May 29, 1962 ÅKE R. SKÄRSTRÖM 3,036,580

BUNCH TRANSFER DEVICE

Filed June 19, 1959 4 Sheets-Sheet 1

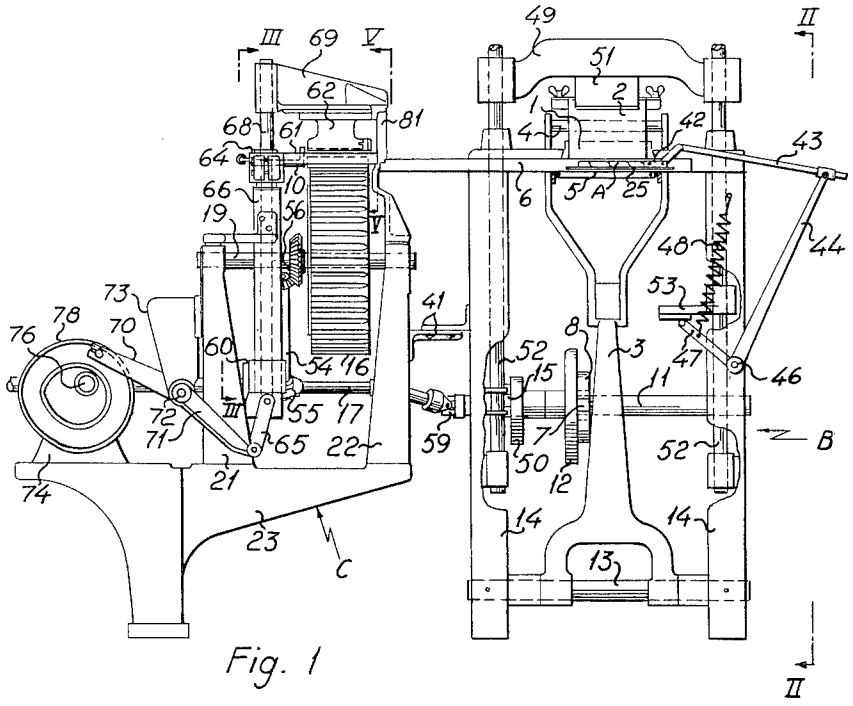


Fig. 1

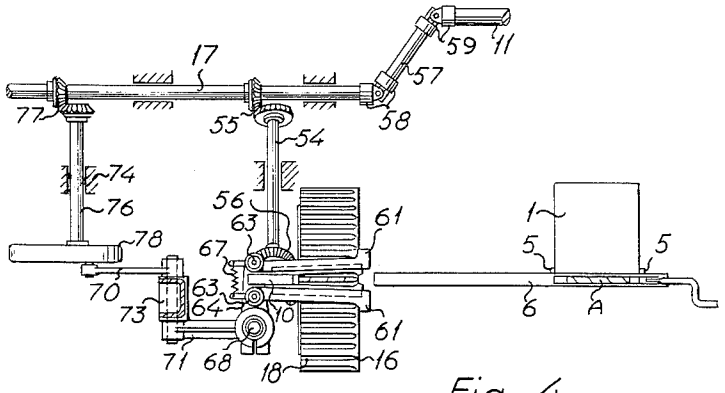


Fig. 4

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May 29, 1962 ÅKE R. SKÄRSTRÖM 3,036,580

BUNCH TRANSFER DEVICE

Filed June 19, 1959 4 Sheets-Sheet 2

Fig. 2

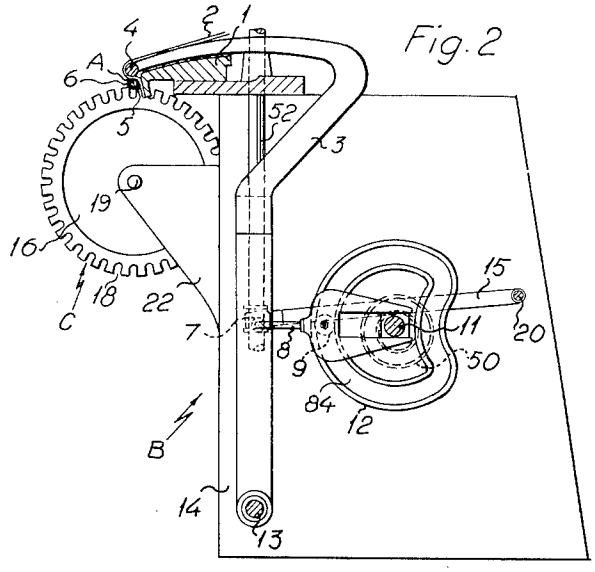
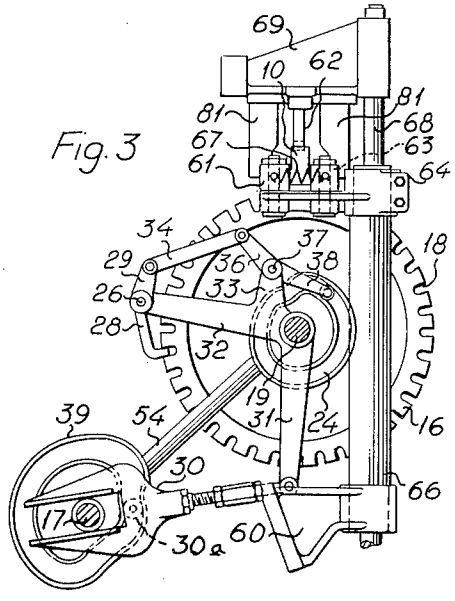


Fig. 3



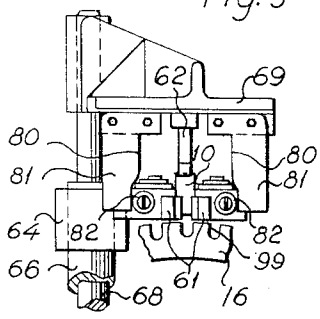
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BUNCH TRANSFER DEVICE

Filed June 19, 1959 4 Sheets-Sheet 3

Fig. 5



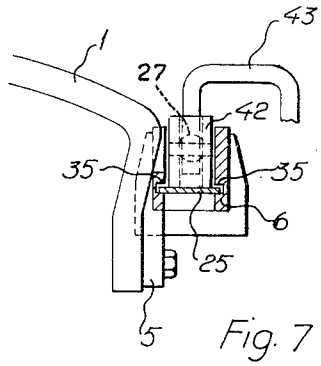


Fig. 7

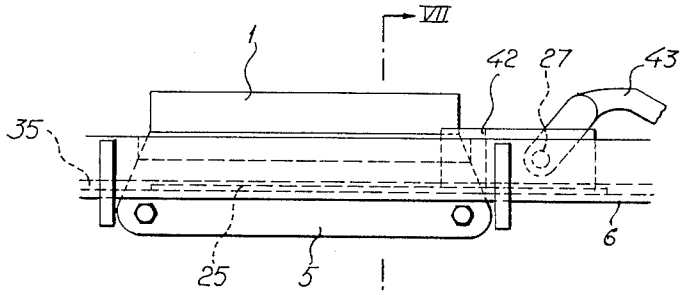


Fig. 6

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May 29, 1962 ÅKE R. SKÄRSTRÖM 3,036,580

BUNCH TRANSFER DEVICE

Filed June 19, 1959 4 Sheets-Sheet 4

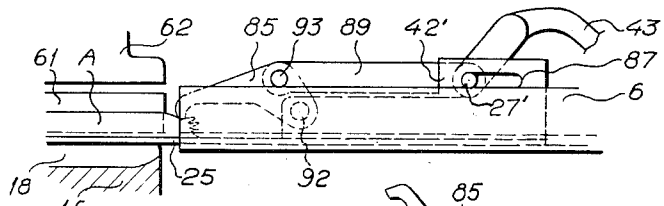


Fig. 8

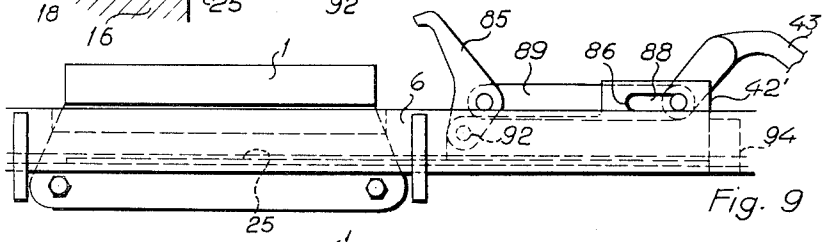


Fig. 9

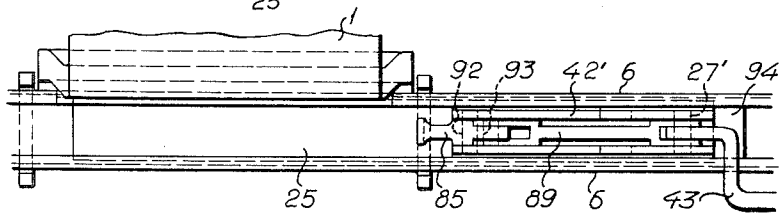


Fig. 10

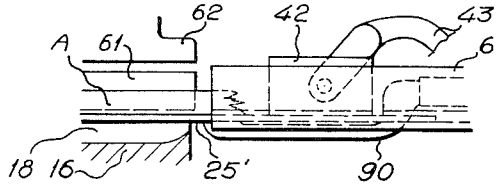


Fig. 11

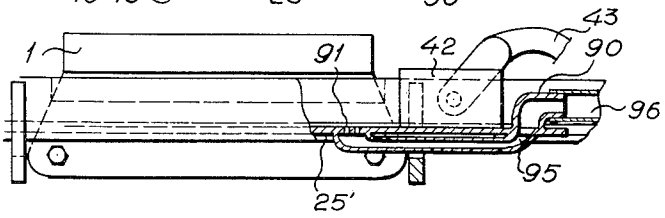


Fig. 12

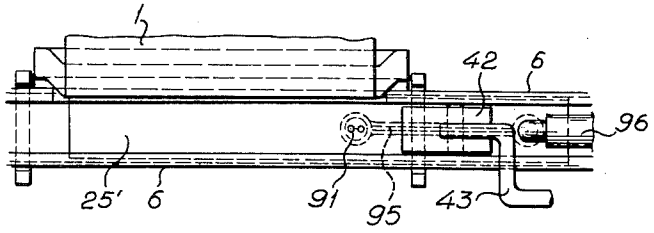


Fig. 13

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United States Patent Office

3,036,580

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BUNCH TRANSFER DEVICE

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Filed June 19, 1959, Ser. No. 821,418
Claims priority, application Sweden July 4, 1958
10 Claims. (Cl. 131—81)

In the manufacture of cigars the cigar bunches are usually transferred by means of a gripper guided for movement from the rolling table of a bunch making apparatus to a bunch shaping device. Readjustments of the gripper guide in dependence on unintentional changes of the relative positions of the bunch making apparatus and the bunch shaping device caused by settlements of the foundations of said apparatus and said device, are time-consuming and difficult. If there is a relatively large distance between the bunch shaping device and the bunch rolling table the bunch transfer has had to be effected manually.

It is an object of this invention to provide for an automatic transfer of the bunches from the bunch making apparatus to the bunch shaping device substantially irrespective of the relative positions of said apparatus and device and the distance between them.

Another object of the invention consists of the provision of bunch transferring means which will be operatively undisturbed by any minor changes which may occur in the relative positions of the bunch making apparatus and the bunch shaping device while said apparatus and device are operating.

Still another object of the invention consists in the provision of means for incessantly controlling the movements and positions of the bunches until they have entered mold pockets in the bunch shaping device.

With these and other objects not specifically mentioned, but which will be apparent from the following detailed description of the apparatus and its operation in view, the invention consists in certain constructions and combinations of parts which will be hereinafter fully described and set forth in the appended claims.

In the drawings:

FIGURE 1 is a front elevational view, partly broken away for better illustration, of a bunch making apparatus and a bunch shaping device interconnected by attachment members, drive means and a bunch transfer device embodying the invention;

FIGURE 2 is a side view of the bunch making apparatus viewed from the line II—II of FIGURE 1;

FIGURE 3 is an enlarged side view, partly in section and with some parts omitted in the interest of clarity of the bunch shaping device viewed on the line III—III of FIGURE 1;

FIGURE 4 is a top plan view of certain parts of the assembly shown in FIGURE 1;

FIGURE 5 is an enlarged elevational view of certain parts of the shaping device on the line V—V of FIGURE 1;

FIGURE 6 is an enlarged side elevational view of the bunch transferring carrier member and part of its guide;

FIGURE 7 is a cross sectional view taken on the line VII—VII of FIGURE 6;

FIGURE 8 is a side elevational view similar to FIGURE 6 but showing another embodiment of the invention;

FIGURE 9 illustrates certain parts of FIGURE 8 in a retracted position;

FIGURE 10 is a top plan view of the front end of a bunch rolling table, the bunch carrier member and associated parts in the relative positions shown in FIGURE 9;

FIGURE 11 is a view substantially similar to FIGURE 8 but showing still another embodiment of the invention;

FIGURE 12 is a view, partly in section and substantially corresponding to FIGURE 9 but showing the modified embodiment of FIGURE 11, and

FIGURE 13 is a top plan view of the device shown in FIGURES 11 and 12 with its parts in the relative positions shown in FIGURE 12.

In the various views like reference characters indicate the same or like parts.

Referring to the drawings, the bunch making apparatus designated in general by reference character B (FIGURE 1) has the conventional bunch rolling table **1** and rolling apron **2** operated by a bunch roller **4** (FIGURE 2) mounted on a forked lever **3**. Filler tobacco delivered from a magazine **51**, for example by the mechanism shown in Patent No. 1,716,117, is wound by the rolling apron **2** into a binder and the bunch A produced thereby is delivered by the rolling apron **2** from the front end of the rolling table **1** to a bunch supporting carrier member **25** consisting of a relatively thin plate slidably guided in a rail **6** secured to a plate **5** fixed on the front end of the rolling table **1**.

The forked lever **3** is pivoted on a shaft **13** secured to the machine frame **14** and it is connected, by a pivot **7**, with a forked rod **8**, FIG. 2, carrying a roller **9** received in a groove **84** in a face cam **12** secured to a rotary shaft **11** and operating the bunch roller **4** in ordinary manner to be reciprocated over the rolling table **1**.

The guide rail **6** consists of two spaced parallel and interconnected bars and extends from the rolling table **1** to a bunch compressing, shaping and drying apparatus, designated in general by reference character C. The bunch shaping apparatus C and the bunch making apparatus B are interconnected by angle irons **41** and are mounted on separate bed plates, but they are driven from the same main drive shaft **17** so that they form a single assembly when operating.

The bunch shaping apparatus C comprises a stepwise rotatable drum **16** having mold pockets **18** of a shape corresponding to that of the finished cigars. The drum **16** is secured to a shaft **19** which is rotatably journalled in posts **21** and **22** mounted on a table **23**, FIG. 1, forming part of the main frame of the shaping apparatus C. To the shaft **19** is secured a face cam **24**, FIG. 3. A lever having three arms **31**, **32** and **33** is freely rotatably mounted on said shaft **19**. To a stud **26** rotatably mounted in the arm **32** are secured a dog **28** and an arm **29**. The arm **29** is pivotally connected to one end of a link **34** the other end of which is pivoted to one arm **36** of a double-armed lever which is freely rotatably mounted on a pivot **37** in the lever arm **33** and the other arm **38** of which is operated by the face cam **24**. The lever arm **31** is pivotally connected to one end of a rod **30** the other end of which is forked and straddles the drive shaft **17** and which is operated by means of a roller **30***a* mounted therein and engaging with face cam **39** secured to said shaft.

By this mechanism, consisting of lever arms, links and cams, the drum **16** will be rotated stepwise whereby each angular step corresponds to the pitch of the mold pockets **18**. Every time the drum **16** is at rest it is supplied with a cigar bunch A transferred from the apparatus B.

For preliminarily shaping the bunches A and for guiding them when being introduced into the molds **18** of the drum **16** a pair of jaws **61** are provided which coact with a vertically reciprocable loading member **62**. The jaws **61** are each secured to a stud **63**, FIG. 4. The studs **63** are rotatably mounted in an arm **64** secured to and projecting laterally from a vertical sleeve **66** which is secured

to a bracket 60 fixed to the table 23. At their rear ends the two jaws 61 are interconnected by a helical tension spring 67 tending to move said jaws apart. In the sleeve 66 is mounted a vertically slidable spindle 68 to which is secured a laterally projecting arm 69. To the arm 69 is secured the downwardly directed loading member 62 right above the center line of the drum shaft 19. The spindle 68 is connected by a link 65 to an arm 71 which is secured to a shaft 72 rotatably mounted in a bracket 73 fixed to the post 21. A shaft 76 is rotatably mounted in a bracket 74 on the table 23 and driven from the shaft 17 by means of a bevel gear 77, FIG. 4. To the shaft 76 is secured a face cam 78 operating an arm 70 which is secured to the shaft 72 so that the spindle 68 will be moved up and down periodically. The arm 69 is, as shown in FIGURES 3 and 5, provided with a pair of cams 81 which act upon rollers 82 on the jaws 61 so as to move said jaws towards each other and to grasp the bunch when the arm 69 is moved downwardly. Thereby the jaws 61 will form a guide opening or channel having the same contour as the molds 18 of the drum 16.

In the guide rail 6 is mounted a slide 42, FIGS. 6 and 7 which is connected by a universal joint, FIG. 7, to one end of a rod 43 the other end of which is pivoted to an arm 44. The arm 44 is secured to shaft 46 which is rotatably mounted in the bunch making machine frame 14 and to which is secured another arm 47 connected to the frame 14 by a helical tension spring 48. To the bottom side of the slide 42 is secured a thin plate 25 which is wider than the slide and projects beyond the left end (FIGURE 6) of said slide so that it forms the aforesaid bunch supporting carrier receiving the bunches A from the bunch rolling table 1 and transferring them to the bunch shaping apparatus C.

The plate 25 is guided by its lateral edges in longitudinal grooves 35 in the guide rail 6. A stop member 10 secured to the arm 64 slightly behind the rear ends of the jaws 61 is adapted to limit the longitudinal movement of the bunches A and fix their longitudinal position when being advanced between the jaws 61.

The magazine 51 for the distribution of filler tobacco portions is suspended from a yoke 49 which is fixed to two spaced parallel vertical rods 52 slidably mounted in the frame 14. The magazine 51, the yoke 49 and the rods 52 are devised and operated substantially as disclosed in Patent No. 1,716,117. Thus, the rods 52 are periodically moved up and down by an arm 15 rotatably mounted on a stud 20 in the frame 14 and pivotally connected with one of said rods and controlled by a face cam 50 secured to the shaft 11. To one of the rods 52 is secured a laterally projecting arm 53, FIG. 1, which, when the rods 52 are moved downwardly, urges the spring biased arm 47 downwardly so that the arm 44 will move the slide 42 forwardly, that is to the left in FIGURE 1. By appropriate configurations of the cams 12 and 50 and their angular positions on the shaft 11 the movements of the rods 52 and the bunch roller operating arm 3 are so timed, disclosed in Patent No. 2,563,032 that the slide 42 will be advanced immediately after the bunch roller 4 has delivered a bunch A to the carrier plate 25 on the slide 42 by means of the apron 2.

The drive shaft 17 is connected with the shaft 19 of the drum 16 by means of a shaft 54 and two bevel gears 55 and 56. By means of a shaft 57 and two universal joints 58 and 59 the shaft 17 is also connected with the shaft 11. By appropriate configuration of the cams 39 and 50 and their angular positions on the interconnected shafts 17 and 11, respectively, the drum 16 will remain immovable with one of its pockets 18 in its uppermost position when the bunch carrier 25 approaches the drum and for a short interval thereafter during which a bunch A is introduced into said uppermost mold.

The mechanisms described herein operate synchronously so that the bunch A supported by the carrier 25 will enter the space between the opened jaws 61 and be arrested by the stop member 10 simultaneously as the loading member 62 occupies its uppermost position. When the slide 42 has moved the projecting leading end of the bunch supporting carrier plate 25 into the narrow space 99 between the jaws 61 and the drum 16, said plate 25 will still act as a support for the bunch and the spindle 68 moves the loading member 62 and the cams 81 downwardly so that the cams 81 will close the jaws 61 about and against the bunch A and define an opening or channel located right above that mold 18 which occupies its uppermost position. As soon as the jaws 61 have closed about the bunch, the slide 42 will be retracted whereby it pulls the bunch supporting plate 25 out of the space between the jaws 61 and the drum 16. When the arm 69 moves further downwards the parallel edges 80 of the cams 81 are in engagement with the rollers 82 of the jaws 61 so that the jaws will be kept closed in fixed relative positions when the loading member 62 enters the bunch shaping channel between the jaws and moves down through said channel and forces the bunch downwardly out of same and into the drum mold 18 registering with said jaw opening. Thereafter, or simultaneously therewith, the slide 42 is retracted to its initial position at the bunch making apparatus where the plate 25 will serve as a receiver for the next bunch delivered from the rolling table 1 and the drum 16 is rotated by the dog 28 through one mold pitch whereafter a bunch previously introduced into one of the molds 18 and shaped and dried therein will be expelled from said mold, for example by the use of the mechanism disclosed in Patent No. 1,982,292. Thereafter the arm 29, acting under the influence of cam 24 and the interconnecting levers and link, moves the dog 28 out of that mold of the drum 16 in which it has been engaged during the rotary step of the drum and the arm 32, under control of cam 39, moves the dog 28 through one mold pitch into a position registering with the next succeeding drum mold, the arm 29 moves the dog 28 into said mold and the arm 32 rotates the drum through one step so that the centers of the next succeeding empty mold will occupy a position in the same vertical plane as the centers of the guide rail 6, loading member 62 and jaws 61.

In the embodiment shown in FIGURES 8 to 10 the bunch supporting carrier plate 25 is associated with a gripping member consisting of a claw-shaped clamp 85. The clamp 85 is turnably mounted on a pin 92 in the slide 42' to which the plate 25 is secured and it is also connected by a pivot 93 to one end of a link 89 the other end of which is connected to the pivot 27' by means of which the slide 42' is connected to the rod 43 reciprocating the slide 42' and bunch carrier plate 25 between both the end positions of FIGURES 8 and 9, namely in the manner as described hereinbefore. The guide rail 6 is provided with a stationary abutment 94 for arresting the slide 42' so that the bunch carrier plate 25 will occupy the position shown in FIGURE 9 in front of the bunch rolling table 1.

When the slide 42' and the bunch carrier plate 25 retracted by the link 89, are arrested by the abutment 94 in their movement to the right (FIGURES 8 and 9) the rod 43 will continue its movement in the same direction until the pivot 27' abuts the right hand end 87 of the slot 88 while the plate 25 remains in the position shown in FIGURE 9 for receiving a bunch from the rolling table 1.

When the pivot 27' moves to the right in the slot 88 it will also pull the link 89 to the right so that said link will turn the clamp 85 upwards into the position shown in FIGURE 9. After a bunch has been delivered from the rolling table 1 to the supporting carrier plate 25 the rod 43 commences moving to the left from the position shown in FIGURE 9 whereby the pivot 27' will first move to the left in the slot 88 while the slide 42' and plate 25 remain immovable in their positions shown in FIGURE 9. Thereby the clamp 85 will be turned anticlockwise by the link 89 into the position relative to the plate 25 as shown

in FIGURE 8 whereby the rear end of the bunch A will be pressed against the plate **25** and be retained thereon. When the rod **43** continues its movement to the left and the pivot **27'** has engaged the left hand end **86** of the slot **88** the slide **42'** and plate **25** will be moved to the left into the position shown in FIGURE 8 while the clamp **85** holds the bunch A. As described hereinbefore the plate **25** is introduced into the narrow space between the drum **16** and the opened jaws **61** right above the uppermost mold **18** in the drum **16** whereby the bunch is introduced into the jaw gap. Thereafter the jaws **61** are closed about the bunch and the rod **43** will retract the slide **42'** and bunch carrier plate **25** to the right whereby the clamp **85** releases the bunch retained by the closed jaws **61**. Thereafter the bunch is forced down into the mold **18** registering with the jaw opening by means of the loading member **62**.

In the embodiment shown in FIGURES 11 to 13 the bunch supporting carrier plate **25'** is provided wth a suction passage **95** one end **90** of which is connected with a hose **96** leading from a suction producing pump (not shown), for example that ordinarily used to establish a suction effect in the bunch rolling table **1**. The suction passage **95** communicates with perforations **91** opening in the upper face of the plate **25'**.

In the use of the embodiment shown in FIGURES 11 to 13 the bunch A dropping from the rolling table **1** onto the supporting carrier plate **25'** is retained on said plate by the suction effect in the perforations **91** acting on the right hand end of the bunch so that the bunch will not be displaced unintentionally on the plate **25'** when being transferred to the jaws **61** in the manner as described hereinbefore. When the plate **25'** commences its retraction to the right it will, by overcoming the relatively moderate suction effect in the perforations **91**, be pulled off the bunch retained by the closed jaws **61**.

I claim:

1. In a device for transferring cigar bunches from a bunch making machine to a bunch shaping member having mold pockets, a thin bunch carrier member, a pair of relatively movable guide jaws separated from said bunch shaping member by a small interspace and being positioned stationarily above said bunch shaping member, means for moving said bunch shaping member to position said mold pockets seriatim below said guide jaws, means for closing said jaws to hold said bunch and form a guide channel, a bunch loading member, means for moving said loading member down between said jaws to introduce the bunches into said mold pockets, reciprocatory means for periodically moving said bunch carrier member from said bunch making machine into said small interspace to position a bunch resting upon said carrier member between the opened jaws above one of said mold pockets, control means operatively controlling said jaws, said loading member and said carrier member to operate in timed relationship by closing said jaws when said carrier member has reached its position above said mold pocket and moving said loading member down between the closed jaws after said carrier member has been retracted from said space between said jaws and said bunch shaping member, and a stop member adjacent said jaws to determine, the longitudinal position of the bunches between said jaws.

2. In a device for transferring cigar bunches from a bunch making machine to a bunch shaping member having mold pockets, a thin bunch carrier member, a pair of relatively movable guide jaws separated from said bunch shaping member by a small interspace and being positioned stationarily above said bunch shaping member, means for moving said bunch shaping member to position said mold pockets seriatim below said guide jaws, means for closing said jaws to form a bunch guide channel, a bunch loading member, means for moving said loading member down between said jaws to introduce the bunches into said mold pockets, reciprocatory means for

periodically moving said bunch carrier member from said bunch making machine into said small interspace to position a bunch resting upon said carrier member between the opened jaws above one of said mold pockets, control means operatively associating said jaws, said loading member and said carrier member to operate in timed relationship by closing said jaws when said carrier member has reached its position above said mold pocket and moving said loading member down between the closed jaws after said carrier member has been retracted from said space between said jaws and said bunch shaping member, and a gripping member for urging the bunches against said bunch carrier member to fix the bunches longitudinally relative to said carrier member.

3. In a device for transferring cigar bunches from a bunch making machine to a bunch shaping member having mold pockets, a thin bunch carrier member, a pair of relatively movable guide jaws separated from said bunch shaping member by a small interspace and being positioned stationarily above said bunch shaping member, means for moving said bunch shaping member to position said mold pockets seriatim below said guide jaws, means for closing said jaws to form a bunch guide channel, a bunch loading member, means for moving said loading member down between said jaws to introduce the bunches into said mold pockets, reciprocatory means for periodically moving said bunch carrier member from said bunch making machine into said small interspace to position a bunch resting upon said carrier member between the opened jaws above one of said mold pockets, control means operatively associating said jaws, said loading member and said carrier member to operate in timed relationship by closing said jaws when said carrier member has reached its position above said mold pocket and moving said loading member down between the closed jaws after said carrier member has been retracted from said space between said jaws and said bunch shaping member, a gripping member pivotally connected with said bunch carrier member, and operating means for urging said gripping member against said bunch carrier member to fix the bunches longitudinally relative to said carrier member, said operating means having a pivot interconnecting said reciprocatory means and said gripping member and being displaceable relative to said carrier member towards and from said bunch shaping member, said carrier member having two abutments for limiting the displacement of said pivot in opposite directions relative to said carrier member.

4. In a device for transferring cigar bunches from a bunch making machine to a bunch shaping member having mold pockets, a thin bunch carrier member having a slot, a pair of relatively movable guide jaws separated from said bunch shaping member by a small interspace and being positioned stationarily above said bunch shaping member, means for moving said bunch shaping member to position said mold pockets seriatim below said guide jaws, means for closing said jaws to form a bunch guide channel, a bunch loading member, means for moving said loading member down between said jaws to introduce the bunches into said mold pockets, reciprocatory means for periodically moving said bunch carrier member from said bunch making machine into said small interspace to position a bunch resting upon said carrier member between the opened jaws above one of said mold pockets, control means operatively associating said jaws, said loading member and said carrier member to operate in timed relationship by closing said jaws when said carrier member has reached its position above said mold pocket and moving said loading member down between the closed jaws after said carrier member has been retracted from said space between said jaws and said bunch shaping member, a gripping member pivotally connected to said carrier member and adapted to fix the bunches longitudinally relative to said carrier member, and operating means pivotally interconnecting said reciprocatory means

and said gripping member and comprising a link, a pivot interconnecting said gripping member and one end of said link, another pivot interconnecting the other end of said link and said reciprocatory means and extending through said slot in which it is movable transversely between the ends of said slot forming abutments for said other pivot.

5. In a device for transferring cigar bunches from a bunch making machine to a bunch shaping member having mold pockets, a thin bunch carrier member, a pair of relatively movable guide jaws separated from said bunch shaping member by a small interspace and being positioned stationarily above said bunch shaping member, means for moving said bunch shaping member to position said mold pockets seriatim below said guide jaws, means for closing said jaws to form a bunch guide channel, a bunch loading member, means for moving said loading member down between said jaws to introduce the bunches into said mold pockets, reciprocatory means for periodically moving said bunch carrier member from said bunch making machine into said small interspace to position a bunch resting upon said carrier member between the opened jaws above one of said mold pockets, control means operatively associating said jaws, said loading member and said carrier member to operate in timed relationship by closing said jaws when said carrier member has reached its position above said mold pocket and moving said loading member down between the closed jaws after said carrier member has been retracted from said space between said jaws and said bunch shaping member, and means for retaining the bunches on said carrier member by suction.

6. In a device for transferring cigar bunches from a bunch making machine to a bunch shaping member having mold pockets, a thin bunch carrier member, a pair of relatively movable guide jaws separated from said bunch shaping member by a small interspace and being positioned stationarily above said bunch shaping member, means for moving said bunch shaping member to position said mold pockets seriatim below said guide jaws, means for closing said jaws to form a bunch guide channel, a bunch loading member, means for moving said loading member down between said jaws to introduce the bunches into said mold pockets, reciprocatory means for periodically moving said bunch carrier member from said bunch making machine into said small interspace to position a bunch resting upon said carrier member between the opened jaws above one of said mold pockets, control means operatively associating said jaws, said loading member and said carrier member to operate in timed relationship by closing said jaws when said carrier member has reached its position above said mold pocket and moving said loading member down between the closed jaws after said carrier member has been retracted from said space between said jaws and said bunch shaping member, and suction means, said bunch carrier having openings communicating with said suction means for retaining the bunches on said carrier by suction.

7. In a device for transferring cigar bunches from a bunch making machine to a bunch shaping member having mold pockets, a thin bunch carrier member, a pair of stationarily disposed relatively movable guide jaws separated from said bunch shaping member by a small interspace, means for moving said bunch shaping member, to position said mold pockets seriatim below said stationarily disposed guide jaws, a bunch loading member, reciprocatory means for first moving said bunch carrier member from said bunch making machine into said small interspace to position a bunch resting upon said carrier member between the jaws above one of said mold pockets, means for then closing said jaws about the bunch, means for then retracting said carrier member from said space between said jaws and said bunch shaping member, and means for then moving said loading member down between the jaws to introduce the bunch into said mold pocket.

8. In a device for transferring cigar bunches from a bunch making machine to a bunch shaping member having mold pockets, a slide, a guide for said slide extending between said machine and said member, a thin bunch carrier member secured to and projecting beyond the leading end of said slide, a pair of stationarily disposed relatively movable guide jaws separated from said bunch shaping member by a small interspace, means for moving said bunch shaping member to position said mold pockets seriatim below said stationarily disposed guide jaws, a bunch loading member, reciprocatory means for first moving said bunch carrier member from said bunch making machine into said small interspace to position a bunch resting upon said carrier member between the jaws above one of said mold pockets, means for then closing said jaws about the bunch, means for then retracting said carrier member from said space between said jaws and said bunch shaping member, and means for then moving said loading member down between the jaws to introduce the bunch into said mold pocket.

9. In a device for transferring cigar bunches from a bunch making machine to a bunch shaping member having mold pockets, a guide having guide grooves extending between said machine and said member, a thin bunch carrier member consisting of a plate and having lateral edges slidable in said guide grooves, a pair of relatively movable guide jaws separated from said bunch shaping member by a small interspace, means for moving said bunch shaping member to position said mold pockets seriatim below said guide jaws, a bunch loading member, reciprocatory means for first moving said bunch carrier member from said bunch making machine into said small interspace to position a bunch resting upon said carrier member between the jaws above one of said mold pockets, means for then closing said jaws about the bunch, means for then retracting said carrier member from said space between said jaws and said bunch shaping member, and means for then moving said loading member down between the jaws to introduce the bunch into said mold pocket.

10. In a device for transferring cigar bunches from a bunch making machine to a bunch shaping member having mold pockets, a thin bunch carrier member, a pair of stationarily disposed relatively movable guide jaws separated from said bunch shaping member by a small interspace, means for moving said bunch shaping member to position said mold pockets seriatim below said stationarily disposed guide jaws, a bunch loading member, reciprocatory means for first moving said bunch carrier member from said bunch making machine into said small interspace to position a bunch resting upon said carrier member between the jaws above one of said mold pockets, means for then closing said jaws about the bunch, means for then retracting said carrier member from said space between said jaws and said bunch shaping member, and means for then moving said loading member down between the jaws to introduce the bunch into said mold pocket, said bunch carrier member being pivotally connected to said reciprocatory means.

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