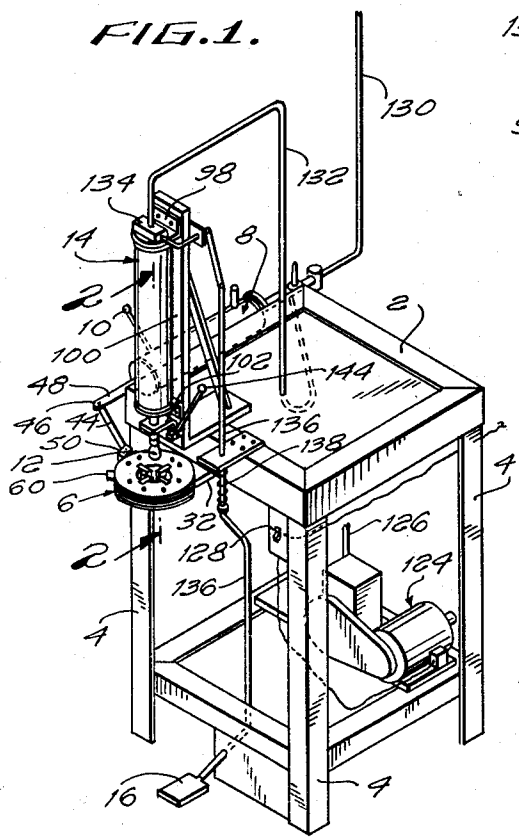
Dec. 23, 1958 D. COHN 2,865,090

MACHINE FOR ASSEMBLING EYES IN DOLL HEADS

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FIG. 1.



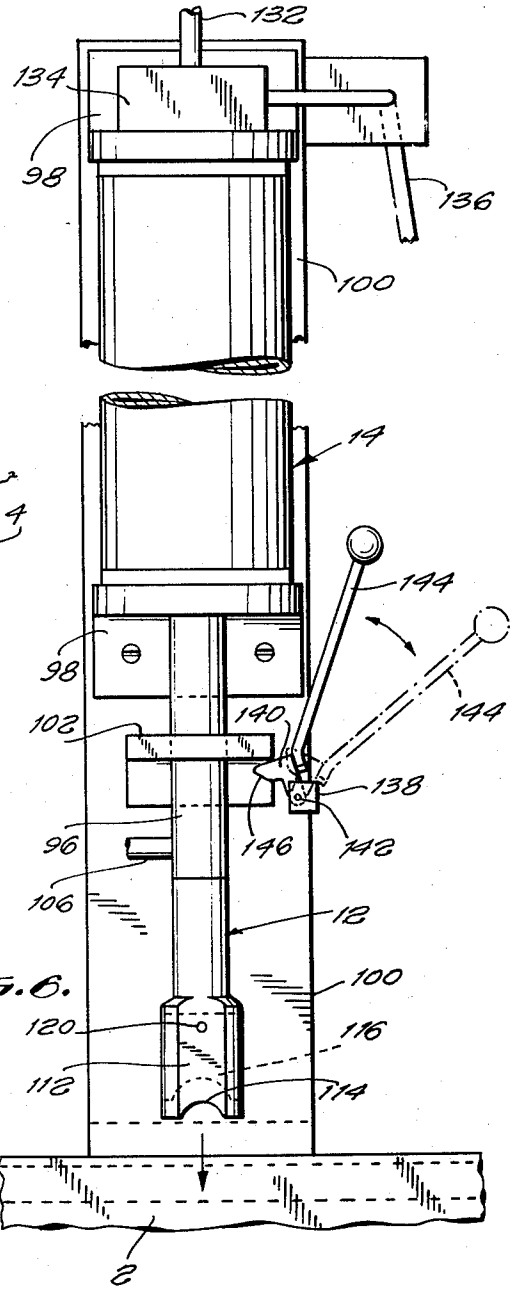




FIG. 6.

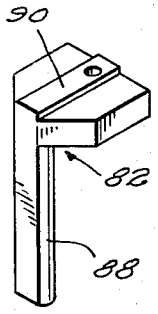



FIG. 14.

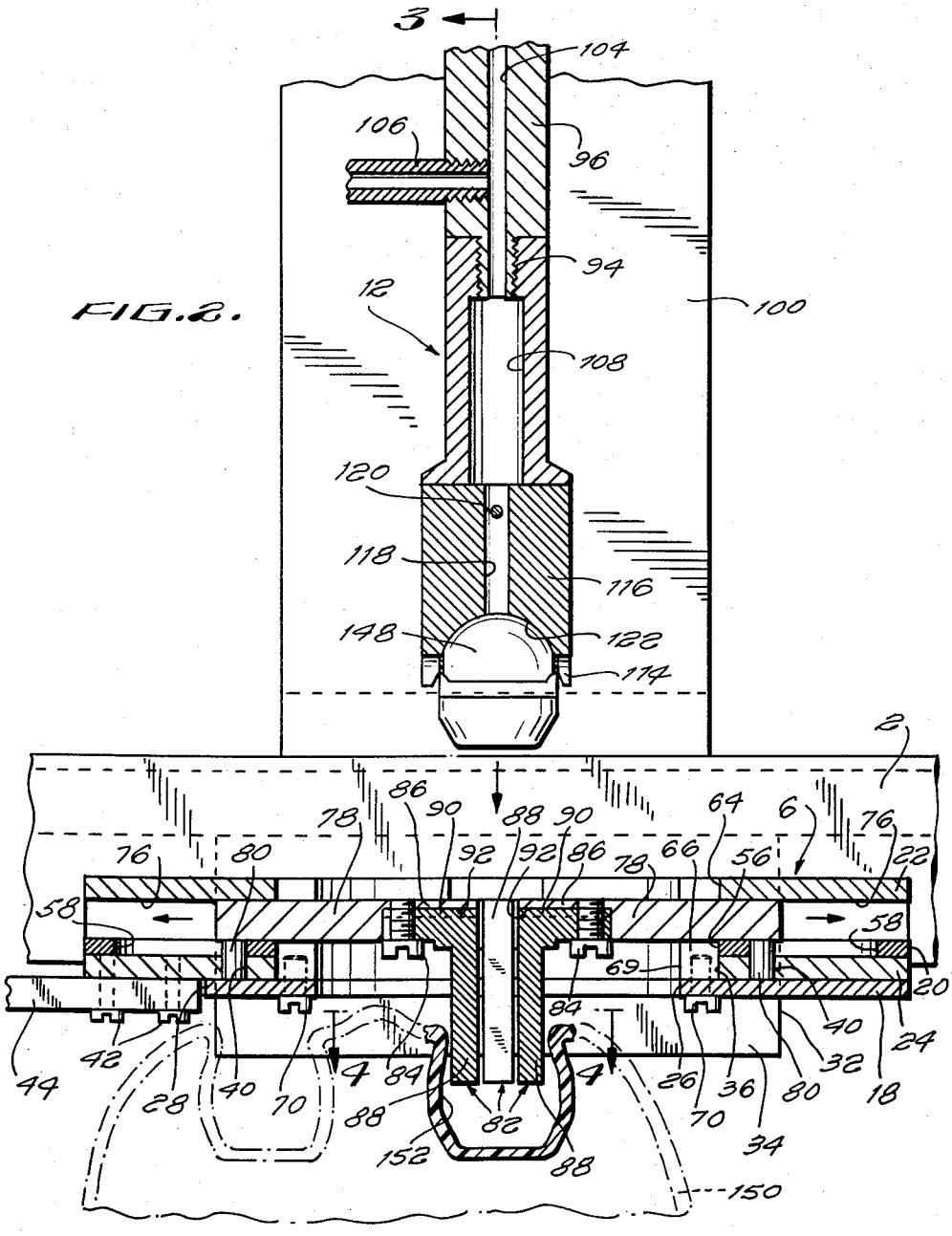
INVENTOR.
DAVID COHN
BY
James and Franklin
ATTORNEYS

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MACHINE FOR ASSEMBLING EYES IN DOLL HEADS

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FIG. 2.



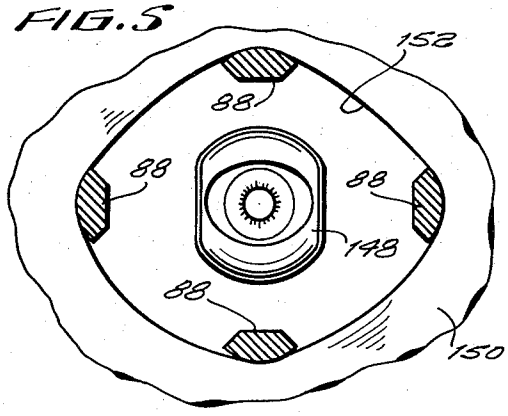

INVENTOR.
DAVID COHN
BY
James and Franklin
ATTORNEYS

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MACHINE FOR ASSEMBLING EYES IN DOLL HEADS

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FIG. 5



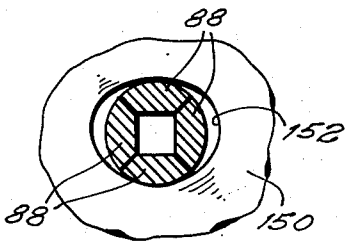
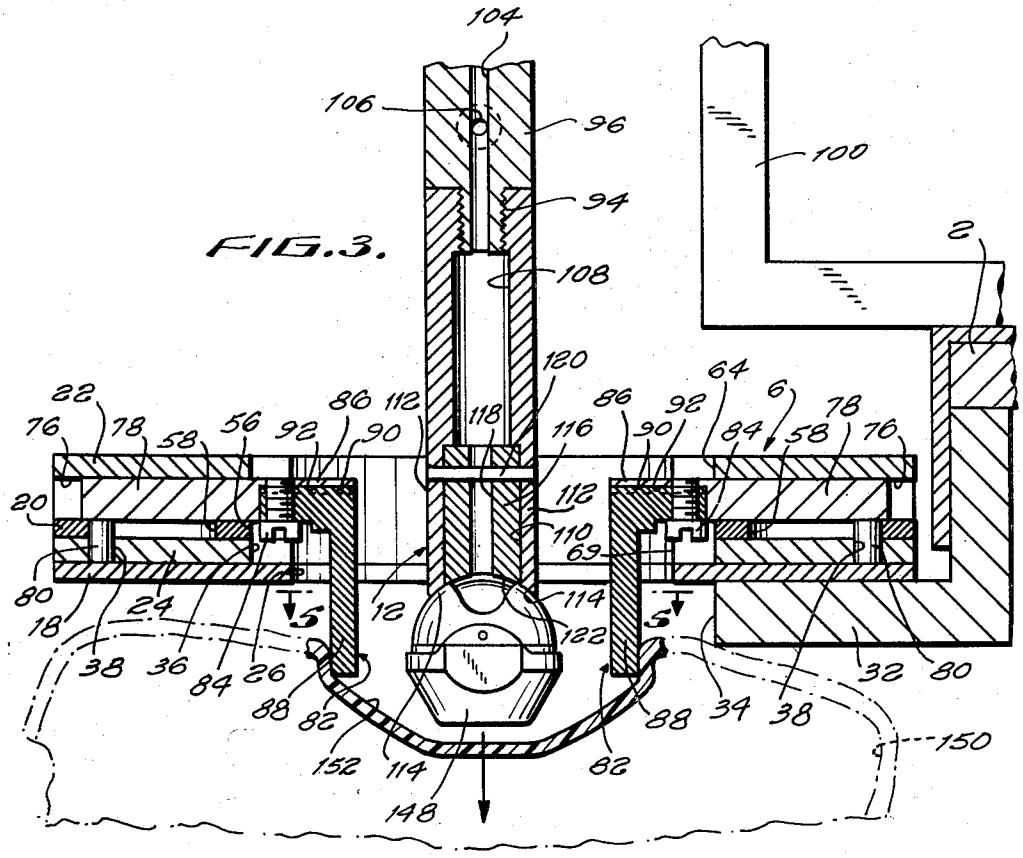




FIG. 4.

FIG. 3.




INVENTOR.
DAVID COHN
BY
James and Franklin
ATTORNEYS

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MACHINE FOR ASSEMBLING EYES IN DOLL HEADS

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FIG. 7.

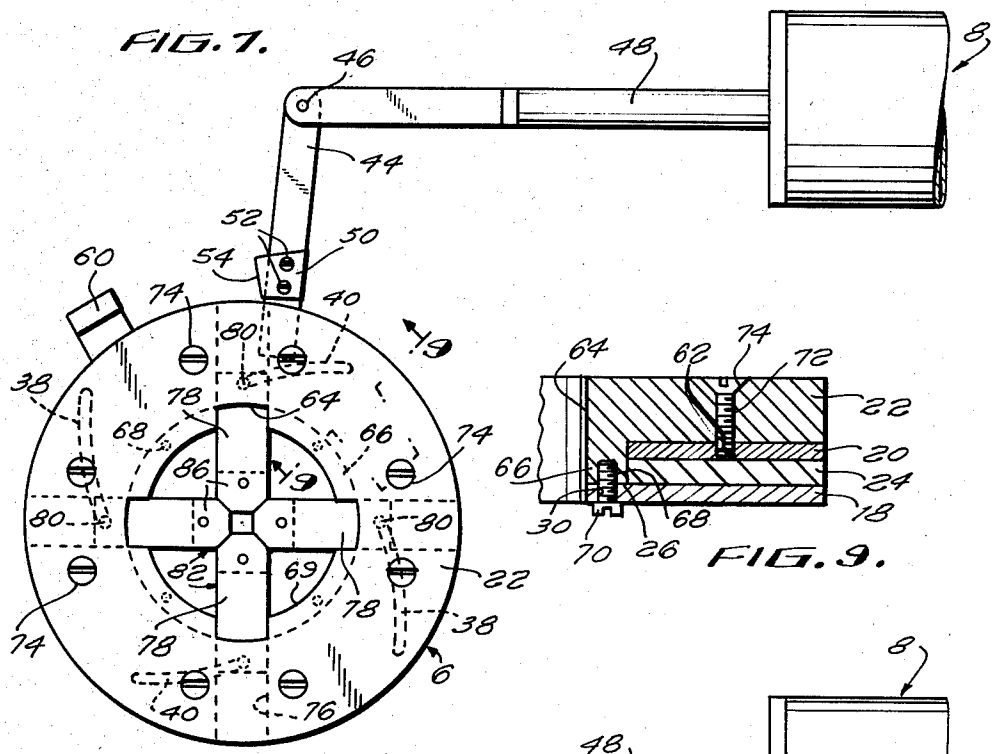






FIG. 9.

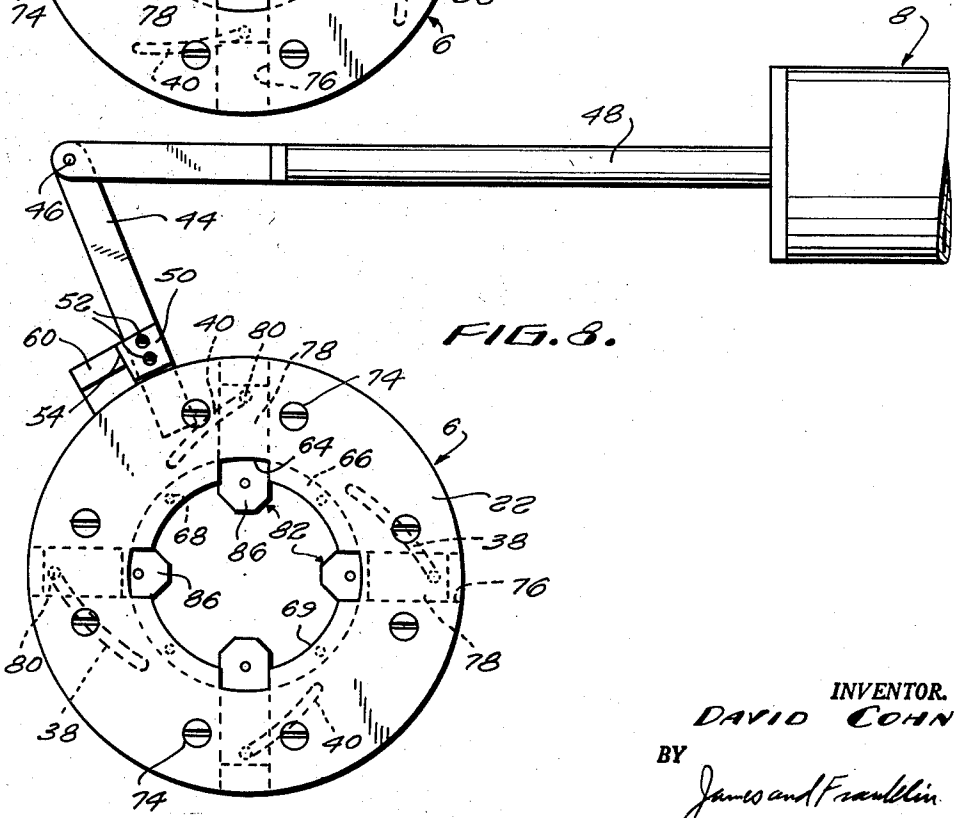



FIG. 8.

INVENTOR.
DAVID COHN
BY
James and Franklin
ATTORNEYS

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FIG. 10.

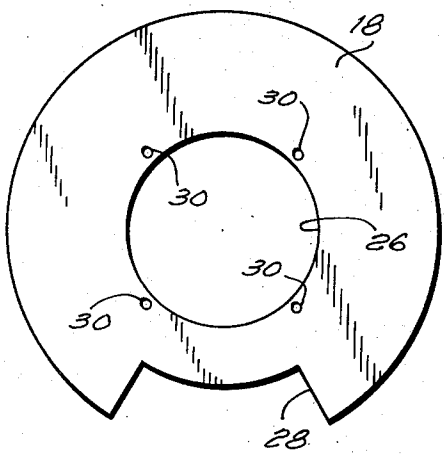



FIG. 11.

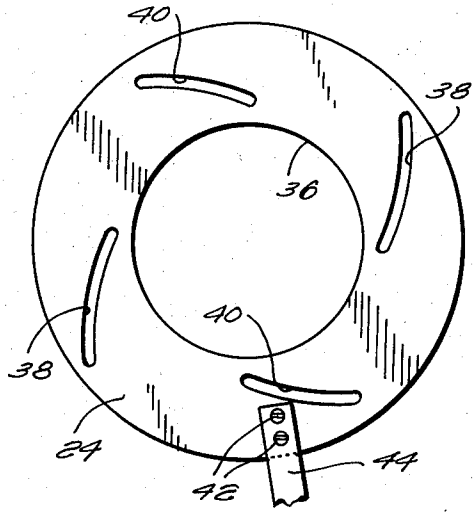



FIG. 12.

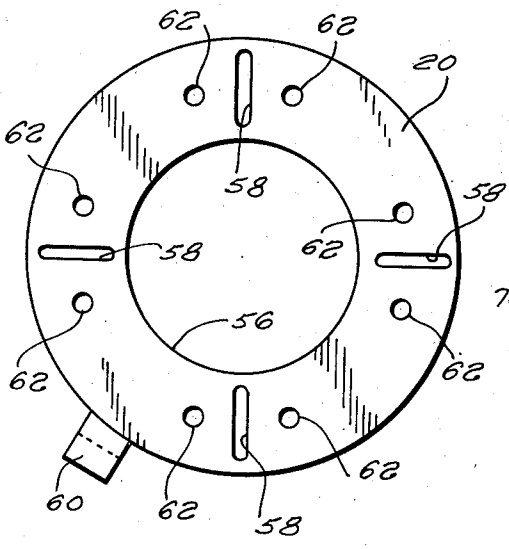
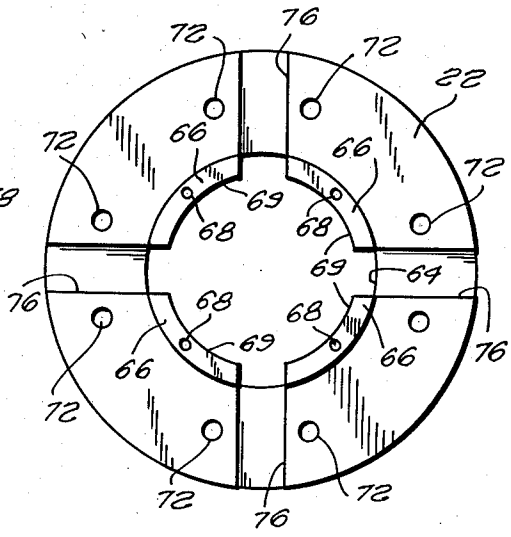



FIG. 13.




INVENTOR.
DAVID COHN
BY
James and Franklin
ATTORNEYS.

United States Patent Office 2,865,090 Patented Dec. 23, 1958



2,865,090

# MACHINE FOR ASSEMBLING EYES IN DOLL HEADS

David Cohn, Brooklyn, N. Y., assignor to Model Plastics Corporation, White Plains, N. Y., a corporation of New York

Application February 8, 1954, Serial No. 408,813

9 Claims. (Cl. 29—209)

The present invention relates to a machine for inserting units into a stretchable socket in a supporting member, and is particularly designed and adapted to facilitate the insertion of individual doll eyes into doll heads formed of stretchable material.

The use of soft material such as vinyl resins and synthetic rubbers to form various parts of doll bodies, and particularly doll heads, has led to a radical redesign of the doll structures and of the appurtenances thereto. In old style dolls having rigid heads the movable doll eyes were supplied in connected pairs as a unit, the unit being rigidly mounted on the inside of the doll head. However, the increased employment of heads made of soft stretchable material has led to the integral formation in such heads of individual sockets for each eye, into which individual movable eyes are adapted to be inserted. This arrangement is greatly preferred because the eye structures are insulated by the socket from the interior of the doll head, and because assembly of the eyes with the head is more inexpensively accomplished than was previously the case. However, it has been found that manual insertion of the individual eyes into their respective sockets presents production problems which, while not insuperable, are nevertheless quite troublesome. Considerable skill is involved in stretching the sockets to the degree necessary to permit the eyes to be manually inserted thereinto without tearing or damaging the head itself, and even the most skilled operator produces a fairly high percentage of rejects. Moreover, manual eye insertion, while fairly rapid, permits attainment of an assembly rate which is far from optimum.

I have devised a simple and positively acting machine which will avoid the above disadvantages. The stretching of the socket in the head and the insertion of the eye into the socket are all accomplished in a controlled and uniform manner so that the machine, when once properly designed, will operate reliably without tearing or damaging the soft material of which the doll head is formed. All of the difficult operations of the assembly operation are performed through the instrumentality of machinery, and all the operator has to do is supply the eyes to the machines and appropriately position the doll head. Hence operators having much less skill than those previously required for hand assembly may be employed, thus reducing labor costs. Production costs are further decreased because of the substantial elimination of rejects and because of a greatly improved production rate. The machine is so designed that but a single operator is required for each machine, and the actions which the operator must perform are exceedingly simple. Appropriate safety devices are included to prevent accidental injury to the operator.

The machine is provided with a plurality of fingers adapted to be received inside the opening in the socket for an individual eye when that socket is in its normal condition, the fingers then being spreadable apart in order to open up the socket. The tension exerted by the spread socket on the fingers serves to retain the doll head in



position without requiring manual support. Thereafter a plunger to which an eye has been releasably attached is caused to pass between the fingers and into the opened socket, carrying the eye with it and inserting the eye into the socket. The motion of the plunger forces the doll head out of engagement with the fingers, the socket edges then springing back to their normal condition so as to retain the eye in the socket. When the plunger is retracted the fingers prevent the doll head from moving upwardly, thus stripping the head, with the eye in place, from the plunger. The plunger and fingers reutrn to their initial positions, and the machine is ready for renewed operation.

In the form here disclosed fluid pressure motors are utilized to move the fingers and the plunger, and controls for those motors are adapted for manual actuation by the operator. In order to prevent the plunger from moving down should the operator accidentally actuate the motor therefor, a manually controlled movement-restraining means is provided, normally biased to a position in the path of movement of the plunger so as to positively prevent the plunger from moving down unless and until the movement-restraining means is manually disabled.

To the accomplishment of the above, and to such other objects as may hereinafter appear, the present invention relates to a machine for inserting units into a stretchable socket into a supporting member, as defined in the appended claims and as described in this specification, taken together with the accompanying drawings, in which:

Fig. 1 is a three-quarter perspective view of the complete machine of the present invention;

Fig. 2 is a partial cross sectional view taken along the line 2—2 of Fig. 1 and showing the plunger and fingers in their normal positions;

Fig. 3 is a partial cross sectional view taken along the line 3—3 of Fig. 2 and showing the fingers spread apart and the plunger almost at the end of its travel in an eye-inserting direction;

Fig. 4 is a cross sectional view taken along the line 4—4 of Fig. 2;

Fig. 5 is a cross sectional view taken along the line 5—5 of Fig. 3;

Fig. 6 is a front elevational view showing the plunger, the motor therefor, and the movement-restraining means active thereon;

Fig. 7 is a schematic top plan view of the finger assembly and the motor therefor, the parts being shown in their respective positions corresponding to the normal retracted position of the fingers;

Fig. 8 is a view similar to Fig. 7 but showing the position which the parts assume when the fingers are spread apart;

Fig. 9 is a cross sectional view taken along the line 9—9 of Fig. 7;

Fig. 10 is a bottom plan view of the fixed bottom plate of the finger assembly;

Fig. 11 is a bottom plan view of the rotatable plate of the finger assembly;

Fig. 12 is a bottom plan view of the intermediate fixed plate of the finger assembly;

Fig. 13 is a bottom plan view of the upper fixed plate of the finger assembly; and

Fig. 14 is a three-quarter perspective view of one of the fingers.

As may be seen from Fig. 1, all of the operative parts of the machine may be mounted on a table 2 or the like supported at an appropriate position above the floor by means of legs 4 so that manipulation of the machine may conveniently and conventionally be carried out by an

operator, either sitting or standing as desired. The mechanism comprises a finger assembly generally designated 6 adapted to be actuated by a fluid pressure motor 8 having a manual control 10, and a plunger generally designated 12 adapted to be actuated by a fluid pressure motor 14 for which a manual control 16 is provided.

The finger assembly 6 comprises a plurality of plates mounted coaxially one above the other and comprising a lower fixed plate 18, an intermediate fixed plate 20 and an upper fixed plate 22, a rotatable plate 24 being mounted between the fixed plates 18 and 20. The lower fixed plate 18 is provided with a central circular opening 26, an arcuate peripheral cutout area 28, and screw holes 30 adjacent the inner periphery thereof. The plate 18 is secured in any appropriate manner to a bracket 32 which extends from the table 2, the central aperture 26 of the plate 18 being completely beyond the outer edge 34 of the bracket 32.

The rotatable plate 24 which is coaxially mounted directly on top of the fixed plate 18 is provided with a central aperture 36 having a greater diameter than the central aperture 26 of the plate 18, and it is further provided with slots 38 and 40 which start at points close to the edge of the central opening 36 and which incline and curve outwardly to points adjacent the outer periphery of the plate 24. As here disclosed, the slots 38 and the slots 40 are disposed in pairs diametrically opposite one another, all of the slots commencing at points equidistantly radially spaced from the center of the opening 36, all of the slots having the same angular extent about the axis of the opening 36, but the slots 40 terminating at points more remote from the outer periphery of the plate 24 than the slots 38. Secured to the undersurface of the plate 24 by means of screws or rivets 42 is an actuating arm 44, this arm being received within and movable through the arcuate cutout portion 28 in the plate 18. The actuating arm 44 is pivotally connected at 46 to a piston rod 48 extending from the fluid pressure motor 8. A positive stop 50 is removably secured to the actuating arm 44 by means of screws 52, the stop 50 being outside the periphery of the plates 18—24 and having a portion 54 extending to one side of the actuating arm 44.

The fixed plate 20 is provided with a central opening 56 of substantially the same diameter as that of the opening 36. It is also provided with four radially oriented slots 58 equally angularly spaced about the plate 20. A stop element 60 extends radially therefrom into the path of movement of the stop 50 on the actuating arm 44 and adapted to be engaged by the portion 54 thereof. A plurality of screw holes 62 are also provided in the body of the plate 20.

The upper fixed plate 22 is provided with a central aperture 64 and with downwardly depending feet 66 extending a short distance radially into the opening 64, these feet being adapted to rest upon the inner portion of the bottom plate 26 and having screw holes 68 adapted to register with the screw holes 30 in the plate 18, screws 70 securing the plates 22 and 26 together. The inner surfaces of the feet 66 are arcuate and define an inner opening 69 of the same diameter as the openings 26. The plate 22 is also provided with screw holes 72 adapted to register with the screw holes 62 in the plate 20, countersunk screws 74 serving to secure the plates 20 and 22 together. The undersurface of the plate 22 is provided with four equally angularly spaced radial channels 76 adapted to register with the slots 58 in the plate 20.

Slides 78 are adapted to move through the channels 76 between the plate 20 and the upper portion of the plate 22, these slides being provided with pins 80 which pass through the slots 58 in the fixed plate 20 and the slots 38 or 40 in the rotatable plate 24. Fingers generally designated 82 are secured by means of screws 84 to those portions 86 of the slides 78 which project inwardly into the central opening of the finger assembly 6 as defined by the central openings 26, 36, 56 and 64 of the plates 18—22 respectively. These fingers 82 have depending finger portions 88 which extend down below the lower surface of the bottom plate 18. In order to facilitate rigid attachment of the fingers 82 to the slides 78, the upper portions of the fingers 82 are provided with keys 90 adapted to fit within keyways 92 formed in the lower surface of the portions 86 of the slides 78.

As may best be seen from Figs. 2 and 7, when the rotatable plate 24 is in the position as shown, the pins 80 depending from the slides 78 will be received in the radially inner portions of the slots 38 and 40, and as a result the slides 78 will be forced inwardly and the fingers 88 will be close together and preferably abutting. When the piston rod 48 of the motor 8 is extended, however, the plate 24 will be rotated in a counter-clockwise direction as viewed in Fig. 7, and this rotation will continue until the portion 54 of the stop 50 on the actuating arm 44 attached to the rotatable plate 24 engages the fixed stop element 60 on the fixed plate 20. During this movement the pins 80 will be moved outwardly along the slots 58 in the fixed plate 20 by reason of the inclination of the slots 38 and 40 in the rotatable plate 24, ultimately attaining the position shown in Figs. 3 and 8, at which time the slides 78 will be pulled outwardly and the fingers 88 will be spread away from one another. As will be particularly apparent from Fig. 8, the fingers 82 moving to the left and to the right have been spread farther than the fingers 82 moving up and down as viewed in that figure. This results from the fact that the slots 40 with which the latter pair of fingers 82 cooperate do not extend as far outwardly radially as do the slots 38 with which the former pair of fingers 82 cooperate. As will be explained more in detail hereinafter, this is desired, in the particular application here illustrated, because of the shape of the units—doll eyes—which it is the function of the machine here specifically disclosed to insert.

The plunger 12 is threadedly secured at 94 to a piston rod 96 extending from the motor 14, the latter being vertically mounted on brackets 98 secured to upright 100 which extends up from the table 2. The plunger carries a bracket 102 which moves up and down therewith. The piston rod 96 is provided at its lower end with an axial passage 104 to which nipple 106 communicates, the passage 104 extending to the lower end of the piston rod 96 and communicating with a central passage 108 in the plunger 12. The lower portion of the plunger 12 is cut away centrally, at 110, so as to define a pair of separated wings 112, the lower edges 114 of the wings 112 being curved to correspond to the shape of the unit to be carried thereby. A magnet 116 having a central passage 118 is adapted to be slid between the wings 112 and is held in position by means of pin 120, the lower surface 122 of the magnet 116 being appropriately shaped so as to blend with the surfaces 114 and conform to the shape of the unit to be carried thereby.

A motor driven suction device 124 is mounted beneath the table top 2 and is provided with a conduit 126 adapted to be connected to the nipple 106 so that suction may be exerted through the passages 104, 108 and 118 upon the unit inserted against the surfaces 114 and 122. A switch 128 is provided on the front of the table 2 and is electrically connected to the unit 124 so that the latter may be started and stopped at will. A conduit 130 brings fluid pressure to the table 2, conduit 132 connecting the conduit 130 to the motor 14 via valve 134. A linkage generally designated 136 and including the biasing spring 138 connects the valve 134 to a foot treadle which defines the manual control 16 for the motor 14. The conduit 130 is directly connected to the motor 8, and the valve therefor (not shown) is manually controlled by the handle 10.

Mounted on the upright 100 by means of bracket 138, is a latch 140 pivotable about axis 142 and biased to its

counter-clockwise position shown in solid lines in Fig. 6 by means of a spring (not shown). In this clockwise position the latch **140** extends into the path of the bracket **102** carried by the piston rod **96**. It will be clear that so long as the latch **140** assumes its counter-clockwise position as shown in solid lines in Fig. 6, the piston rod **96** and the plunger **12** cannot descend even if the motor **14** is appropriately actuated through depression of the foot treadle **16**. A handle **144** is secured to the latch **140**, and when the operator moves the handle **144** to the position shown in broken lines in Fig. 6, thus causing the latch **140** to pivot in a clockwise direction to a position out of the path of travel of the bracket **102** carried by the piston rod **96**, that rod and the plunger **12** are permitted to descend. When the piston rod **96**, plunger **12** and bracket **102** rise, and if the latch **140** has moved back to its counter-clockwise solid line position, the upper surface of the bracket **102** will engage the inclined surface **146** of the latch **140**, thus causing it to pivot in a clockwise direction until the bracket **102** has passed it, after which the latch **140** will snap into the position under the bracket **102** ready to prevent descent of the plunger **96** unless and until the handle **144** is manually moved to its broken line position.

When used to insert doll eyes into a doll head formed of soft plastic material, the parts of the machine will initially take the position shown in Fig. 2. The operator will first insert a doll eye **148** into the bottom of the plunger **12**. Since dolls eyes are normally made at least in part of magnetically attractable material, the magnet **116** will serve to hold the eye in position once it has been placed there. For greater security, or in the case of large eyes the weight of which may be too great for the magnet **116** alone, the suction unit **124** may be started, the suction exerted at the bottom of the passage **118** on the upper surface of the eye **148** further serving to hold the latter in position. The operator will then take a doll head **150** and move it up until the depending portions **88** of the fingers **82** in their contracted position enter the socket **152** for the eye **148**. The operator will then throw the lever **10** energizing the motor **8**, causing the piston rod **48** to move from its position shown in Fig. 7 to its position shown in Fig. 8, thus spreading the fingers **82** and causing the eye socket **152** in the doll head **150** to spread wide, as shown in Fig. 3. Once this has been done the operator need no longer support the head **150**, as the resilient tension thereof on the spread finger portions **88** will be sufficient to keep the head **150** from falling. Reference has previously been made to the fact that one pair of fingers is spread apart to a somewhat lesser extent than the other pair of fingers in the embodiment here disclosed. This is because the doll eye **148** in its conventional form is longer in one direction than in the other, and the socket **152** is opened only to that degree required to facilitate insertion of the eye **148**. Hence it need be opened to a lesser degree in one direction than the other.

The operator next steps on the foot treadle **16**, puts her hand beneath the head **150**, and swings the handle **144** in a clockwise direction to move the latch **140** out of the way and permit the plunger **12** to descend. The plunger, as may be seen from Fig. 3, passes between the spread fingers **82** and into the socket **152**, carrying the eye **148** with it. The position of the plunger **12** shown in Fig. 3 does not represent its final position. The plunger travels downwardly to a greater degree than shown in Fig. 3, causing the eye **148** to engage the bottom of the socket **152** and push the head **150** down until the rim of the socket **152** is slid past the tips of the downwardly extending finger portions **88**. When this occurs the socket **152** will resiliently contract about the eye **148**. The retentive effect of the magnet **116**, optionally aided by suction, on the eye **148** is usually sufficient to retain the eye and head in place on the bottom of the plunger **12**, but it is usually desirable for the operator to have her hand under the head **150** as a precautionary measure.

The operator will then release the foot treadle **16** and the plunger **12** will rise until the head **150** engages the lower tips of the finger portions **88**. This will positively stop upward motion of the head **150**, while the plunger **12** will continue to move upwardly. This will break the retentive force between the plunger **12** and the eye **148**, releasing to the hand of the operator the head **150** with the eye **148** properly inserted in its socket **152**, which is positioned therebelow. After the plunger **12** has reached its upper position, the operator will move the handle **10**, returning the fingers **82** to their normal retracted position, and the machine will be ready for another sequence of operation.

The plunger **12** is removable from the piston rod **96** so that different size plungers, and particularly plungers having different sizes and shapes of lower surfaces, may be employed depending upon the size and shape of the particular eye **148** to be inserted into the doll head. Depending upon the size of the eye, and hence the size of the eye socket **152**, different fingers **82**, and particularly fingers having thicker or thinner depending portions **88**, may be utilized. The degree to which the sockets **152** are to be opened will also depend upon the size and shape of the eyes **148** employed, and this too can be readily and positively controlled by removing the stop **50** shown in Figs. 7 and 8 and attaching a different stop **50** having a portion **54** which projects laterally beyond the actuating arm **44** to a greater extent than is shown in the drawings. This will positively limit the degree of rotation of the plate **24**, and hence limit the degree to which the fingers **82** are spread.

It will be apparent from the above that the machine here disclosed is simple and positive of operation, may very readily be adapted for use with eyes of different sizes and shapes, the sequence of operation is the same no matter what the size or shape of the eye, the degree to which the eye socket **152** is spread open is uniform for any given setup of the machine and will not vary no matter how the machine be operated, stripping or ejecting of the assembled head-eye combination from the machine is automatically accomplished, and all in all, the operations are simple, positive, rapid, uniform and effective to an exceptional degree.

While but a single embodiment of the present invention has been here disclosed, relating specifically to the assembly of doll eyes into sockets therefor formed in doll heads of stretchable plastic material, it will be apparent that the applicability of this machine is not limited to that special use, and that many variations may be made in the specific details of the machine, all without departing from the spirit of the invention as defined in the following claims.

I claim:

1. A machine for inserting individual dolls' eyes into a stretchable socket in a doll's head, said machine comprising a frame including a support having an aperture, fingers adapted to be inserted within said socket extending from one side of said support and being mounted on said support so as to be movable between a first position adapted to be received within said socket and a second position outwardly spaced from said first position, means operatively connected to said fingers to move them between said positions, an element mounted on said frame, said element being movable between a first position remote from said support on said other side thereof and a second position passing through said aperture and inside said fingers when the lattter are in their second position, means operatively connected to said element for moving it between its first and second positions, and means on said element for releasably holding a doll's eye, said element being adapted to move through and beyond said fingers to insert said doll's eye in said stretchable

socket and strip said socket off the fingers upon continued movement of the element.

2. In the machine of claim 1, movement-restraining means on said frame, movable between operative and inoperative positions spaced from one another by an appreciable distance, and operatively connected to said element and effective to restrain it from movement to its second position even when said means for moving said element has been actuated whenever said movement-restraining means is in its operative position, said movement-restraining means when in inoperative position being disengaged from said element, and manual control means operatively connected to said movement-restraining means and effective, when manually actuated, to move the latter between its operative and inoperative positions.

3. The machine of claim 1, in which said moving means for said element comprises a fluid pressure motor having a manual control, and mechanical movement-restraining means on said frame, movable between operative and inoperative positions spaced from one another by an appreciable distance, and operatively connected to said element and effective to positively restrain it from movement to its second position even when said manual control for said fluid pressure motor has been actuated whenever said movement-restraining means is in its operative position, said movement-restraining means when in inoperative position being disengaged from said element, and second manual control means operatively connected to said movement-restraining means and effective, when manually actuated, to move the latter between its operative and inoperative positions.

4. The machine of claim 3, in which said movement-restraining means comprises a member movably mounted on said frame and biased to said operative position in the path of movement of said element so as to be engaged thereby when said element moves toward its second position, said member positively preventing further movement of said element, said second control means, when actuated, moving said member out of the path of movement of said element to its inoperative position.

5. The machine of claim 3, in which said movement-restraining means comprises a member movably mounted on said frame and biased to said operative position in the path of movement of said element so as to be engaged thereby when said element moves toward its second position, said member positively preventing further movement of said element, said second control means, when actuated, moving said member out of the path of movement of said element to its inoperative position, said element in moving from its second to its first position engaging said member when the latter is in its biased position, the then inter-engaging surfaces of said member and said element defining camming surfaces effective to move said member away from its biased position and beyond the path of movement of said element under the influence of the force exerted by said element intending to move to its first position, thereby permitting said element to return to its first position.

6. A machine for inserting individual dolls' eyes into a stretchable socket in a doll's head, said machine comprising a frame including a support having an aperture, fingers adapted to be inserted within said socket extending from one side of said support and being mounted on said support so as to be movable between a first position adapted to be received within said socket and a second position outwardly spaced from said first position, then being effective to stretch said socket, the resiliency of said stretched socket serving to retain said doll head on said fingers, means operatively connected to said fingers to move them between said positions, an element mounted on said frame, said element being movable between a first position remote from said support on said other side thereof and a second position passing through said aperture, inside said fingers when the latter are in their second position, and sufficiently beyond said fingers so as to force said doll head out of engagement with said fingers, thus permitting said socket to contract, means operatively connected to said element for moving it between its first and second positions, and means on said element for releasably holding a doll's eye, said element being adapted to move through and beyond said fingers to insert said doll's eye in said stretchable socket and strip said socket off the fingers upon continued movement of the element.

7. A machine for inserting units into a stretchable socket in a supporting member, said machine comprising a frame, a plurality of fingers on said frame and insertable into said socket, means operatively connected to said fingers for spreading them apart and thus stretching said socket, an element mounted on said frame for movement between a first position remote from said fingers and a second position between said fingers, means operatively connected to said element for moving it between its first and second positions, means on said element for releasably holding one of said units, movement-restraining means on said frame, movable between operative and inoperative positions spaced from one another by an appreciable distance, and operatively connected to said element and effective to restrain it from movement to its second position even when said means for moving said element has been actuated whenever said movement-restraining means is in its operative position, said movement-restraining means when in inoperative position being disengaged from said element, and manual control means operatively connected to said movement-restraining means and effective, when manually actuated, to move the latter between its operative and inoperative positions.

8. The machine of claim 7, in which said movement-restraining means comprises a member movably mounted on said frame and biased to said operative position in the path of movement of said element so as to be engaged thereby when said element moves toward its second position, said member positively preventing further movement of said element, said manual control means, when actuated, moving said member out of the path of movement of said element to its inoperative position.

9. The machine of claim 7, in which said movement-restraining means comprises a member movably mounted on said frame and biased to said operative position in the path of movement of said element so as to be engaged thereby when said element moves toward its second position, said member positively preventing further movement of said element, said manual control means, when actuated, moving said member out of the path of movement of said element to its inoperative position, said element in moving from its second to its first position engaging said member when the latter is in its biased position, the then inter-engaging surfaces of said member and said element defining camming surfaces effective to move said member away from its biased position and beyond the path of movement of said element under the influence of the force exerted by said element intending to move to its first position, thereby permitting said element to return to its first position.

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