Oct. 11, 1955 R. A. HARRIS ET AL 2,720,003

APPARATUS AND METHOD OF MAKING CLOTHESPINS

Filed Oct. 17, 1952

FIG. 1

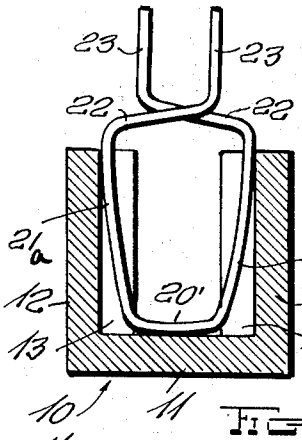

FIG. 2

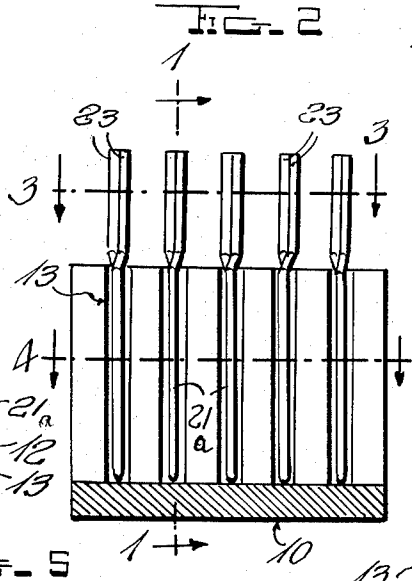

FIG. 3

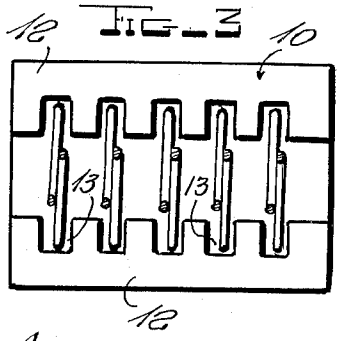

FIG. 4

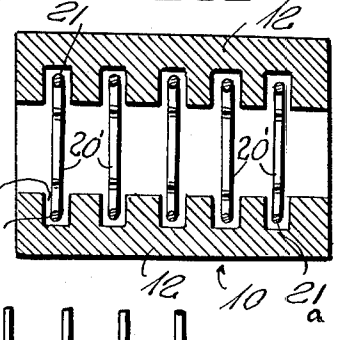

FIG. 5

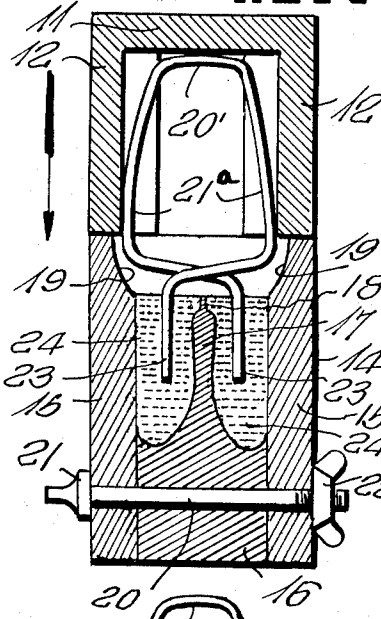

FIG. 6

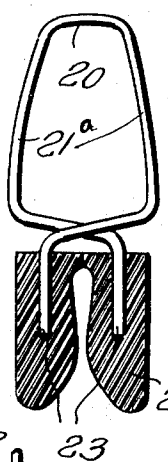

FIG. 7

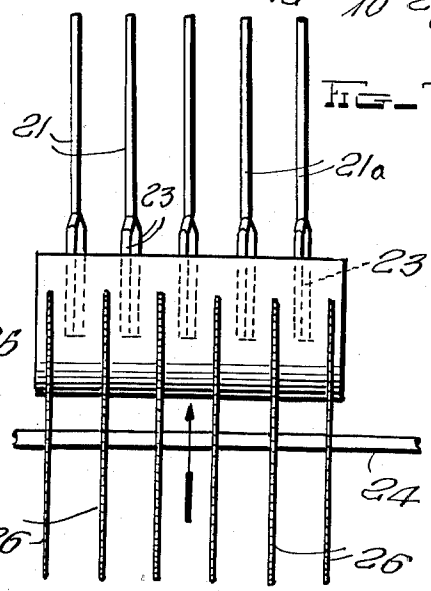

FIG. 9

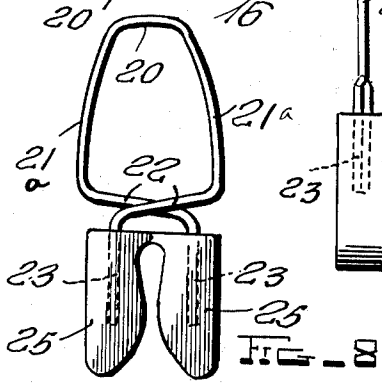

FIG. 8

INVENTORS
RICHARD A. HARRIS,
ROY E. CARR,

BY Frank C. Maley
AGENT

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APPARATUS AND METHOD OF MAKING CLOTHESPINS

Richard A. Harris and Roy E. Carr, High Point, N. C.; said Richard A. Harris assignor of ten per cent to said Roy E. Carr and twenty per cent to E. W. Harris, Sophia, N. C.

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4 Claims. (Cl. 18—42)

This invention relates to a method of apparatus for making clothes pins and further relates to a clothes pin made by the use of said method and apparatus.

One important object of the invention is to provide a novel method for the construction of clothes pins whereby a spring wire clothes pin may be provided with plastic gripping jaws.

A second important object of the invention is to provide a novel method whereby a gang of such clothes pins may be formed at the same time and thereafter separated into single units.

A third important object of the invention is to provide a novel mold for such clothes pins and having a cap member arranged to hold the wire portions of the clothes pin in laterally spaced relation.

A fourth important object of the invention is to provide a novel mold whereby each end of a spring wire may be provided with a plastic gripping jaw.

A fifth important object of the invention is to provide a mold of this character which may be disassembled for removal from the plastic jaws.

A sixth important object of the invention is to provide means for separating the individual clothes pins from a gang of such pins.

With the above and other objects in view, as will be hereinafter apparent, the invention consists in general of a novel method of forming clothes pins of the character above described, a novel mold apparatus for carrying the method into execution and a novel article of manufacture in the shape of a clothes pin, all being fully described and illustrated in the accompanying drawings, and particularly claimed.

In the accompanying drawings like characters of reference indicate like parts in the several views and;

Fig. 1 is a section on the line 1—1 of Fig. 2.

Fig. 2 is a longitudinal median vertical section on the center line of Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a section on the line 4—4 of Fig. 2.

Fig. 5 is a vertical transverse section through the old parts, the spring wire frame and the molten plastic material.

Fig. 6 is a view taken transversely through a gang of the wire frames and illustrating the hardened plastic material in sections.

Fig. 7 is a view illustrating the step of separating the gang of pins into single units.

Fig. 8 is a side view of a completed pin as constructed in accordance with the method and in the apparatus forming features of this invention.

Fig. 9 is a view taken from the right side of Fig. 8.

In the accompanying drawings there is shown a mold cap indicated generally at **10**, and shown in inverted position in Fig. 1 and in erect position in Fig. 5. This cap has a top member **11** and side walls **12**. The inner surfaces of these side walls are provided with vertical grooves **13**, the grooves in each wall being spaced laterally from each other and the grooves in one wall being opposite

the grooves in the other wall. In connection with the capping member **10** there is provided a sectional mold bottom indicated in general at **14**. This mold bottom includes a pair of mold sides **15** between which is fitted a mold bottom **16**. This mold bottom has a rib **17** extending upwardly along the center line of the bottom and the rib is provided with a narrow edge portion **18**. The upper part of the inner face of each wall **15** is cut away to provide an outwardly flaring portion **19**, the lower edges of these flaring portions lying in the horizontal plane of the upper surface of the rib portion **18**. Through the sides **15** and mold bottom **16** passes a bolt **20** having a head **21**. On this bolt is fitted a swing nut **22**, the head and wing nut bearing on the outer surfaces of the mold sides **15**.

In the formation of the clothes pin there is provided a length of wire bent at its middle portion to provide a substantially flat end **20**. From the ends of this extends a pair of arms **21***a*. At the upper end of these arms the wire is bent to provide cross-members **22**. From each of these extends a terminal portion **23**, these being parallel upon insertion of the wire portion of the clothes pin in the mold cap, so that the arms **21***a* lie in opposed grooves **12**.

In use a series of these wire forms is placed in the mold cap while the cap is in the inverted position shown in Figs. 1 and 2, the arrangement of the wires in the mold cap being also shown in Figs. 3 and 4. When all of the grooves of the mold cap have been filled, a supply of liquid plastic material such as is shown at **24** is provided in the mold bottom **14** between each wall **15** and rib **17**, and its reduced portion **18**, the plastic material filling the mold **14** to a level of the horizontal plane wherein lies the top surface of the reduced portion **18** and the lower edges of the cutaway portions **19**.

The cap and the bottom part **14** are then set aside and left until the plastic material becomes hardened or set. When this happens the mold cap may be removed, the nut **22** is then unscrewed from the bolt **20**, the sides **15** separated laterally and the mold bottom **16** drawn out from between the plastic masses. This will leave two strips of plastic mass sections through which are shown in Fig. 6 at **23** and a number of the wire forms projecting upwardly therefrom as shown in Fig. 7. In order to separate the individual clothes pins from these plastic strips we preferably provide a rapidly revolving shaft **24**, on which is carried a series of spaced circular cutter blades **25** preferably serrated to form saws. The spacing of these cutter blades is identical with the spacing between the wire loops so that when the plastic masses **23** are brought into contact with these blades, such masses are cut to have parallel faces and form jaws **25** of the proper shape to fit over a clothes line and grip the clothes thereon.

It will be obvious that in the practice of the present invention the arms **21***a* will be compressed in the act of inserting the wire formation into the mold cap **10** which not only places the wire formation under tension, but also serves to spread apart the terminal portions **23** of the formation. Thus, this procedure not only retains the wire formation in the mold cap, but also permits the plastic tips to be molded on the terminal portions **23**, while the latter are under tension and in spaced apart relation whereby when the tips have set the completed clothespin acts in the nature of a spring clamp.

It is obvious that minor changes may be made in the form of construction of the apparatus and changes may also be made in the steps of the method without departing from the material principles involved. Furthermore, the precise form of the finished clothes pin may be varied also without departing from the peculiar char-

acteristics thereof. It is not, therefore, desired to confine the invention to the exact form herein shown and described, but it is wished to include all such as properly come within the scope claimed.

We claim:

1. A molding apparatus for forming plastic jaws on the free ends of spring wire clips, each clip including a pair of free clamping ends and an integral loop portion connecting the ends and urging them relative to each other, comprising an elongated mold having a bottom wall, upstanding side walls and an open top, a longitudinally extending rib upstanding centrally from the bottom wall and dividing the mold into two separate cavities, each of which is adapted to contain a separate bath of liquid plastic material, said rib terminating in a reduced upper end at the upper level of the baths, a channel shaped holder including a pair of opposed side walls and a wall connecting the side walls and adapted to form a top wall for the mold, said side walls of the holder seating on the upper ends of the side walls of the mold, each side wall of the holder being formed with longitudinally spaced transverse grooves, the grooves in the walls being aligned transversely of the holder to receive the sides of the loops of the clips and the grooves in the walls being spaced apart transversely of the holder to compress the loops slightly and spread the ends of the clips apart, the ends of each clip extending from the holder beyond the walls and being immersed in the separate baths, said upper ends of the side walls of the mold extending above the upper end of the rib and having their inner surfaces concaved to receive the juncture portions of the loop and clamping ends.

2. The method of forming plastic jaws on the free ends of a spring wire clip, which includes a pair of free ends and a loop connecting said ends and normally urging them relative to each other; comprising the steps of preparing separate side by side baths of liquid plastic material, compressing the loop of the clip to spread the ends apart, immersing the ends of the clip in the separate baths while retaining them spread apart and allowing the material to set.

3. The method of forming plastic jaws on the free ends of spring wire clips, each of which includes a pair of free clamping ends and a loops connecting the ends and normally urging them relative to each other, comprising the steps of preparing separate side by side baths of liquid plastic material, assembling the clips in spaced fashion in a row, compressing the loops of the clips to spread the ends apart, immersing the ends of the clips in the baths while retaining them spread apart with the legs of each clip being in the separate baths, and allowing the material to set.

4. In the method of claim 3, the further step of simultaneously severing the material between each clip.

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