June 18, 1946. F. F. MOREHEAD 2,402,338

MOLDING DEVICE

Filed March 25, 1943

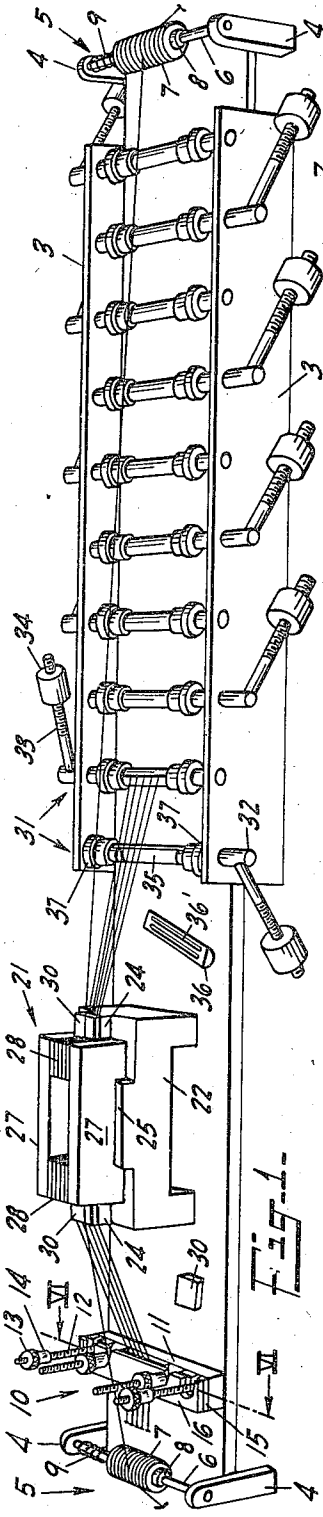


Fig-1.

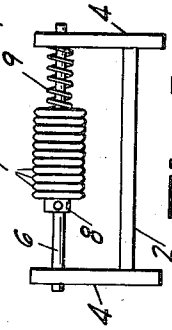


Fig-5.

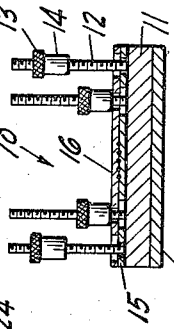


Fig-6.

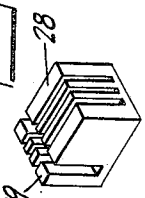


Fig-12.



Fig-2.

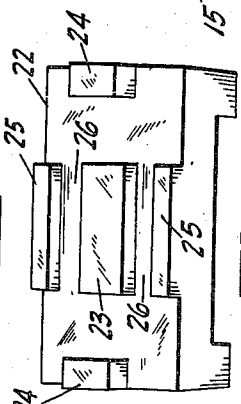


Fig-3.

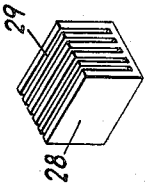


Fig-4.

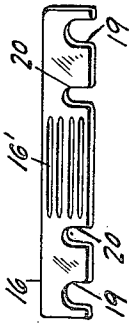


Fig-8.

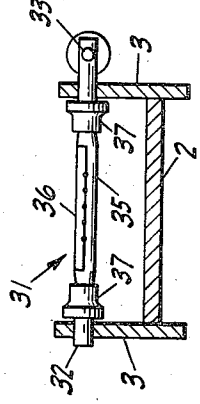


Fig-9.

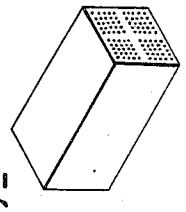


Fig-11.

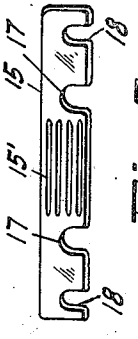


Fig-7.

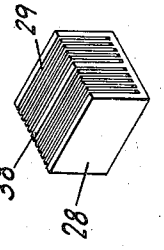


Fig-10.

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2,402,338

MOLDING DEVICE

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Application March 25, 1943, Serial No. 480,481

9 Claims. (Cl. 18—39)

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This invention relates to a molding device, particularly adapted to embed within a single mass a plurality of distinctly separated flexible strands, each of which may be constituted of a single fiber, filament, thread or wire, or of a twisted or untwisted bundle of fibers, filaments, threads or wires, examples of the latter being spun yarns or continuous filament yarns. The invention is especially applicable to the embedding of natural or artificial filaments or staple fibers within a suitable wax preparatory to cutting thin cross-sections with a microtome.

It is an object of this invention to provide a device which is adapted to facilitate the arrangement of the individual strands in a reasonably regular fashion so that they can be readily identified in the cross-section made from the molded product. A further object is to provide a tensioning device in which an entire row comprising a plurality of strands may be clamped as a unit in simple manner. A further object is to provide a clamp of compact form which is adapted to secure a plurality of rows of strands, the rows being clamped separately and in succession without releasing the previously clamped rows. A further object is to provide a device for temporarily and releasably holding a plurality of strands in readiness for clamping by the tensioning device and the clamping device. Further objects and advantages of the invention will be apparent from the drawing and the description thereof hereinafter.

In the drawing, illustrative of the invention,

Figure 1 is a perspective view of the entire device as viewed from above,

Figures 2, 3 and 4 are perspective views showing parts of the molding box,

Figure 5 shows an end view of the device, illustrating one of the temporary clamps,

Figure 6 is a cross-section taken on lines VI—VI of Figure 1,

Figures 7 and 8 are perspective views showing clamp bars,

Figure 9 is an end elevation, partially in cross-section, showing one of the tensioning clamps,

Figure 10 shows a modified form of slotted end wall of the molding box,

Figure 11 diagrammatically illustrates the form of cross-section and the arrangement of the strands within it obtained when using the end walls shown in Figure 10, and

Figure 12 is a perspective view showing another modified form of slotted end wall.

As shown in Figure 1, the molding device comprises a suitable longitudinal base 2 to which

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are secured side pieces 3 which, together with the corner posts 4 secured to the base serve as legs to support the base. A temporary clamp 5 is provided at each end of the base 2 and is supported by the corresponding pair of the corner posts 4. The temporary clamp 5 (see Figure 5) comprises a rod 6 carrying a plurality of washers 7 which are free to rotate with respect to the rod. A collar 8 secured to the rod, as by a set screw, serves to adjustably limit the motion of the washers to the left as viewed in Figure 5. A helical spring 9 surrounding the rod is inserted between one of the posts 4 and the end washer facing it and presses the washers together. Preferably, the washers are highly polished and have rounded edges.

Adjacent the temporary clamp 5 at the left of Figure 1, there is disposed a permanent clamp 10 (see Figure 6) which comprises a fixed base 11 secured to the longitudinal base 2 and four threaded posts 12 which extend upwardly from the base. Each post is provided with a knurled thumb nut 13 which has a depending sleeve 14. Clamp bars 15 and 16, shown in Figures 7 and 8, are laid upon successive rows of strands. The effective surface of these bars may be scored as at 15' and 16' to assist the clamping action. The clamp bar 15 of Figure 7 has four slots, the two 17 at the inside being large enough to permit the entry of the sleeves 14 of the inner thumb nuts and the outer two 18 being only large enough to permit entry of the posts 12. The clamp bar 16 of Figure 8 has four slots of which the two outer ones 19 are large enough to permit the entry of the sleeves of the thumb nuts on the outer posts and the inner two 20 are only large enough to permit entry of posts 12. This construction permits the clamping of a row of strands without releasing the previously clamped row. For example, the row of strands shown in Figure 1 are clamped by the top clamp bar 15 which is held by the inner two thumb nuts 13. The next row of strands may be clamped on top of the clamp bar 16 shown in Figure 1 by means of a bar of the type 15 shown in Figure 7 where the inner two slots 17 will pass over the sleeves of the inner two thumb nuts, after which the two outer thumb nuts may be screwed down to tighten the clamp bar. Thereafter the two inner nuts may be loosened without releasing the previously clamped row of strands and the process may be carried out to any number of successively applied rows of strands merely by alternating the clamp bar 15 of Figure 7 with that 16 of Figure 8.

The molding box 21, whose parts are more particularly shown in Figures 2 to 4 inclusive, comprises a support 22 (particularly shown in Figure 3) which is provided with a central platform 23, two end platforms 24, and two side platforms 25. The central platform 23 of the support serves as the bottom of the molding box. The grooves 26 formed between the side platforms 25 and the central platform 23 are adapted to receive the side walls 27 of the molding box shown in Figure 2. Slotted end blocks 28 are then received between the end platforms 24 and the central platform 23 and between the opposite faces of the side walls 27 of the molding box. The form of end block shown in Figures 1 and 4 is provided with five slots 29 adapted to receive and separate the strands in horizontal rows. As shown in Figure 1, separator plates 30 may be used to separate successive rows of strands, the first pair of separator plates being shown in position on the two end platforms 24 over the first row of filaments. Each row may thus be separated by any desired distance which is controlled by the thickness of the separator plates 30 used.

The two side walls 3 support a plurality of tension clamps 31 which are freely rotatable in the walls 3. The tension clamp 31 second from the left in Figure 1 is shown in use for tensioning the first row of filaments, the first tension clamp 31 at the left of Figure 1 being shown dismantled. Referring to Figures 1 and 9, the tension clamp 31 comprises a rod 32 rotatably supported within the side walls 3 and provided at one end with a threaded post 33 for carrying an adjustable weight 34. The rod 32 is split at its center to form a saddle or seat 35 within which the clamping bar 36 is adapted to fit. The effective clamping surface of the bar 36 may be scored as at 36'. At each side of the split portion, there is provided a slidable collar 37 whose internal surface constitutes a portion of a cone, the wider opening being toward the center of the clamp. The rod 32 is slightly tapered adjacent the end of the seat portion 35 and similarly the clamping bar 36 may be tapered for a short distance adjacent its ends so that the sliding of the collars 37 inwardly after disposing the strands on the seat 35 under the clamping bar 36 causes effective gripping.

Briefly, the charging of the molding device is accomplished as follows: The side walls 27 and slotted end walls 28 of the molding box are set in their proper places on the support 22 and the first row of strands are separately inserted between the washers 7 at the left of Figure 1, through corresponding slots 29 of each of the molding box ends 28 and between the washers 7 on the temporary clamp at the other end of the device. After as many strands as are desired in a row are charged by placing each strand in a separate slot in each end wall of the molding box, the washers 7 of one of the temporary clamps may be rotated to equalize the tension on the strands. Then an appropriate clamping bar 15 or 16 may be laid upon the base 11 of the permanent clamp shown at the left of Figure 1. Thereafter, one of the tension clamps 31 is swung counterclockwise into the position shown at the extreme left of these clamps in Figure 1, the collars 37 of the tension clamp are spread, the corresponding clamping bar 36 is removed and placed over the strands in the saddle or seat 35, and the collars are then slipped inwardly to clamp the bar 36 against the seat 35 tightly. Thereafter, the tension clamp is rotated clockwise from the charging position to the position in

which the clamp 31 second from the left in Figure 1 is shown where the weight 34 is exerting tension upon the filaments. Thereupon, the appropriate thumb nuts 13 are tightened to secure the tension bar 15 or 16 of the permanent clamp 10 in place. The ends of the strands extending from the clamp 31 and clamp 10 to the corresponding temporary clamps 5 are severed and removed from the temporary clamps.

A separator plate 30 is then placed upon the filaments over each end platform 24 of the molding box support 22 and a second row of strands is disposed within the temporary clamps 5 and the slotted end blocks 28 of the molding box, clamped in another tensioning clamp 31 and in the permanent clamp 10, using that one of the types of permanent clamp bars 15 and 16 which can be inserted over the sleeves 14 of the nuts 13 holding the previously applied row or rows of strands. In this manner any number of rows may be piled one above the other within the limits of the device.

After the charging of the device, the molding may proceed. Any molten wax or other molding medium may be poured into the box 21.

While the limits of the device as shown in Figure 1 prevent the disposition of more than ten rows one above the other because of the fact that only ten tensioning clamps 31 are provided at the right of the molding box 21, yet it is obvious that any such number of clamps may be so arranged. The slotted end blocks 28 of the molding box proper are, of course, interchangeable and end blocks having any desired number of slots 29 may be used. Similarly, any number of washers 7 may be provided upon the temporary clamps 5, eleven being shown to take care of the maximum of ten corresponding to the limit of the number of tensioning clamps 31 provided in Figure 1.

Figure 10 shows a modification of slotted end block 28' in which ten slots 29' are divided in two groups of five each by a central partitioning wall 38 of considerable thickness as compared to those between the individual slots within each group of five. By combining the use of such a slotted end block with the use of an extra thick separator 30 between the fifth and sixth horizontal rows upon the end platforms 24 of the molding box support (or by the use of a plurality of thin separators 30), the arrangement of strands obtained in the final cross-section would appear as shown in Figure 11. The identity of each of the strands within the final unitary block may be readily ascertained by a simple form of chart conveniently filled out as the molding device is charged and the location of any particular strand within the plurality may be facilitated by the use of one or more reference strands of peculiar and readily observed character.

A modified form of block 28'' shown in Figure 12 is particularly useful where only relatively short lengths of the material are available. For example, it may be desired to embed samples of staple fiber products or a short sample of yarn. Such samples may be used by tying to the ends of the short sample suitable lengths of other strand material. The distance between the knots at opposite ends of the sample is preferably selected so that the knots fall within the transverse slots 39 provided in the slotted end blocks 28'' of the molding box.

If desired, the central platform 23 of the molding box support 22 shown in Figure 3 may be separable therefrom and replaceable by platforms of greater or less length. Such shorter or longer

central platforms 23 may be used in cooperation with slotted end blocks 28 having correspondingly greater or less lengths. Such a modification may particularly find advantage when used with the type of slotted end blocks 28'' shown in Figure 12 where it is desired to embed samples of materials having extremely short lengths.

While preferred embodiments of the invention have been shown and described, it is to be understood that changes and variations may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

What I claim is:

1. In combination, a support, an enclosure on the support having opposed walls each having a plurality of corresponding transverse slots therethrough, a platform adjacent the slots in each of the opposed walls, temporary strand clamping means spaced from each of the platforms for holding a plurality of strands extending through the slots under tension, and permanent clamping means between each platform and the corresponding temporary clamping means, the permanent clamping means being arranged to hold a plurality of strands in a plurality of distinct rows.

2. In combination, a support, an enclosure on the support having opposed walls each having a plurality of corresponding transverse slots therethrough, a platform adjacent the slots in each of the opposed walls, temporary strand clamping means spaced from each of the platforms for holding a plurality of strands extending through the slots under tension, permanent clamping means between each platform and the corresponding temporary clamping means, the permanent clamping means being arranged to hold a plurality of strands in a plurality of distinct rows, and adjustable tensioning means associated with the permanent clamping means.

3. In combination, a support, an enclosure on the support having opposed walls each having a plurality of corresponding transverse slots therethrough, a platform adjacent the slots in each of the opposed walls, temporary strand clamping means spaced from each of the platforms for holding in substantially regular arrangement a plurality of strands extending through the slots under tension, permanent clamping means between each platform and the corresponding temporary clamping means, the permanent clamping means being arranged to hold a plurality of strands in a plurality of distinct rows, and adjustable tensioning means associated with the permanent clamping means.

4. In combination, a support, an enclosure on the support having opposed walls each having a plurality of corresponding transverse slots, a platform adjacent the slots in each of the opposed walls, temporary strand clamping means spaced from each of the platforms for holding a plurality of strands extending through the slots under tension, said temporary clamping means comprising at least three separable members arranged face to face and resilient means for pressing them together.

5. In combination, a support, an enclosure on the support having opposed walls each having a plurality of corresponding transverse slots, a platform adjacent the slots in each of the opposed walls, temporary strand clamping means spaced from each of the platforms for holding a plurality of strands extending through the slots under tension, permanent clamping means between each platform and the corresponding temporary clamping means, said permanent clamping means comprising a rotatably mounted rod having a portion of its length cut away to form a seat, a pair of collars disposed on the rod on opposite sides of the cut-away portion and a clamp bar adapted to fit in the seat.

6. In combination, a support, an enclosure on the support having opposed walls each having a plurality of corresponding transverse slots, a platform adjacent the slots in each of the opposed walls, temporary strand clamping means spaced from each of the platforms for holding a plurality of strands extending through the slots under tension, permanent clamping means between each platform and the corresponding temporary clamping means, said permanent clamping means comprising a rotatably mounted rod having a portion of its length cut away to form a seat, a pair of collars disposed on the rod on opposite sides of the cut-away portion and a clamp bar adapted to fit in the seat, the rod being tapered down from each end of the seat, and the collars having an internal gripping surface of frustoconical shape adapted to cooperate with the tapered ends of the rod.

7. In combination, a support, an enclosure on the support having opposed walls each having a plurality of corresponding transverse slots therethrough, a platform adjacent the slots in each of the opposed walls, temporary strand clamping means spaced from each of the platforms for holding a plurality of strands extending through the slots under tension, permanent clamping means between each platform and corresponding temporary clamping means, said permanent clamping means comprising a base, a plurality of threaded posts secured in the base, nuts on the post provided with sleeves arranged to extend toward the base, two sets of clamp bars provided with a plurality of lateral slots corresponding in disposition to the threaded posts, at least one of the slots being large enough to permit free entry of a sleeve and at least one other of the slots being large enough to permit free entry of a threaded post but insufficiently large to permit entry of a sleeve, the large slots of one set of clamp bars being disposed where the smaller slots of the other set are disposed.

8. A thread clamping means comprising a base, a plurality of threaded posts secured in the base, nuts on the posts provided with sleeves arranged to extend toward the base, two sets of clamp bars provided with a plurality of slots corresponding in disposition to the threaded posts, at least one of the slots being large enough to permit free entry of a sleeve and at least one other of the slots being large enough to permit free entry of a threaded post but insufficiently large to permit entry of a sleeve, the large slots of one set of clamp bars being disposed where the smaller slots of the other set are disposed.

9. In combination, a support, an enclosure on the support having opposed walls each having a plurality of corresponding transverse slots therethrough, a platform adjacent the slots in each of the opposed walls, temporary strand clamping means spaced from each of the platforms for holding a plurality of strands extending through the slots under tension, permanent clamping means between each platform and a corresponding temporary clamping means, that portion of the permanent clamping means arranged between one platform and the corresponding temporary clamping means comprising a rotatably

mounted rod having a portion of its length cut away to form a seat, a pair of collars disposed on the rod on opposite sides of the cut-away portion, and a clamp bar adapted to fit in the seat, that portion of the permanent clamping means arranged between the other platform and the corresponding temporary clamping means comprising a base, a plurality of threaded posts secured in the base, nuts on the posts provided with sleeves to extend toward the base, two sets of

clamp bars provided with a plurality of lateral slots corresponding in disposition to the threaded posts, at least one of the slots being large enough to permit free entry of a sleeve and at least one other of the slots being large enough to permit free entry of a threaded post but insufficiently large to permit entry of a sleeve, the large slots of one set of clamp bars being disposed where the smaller slots of the other set are disposed.

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