjusting mechanism for the clamps. Fig. 4 is a detail view of the stop mechanism controlled by the pattern-cam shaft for arresting the movement of the machine when the pattern-cams have reached a predetermined point in their movement. Fig. 5 is a further detail of parts of the stop mechanism which coöperate with the drive-shaft, said parts being shown separated. Fig. 6 is an elevation of one of the pattern-cams. Fig. 7 is a plan of a brush-back, showing the course traversed with relation to the tool or inserter. Fig. 8 is a detail section of the holder for the clamp-screw. Fig. 9 is a detail of the operating mechanism for the centering and advancing point and also showing a portion of the block-carrier and templet. Fig. 10 is a detail perspective showing the stopping mechanism and parts associated therewith.

Like letters of reference in the several figures indicate the same parts.

The machine for inserting the bristles or tufts, as illustrated in the accompanying drawings, is indicated generally by the letter A, its drive-shaft by the letter B, and the inserter by the letter C, and it will be understood that the bristles are in the well-known manner separated, advanced to the inserter, and by the latter inserted in the sockets provided for the tufts when a brush-back containing sockets is presented in proper position for the coöperation of the inserter. The drive-shaft for the filling-machine also constitutes the drive-shaft for the mechanism for automatically positioning the block and for advancing the block toward and from the inserter, the mechanism for effecting the latter movement being substantially similar to that heretofore employed in filling-machines, as will be hereinafter pointed out.

The brush-block positioning and presenting mechanism referred to is located in rear

of the filling-machine and embodies a base-frame D and a top frame D′, the latter being in the form of a table-top upon which certain of the parts are mounted.

The block-carrier is in the form of a pair of clamps E, mounted to slide on guide-rods E′ and adapted to be adjusted toward and from each other by a central adjusting-screw E^2, having right and left threads thereon, said screw and clamps being bodily adjustable in order to position the clamps simultaneously with relation to the filling-machine or other working parts of the machine. The guide-rods E′ are mounted in or constitute a portion of a frame having heads E^6 and rearwardly-extending rods E^3, adjustably mounted in trunnion-blocks E^4, the latter being pivoted in line with each other in a swinging frame F. The frame F is provided with rearwardly-extending rods F′, adjustably mounted in trunnion-blocks F^2, and the latter are journaled in line with each other on the forward end of a longitudinally-movable frame G. This frame G is provided with rearwardly-extending shafts G′, adapted to slide longitudinally in bearings G^2 on the table D′ and to be moved toward and from the inserter in line therewith. Thus while the block-carrier may be adjusted on two centers at right angles to each other, so as to vary its angle with relation to the inserter in its movements toward and from the inserter, it moves in a definite line, thereby insuring the insertion of the bristles uniformly with relation to the sockets for holding the same.

The mechanism for moving the block-carrier toward and from the inserter preferably consists first of a centering and advancing point H, adapted to coöperate with a templet I, secured in rear of the clamps E and having apertures formed therein corresponding, but reversely arranged, with respect to the sockets in the brush-back. This centering and advancing point is adjustably mounted on the forward end of a slide H′, which slide H′ corresponds to the slide heretofore employed in the Gane filling-machine for directly advancing the brush-block. The operating and controlling mechanism for the slide is similar to the mechanism heretofore employed in the Gane machine for a like purpose and consists of a rock-shaft H^2, having an upwardly-extending arm H^3, the upper end h^3 of which coöperates with the under side of the slide through the usual well-known connections, and a downwardly-extending arm H^4 is connected at its lower end by a connecting-rod H^5 with a lever H^6, pivoted to the frame of the filling-machine, adapted to be moved by a cam h^6 on the drive-shaft of the filling-machine. On the return movement it is necessary that some play or independence of movement should be allowed the advancing and centering point in order that it may be effectually disengaged from the templet prior to the time when said templet and block are adjusted laterally for the insertion of a tuft in a new or different socket, and for this reason the initial retrograde movement preferably first moves the advancing and centering point to withdraw it from the templet, the movement of the block-carrier taking place after the said point has retreated sufficiently far to be disengaged from the templet. To prevent immediate movement of the carrier, a friction device is preferably provided which will hold the carrier until the point has moved a certain distance, and the friction is preferably provided by arranging the bearings G^2 to clamp the rods with a greater or less pressure, as desired. The return or retrograde movement of the carrier may be effected or inaugurated by lateral projections h on the point, adapted to coöperate with vertically-extending rods h' on the carrier; but in addition to this means for effecting such movement a spring K is also provided, located between a cross-head K′, connecting the rods G′, and a fixed abutment K^2 on the frame D′. In adjusting this portion of the mechanism it will be understood that the friction of the bearings in which the rods G′ work should be sufficient to prevent the spring from moving said rods and the block-carrier until the advancing and centering point has moved a short distance toward the rear.

Mechanism for adjusting the angular position of the block-carrier preferably coöperates directly with said carrier or with the carrier-frame, and in the present instance it consists of a vertically and horizontally adjustable track or guideway L, upon which is guided a shoe or block M, pivotally mounted on the lower portion of the block-carrier, the pivotal connection being such as to permit the block-carrier and its frame to swing transversely, while the shoe M moves on the track as the latter rises and falls, and permit said carrier and its frame to swing vertically on the centers formed by the trunnion-blocks F^2. The track or guide L is preferably mounted upon or constitutes a portion of a framing, the remaining portion of which is formed by parallel rods L′, Fig. 2, connected at the ends and mounted to slide longitudinally in bearings on a vertically-adjustable support N. Thus the angular position of the block-carrier may be adjusted vertically by the vertical movement of the support N and transversely by the movement of the track-frame L′ on said support N, and suitable mechanism is provided for effecting the movements of the support and track automatically under the control of pattern-cams, which have been previously designed to conform to the particular style of brush being made.

The support N is mounted on the upper end of a tubular shaft N′, mounted to slide in a fixed bearing O, and is held against rotary motion by a guide-rod N^2, working through an arm O′ on the bearing O and connected at its lower end with the shaft N′ by an arm N^3. Thus said shaft and its guide N^2

and arm N^3 constitute a vertically-movable frame, and this frame is adapted to be moved vertically by a bell-crank lever P, one arm of which is connected through links p with the lower end of the shaft N′ and the other arm of which is connected by a link P′ with one arm P^2 of a bell-crank lever loosely mounted on shaft L^{10}, the other arm P^3 of which carries a roller p^3, adapted to coöperate with the periphery of one of the pattern-cams shown in dotted lines in Fig. 1. Obviously by the rotation of said pattern-cam the support N will, through the said connections P, P′, P^2, and P^3, be moved vertically, and by properly forming the periphery of said cam the support and track may be moved to any desired degree and so as to change the angle of the block-carrier in a vertical plane with relation to the inserter to conform to the desired angle and position the bristles shall occupy in the completed brush.

To effect the transverse movement of the guide or track L, the track-frame L′ is connected by a link L^2 with the end of a crank-arm L^3 on the upper end of a shaft L^4, extending down through the tubular shaft N′ and provided with a laterally-extending arm L^5. The outer end of arm L^5 is bifurcated and adapted to embrace a vertically-arranged controller L^6, said controller being in the form of an elongated crank having an axis coincident with the longitudinal center of the shaft N′ and of the shaft L^4. Thus the shafts N′ and L^4 may be moved vertically in unison with each other, and at the same time the shaft L^4 may be rotated by the movement of its controller L^6 to shift the track or guide L transversely of the support N, and thereby swing the block-carrier in a lateral direction, with the trunnion-blocks E^4 as a center.

The vertically-extending controller L^6 is preferably in the form of a rod carried at its opposite ends on crank-arms L^7, journaled one on the bearing O and the other on a bearing O^2 on the bottom frame D of the machine, the shaft L^4 extending down through the latter bearing.

The movement of the controller L^6 is effected through a link L^8, jointed at one end to the upper arm L^7 of said controller and at the opposite end to a relatively long crank-arm L^9 on a rock-shaft L^{10}, which shaft L^{10} also carries a second crank-arm L^{11}, having at its outer end a roller L^{12}, adapted to coöperate with the other one of the two pattern-cams indicated in dotted lines in Fig. 1, and consequently by the movement of said latter cam the transverse adjustment or positioning of the block-carrier is effected by the combined transverse and vertical adjustments of said carrier, enabling the brush-block to be properly positioned for inserting the bristles in all of the sockets.

The pattern-cams are rigidly mounted on the shaft Q by being clamped against the disk Q′, and the shaft Q extends through to the opposite side of the machine, where it is provided with a driving and controlling mechanism to be now described. For driving said shaft intermittently it is provided with a worm-gear Q^2, with which a vertically-arranged worm Q^3 meshes. The vertically-arranged worm Q^3 carries a ratchet-wheel Q^4, and coöperating with said ratchet-wheel is a pawl q, mounted on an oscillatory carrier q'. The pawl itself is preferably held in engagement with the ratchet-wheel by spring-pressure, and any ordinary means may be provided whereby said pawl may be held out of engagement when desired for the purpose of rotating or adjusting the pattern-cams by hand, the arrangement shown being similar to that described in my prior patent, No. 666,217, dated January 15, 1901. The pawl-carrier q' is connected by a link q^2 with an eccentric q^3 on the drive-shaft B of the filling-machine. Thus by the rotation of said drive-shaft the pawl-carrier and pawl are oscillated, and on the movement of said parts in one direction movement is imparted to the ratchet-wheel, worm, worm-gear, and pattern-cam shaft Q, and this movement is timed to occur when the block-carrier is withdrawn from the inserter and the advancing and centering point is withdrawn from the templet on the back or block carrier.

The pattern-cams as ordinarily constructed are preferably of large size or of sufficient size to permit of the making of a brush by one rotation of said cams, (see Fig. 6,) and when said rotation is completed it is desirable that the mechanism should be automatically brought to rest to enable the operator or attendant to remove the completed brush-back and to insert a new back for the subsequent operation. For this purpose the pattern-cam shaft is provided with a stop projection, which at the proper time coöperates with a clutch mechanism to release the driving-pulley from the driving-shaft, permitting said pulley to continue its movement, while the driving-shaft and filling and positioning mechanisms come to rest. The stop mechanism is well illustrated in Fig. 4, and by reference to this figure it will be seen that there is mounted on the shaft Q a collar having a projection R, having an inclined face adapted to coöperate with the end of and move a clutch-rod S longitudinally. The clutch-rod S is suitably supported in bearings, and at its farther end it is provided with an incline projection T, adapted to coöperate with a spring-pin T′, mounted in a disk T^2 (shown in Fig. 5) and keyed to the drive-shaft of the filling-machine. The pin T′ when projected coöperates with a semicircular recess T^3 in a sleeve journaled on said drive-shaft and rigidly connected with the driving-pulleys T^4. The projection T on the clutch-rod when pressed toward the driving-shaft will be in position to ride under the end of the pin T′, moving the same out of the recess T^5 and disengaging the drive-shaft from its drive-pulleys, said shaft coming to rest with the pin T′ ele-

vated on the projection T, and in order to again couple the parts it is only necessary to withdraw the projection T by a longitudinal movement of the clutch-rod in the reverse direction. To enable this movement to take place with the projection R still in position, the end S′ of said clutch-rod is pivoted or hinged to the rod and provided with a projecting operating-arm S^2, with which a slotted link S^3 coöperates. The link S^3 is extended out into convenient position to be moved by the attendant, and hence by a pull upon said link the pivoted end S′ of the clutch-rod may be swung to one side, and the rod under the influence of its spring S^4 will immediately advance to release the clutch-pin T′, thereby inaugurating the movement of the machine.

To hold the clutch-rod S in position to retain the clutch disengaged, it is provided with a projection *s*, with which a latch *s′* is adapted to coöperate whenever the clutch-rod is moved outwardly, and said latch *s′* is preferably in the form of a bell-crank lever, one arm of which is jointed to the link S^3 and is adapted to be operated thereby to release the latch at the same time that the jointed end S′ of the clutch-rod is flexed. The joint between the end S′ and body of the rod S is preferably a hinge or rule joint, whereby said end is prevented from moving out of alinement with the rod in but one direction, and the joint is so set that the pressure of the projection R when it contacts with the end S′ is in a direction opposite to the direction in which said end can swing, whereby the certain operation of the projection and clutch-rod is insured. To take up any lost motion which might occur in the joints of the mechanism for moving the block-carrier, springs—such, for instance, as those indicated at U and U′—are employed for holding the carrier or parts directly connected therewith normally under tension in one direction, and thus while a variation may occur it will be a uniform variation and may be compensated for in the contour-lines of the pattern-cams or in the adjustment of the various operating connections. Said springs also preferably serve as the means for moving the block in one direction and hold the rollers down to the cams, while the pattern-cams move it in the opposite direction against the tension of the springs. In the vertical movements gravity may perform the same function, but is usually assisted by the spring-pressure.

In the normal operation of the machine, as illustrated in the drawings, wherein it is assumed that the sockets have been previously formed in the brush-backs, a back is placed in position between the clamps and the screw E^2 tightened to hold the same rigidly in place. Should it be found that the brush-back is too high or too low, both clamps, together with the brush-back, may be bodily adjusted in the carrier-frame by loosening up the internally-threaded jam-nuts W W′, which support the screw at the upper end and take a bearing in the frame-head E^6, Fig. 8, then adjusting said nuts and the screw to the new position, when by tightening said nuts against each other it will be found that the screw has been shifted bodily, but at the same time it is free to be rotated to advance or retract the clamps when clamping or releasing the brush-back. The brush-back having been secured in position and the parts of the filling-machine adjusted for operation, the mechanism is started by the attendant through the manipulation of the rod S^3, which releases the clutch-rod S. The subsequent operation of the machine is entirely automatic, one pattern-cam operating to position the brush-block vertically, and the other pattern-cam to position the same horizontally, the combined movements permitting of the movement of the brush-block to any desired angle with respect to the inserter. It will be observed that in the present improvements while the pattern-cams do position the brush-block the final centering is effected by means of the centering and advancing point H, which coöperates with the templet I, preferably secured immediately in rear of the brush-back and in such position that the pressure between said point and inserter is in a direct line. The advancing and positioning point is preferably conical, and in this coöperation with the recesses in the templet it insures a perfect centering, but at the same time the automatic positioning of the brush-back is not interfered with, inasmuch as the movements of the parts are so timed that the brush-back is not shifted until after it is withdrawn from the inserter and until after the centering and advancing point has withdrawn from the templet.

In positioning-machines as heretofore constructed to position brush-backs it has been customary to provide pattern-cams in which the contour-lines corresponded to the course traversed by the tool with relation to the brush-back, said course starting from some definite point at one end or side of the brush-back and terminating at a diametrically opposite point at the opposite end or side of the brush-back. The starting-point and the terminating-points of the course traversed by the tool with relation to the back necessarily left or formed a wide space between the two corresponding points on the pattern-cam. This space has usually taken the form of a high step, over which the controlling-arm must be elevated or over which it must pass from the stopping to the starting point, such movement being a dead movement. In other words, from the stopping to the starting point it required an extreme swing of the carrier, and, furthermore, it has usually necessitated the employment of a special means for moving the parts to enable the controlling-arm which coöperates with the pattern-cam to traverse this space without causing the portions of the mechanism other than the positioning devices to be operated. In accord-

ance with the present invention the pattern-cams are so formed that the starting and stopping points are in proximity—that is to say, they are so formed that the course traversed by the tool terminates in a socket next adjacent the socket constituting the starting-point. By reference to Fig. 7 it will be seen from the dotted lines extending from hole to hole that the tool travels a continuous course, there being no point of interruption, and by reference to Fig. 6 it will be seen that the pattern-cam is formed with regular crests and depressions for guiding the tool in its continuous course, with no dead or ineffective part. With such an arrangement no extreme or dead movement of the controlling-arm which coöperates with the pattern-cam is necessary. The starting-point may be anywhere in the course of the travel of the tool with relation to the back, and when all of the sockets have been filled and the machine has come to rest and upon the insertion of a new back the machine is ready without the necessity of a dead movement of any of the parts in order to bring them into proper position for operation or cooperation with the first socket. This system, it will be seen, differs from other systems in that there is always provided a path for the return movement of the tool during its operation to a point in proximity to the starting-point, such return movement being the final course traversed by the tool toward the starting-point and being the final course in which the bristles are inserted.

Obviously this system is applicable in either a socket-forming or bristle inserting or filling machine, and I do not wish to be restricted in the application of this portion of the invention to its use in connection with any particular machine.

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

1. In a brush-machine, the combination with a brush-block carrier mounted to swing on trunnions with their axes at right angles to each other, of a positioning mechanism for said carrier embodying a track or way, a vertically-movable support on which said track or way moves transversely, a crank coöperating with the track or way to move the same transversely and pattern-cams with connections operated thereby controlling the movements of the support and crank independently; substantially as described.

2. In a brush-machine, the combination of a brush-block carrier supported to move in front of the coöperating tool, a shoe on said carrier, a track or way for the shoe, a movable support on which the track or way is movably mounted, pattern-cams and connections intermediate said cams and support and track or way respectively whereby said track or way may be moved in one direction in unison with its support and transversely independently of its support; substantially as described.

3. In a brush-machine, the combination with the block-carrier mounted to swing on trunnions with their axes at right angles to each other, of a positioning mechanism for said carrier embodying a support movable bodily in right lines, a track or way movable on said support and at an angle to the plane of movement of the support, a shoe on the carrier coöperating with said track or way, pattern-cams and connections intermediate said cams and supporting said track or way respectively; substantially as described.

4. In a brush-machine, the combination with the block-carrier mounted to swing on trunnions with their axes at right angles to each other, of a positioning mechanism for said carrier embodying a shoe on the carrier, a track with which the shoe coöperates, a transversely-movable track-frame, a support on which the track-frame slides, itself supported to move bodily in a plane at right angles to the plane of movement of the track, a crank-shaft journaled in said support and movable therewith, a connection between the crank-shaft and track-frame, pattern-cams and connections intermediate one of said cams and the support and independent connections intermediate the other of said cams and the crank-shaft; substantially as described.

5. In a brush-machine, the combination with the movable block-carrier, of a positioning mechanism therefor embodying a track or way with which the carrier has sliding engagement, a vertically-movable support on which the track is movably mounted, a crank-shaft movable with the support, a link connecting the crank and track, pattern-cams, a movable connection intermediate one of said cams and crank-shaft, whereby said shaft is controlled in its oscillations by the cam, but is movable longitudinally with the support, and connections intermediate the other cam and support for moving the latter in a direction longitudinally of the crank-shaft; substantially as described.

6. In a brush-machine, the combination with the movable block-carrier, of a positioning mechanism for said carrier embodying a vertically-movable support having horizontally-arranged bearings, a track-frame mounted to slide in said bearings, a track on said frame extending transversely of the direction of movement of the frame on the support, a shoe on the carrier coöperating with said track, a crank-shaft movable with and having crank-arms above and below the support, a link connecting the upper arm with the track-frame, pattern-cams, a bell-crank lever, connections between the same and the support and operated by one of the cams for moving the support vertically, and connections intermediate the other pattern-cam and lower arm of the crank-shaft for moving the track-frame transversely on the support; substantially as described.

7. In a brush-machine, the combination with the block-carrier movable toward and

from the coöperating tool, and mechanism for positioning the carrier transversely with relation to said tool, of means for advancing said carrier toward the tool embodying a driving mechanism having a limited movement independent of the carrier; substantially as described.

8. In a brush-machine, the combination with the block-carrier movable toward and from the coöperating tool and mechanism for positioning the carrier transversely with relation to said tool, embodying a track extending parallel with the path of travel of the carrier, of a driver for advancing the carrier movable in a line parallel with the track and having a limited movement independent of the carrier; substantially as described.

9. In a brush-machine, the combination with the block-carrier movable toward and from the coöperating tool and mechanism cooperating with the carrier for positioning the same transversely with relation to the tool, of a reciprocatory driver for advancing the carrier, an apertured templet on the carrier and a centering-point on the driver for centering the carrier as it is advanced; substantially as described.

10. In a brush-machine, the combination with the movable block-carrier movable toward and from the coöperating tool and mechanism coöperating with the carrier for positioning the same transversely with relation to the tool, of a reciprocatory driver for advancing the carrier and having a limited movement independent thereof, an apertured templet on the carrier and a centering-point on the driver adapted to move into engagement with the templet to center the carrier as the point advances, said point moving out of engagement with the templet when it retreats and during the positioning of the carrier; substantially as described.

11. In a brush-machine, the combination with the movable block-carrier movable toward and from the coöperating tool and mechanism for positioning the carrier embodying pattern-cams and connections intermediate the cams and carrier, of a reciprocatory driver for advancing the carrier and having a limited movement independent thereof, an apertured templet on the carrier, and a centering-point on the driver adapted to coöperate with the templet to center the carrier as it is advanced; substantially as described.

12. In a brush-machine, the combination with the movable block-carrier, movable toward and from the coöperating tool, pattern-cams and connections between said cams and carrier for positioning the carrier, of a reciprocatory driver for advancing the carrier having a centering and advancing point, and an apertured templet on the carrier with which the point coöperates as the driver advances, to thereby center and advance the carrier; substantially as described.

13. In a brush-machine, the combination with the movable block-carrier, the longitudinally-movable frame on which said carrier is mounted, of a reciprocatory driver having a movement independent of said frame, an apertured templet on the carrier, an advancing and centering point on the driver adapted to coöperate with the templet, pattern-cams and connections intermediate the cams and carrier for positioning the carrier for the cooperation of the point with any desired aperture in the templet; substantially as described.

14. In a brush-machine, the combination with the block-carrier movable toward and from the coöperating tool and means for resisting such movements, of a reciprocatory driver having a limited movement independent of said carrier but adapted to coöperate with the carrier to both advance and retract the same, an apertured templet and coöperating centering-point on the carrier and driver, whereby the carrier may be positioned transversely when the point and templet are out of engagement; substantially as described.

15. In a brush-machine, the combination with the block-carrier, movable toward and from the coöperating tool, friction devices for holding the carrier against such movements, and means for automatically positioning said carrier transversely, of a reciprocatory driver having a limited movement independent of said carrier but coöperating therewith to both advance and retract the same, an apertured templet and coöperating centering-point on the carrier and driver adapted to be moved into engagement on the advance of the driver and to move out of engagement on the retraction of the driver, whereby the carrier may be positioned transversely when the point and templet are out of engagement; substantially as described.

16. In a brush-machine, the combination with a movable block-carrier, and a longitudinally-movable crank-shaft for positioning said carrier, of a controller extending parallel with said crank-shaft, an arm on the crank-shaft and embracing the controller, whereby the shaft is free to move longitudinally but is controlled in its rotary movements by the controller, a pattern-cam and connections between said cam and controller for moving the shaft on its axis and a second pattern-cam and connections between said cam and shaft for moving the shaft longitudinally; substantially as described.

17. In a brush-machine, the combination with the block-carrier, pattern-cams for positioning said carrier, and a drive-gearing for intermittingly rotating said cams to position the carrier, of a stop mechanism for arresting the movement of the drive-gearing, embodying a projection moving with the pattern-cam shaft, a clutch on the drive-shaft, a jointed clutch-rod operated by the projection to disconnect the clutch and an operating-rod cooperating with the clutch-rod to flex the same and permit the clutch to reëngage without

further movement of the pattern-cam shaft; substantially as described.

18. In a brush-machine, the combination with a block-carrier, pattern-cams for positioning said carrier and a drive-gearing for intermittingly rotating said cams to position the carrier, of a stop mechanism for arresting the movement of the drive-gearing, embodying a projection moving in unison with the pattern-cams, a clutch controlling the drive-shaft, a clutch-rod moved by the projection for disconnecting the clutch, and means for manually disengaging the rod and projection without further movement of the cams to permit of the coupling of the clutch when the machine is to be started; substantially as described.

19. In a brush-machine, the combination with the block-carrier, pattern-cams for positioning said carrier and a drive-gearing for intermittingly rotating said cams to position the carrier, of a stop mechanism for arresting the movement of the drive-gearing embodying a projection moving in unison with the pattern-cams, a clutch controlling the drive-shaft, a spring-pressed clutch-rod moved by the projection against the tension of the spring to release the clutch, a catch for holding the rod in such position and a control-rod for said catch whereby the rod may be released when it is desired to effect the engagement of the clutch; substantially as described.

20. In a brush-machine, the combination with the block-carrier mechanism for positioning the same, embodying pattern-cams and inserter for inserting tufts of bristles in the blocks, of a drive-shaft common to the inserting and positioning mechanisms, a clutch through which said shaft is driven, a clutch-rod controlling the clutch and a projection moving with the pattern-cam shaft for moving said rod to disconnect the clutch and simultaneously arrest the movement of the inserting and positioning mechanism; substantially as described.

21. In a brush-machine, a brush-block carrier consisting of a frame, clamps movable toward and from each other in the frame, a screw for moving the clamps and jam-nuts mounted on said screw and journaled in the frame, whereby by loosening said nuts the screw may be adjusted longitudinally and by tightening the same together said screw is held against longitudinal movement, but is free to rotate for the adjustment of the clamps; substantially as described.

EDWARD F. ABBEY.

Witnesses:
C. A. BYERS,
J. F. TROENDLE.