April 1, 1941. J. L. GILLIAN ET AL 2,237,099

PARTITION ASSEMBLING MACHINE

Filed Feb. 9, 1940 6 Sheets-Sheet 1

Fig. 1.

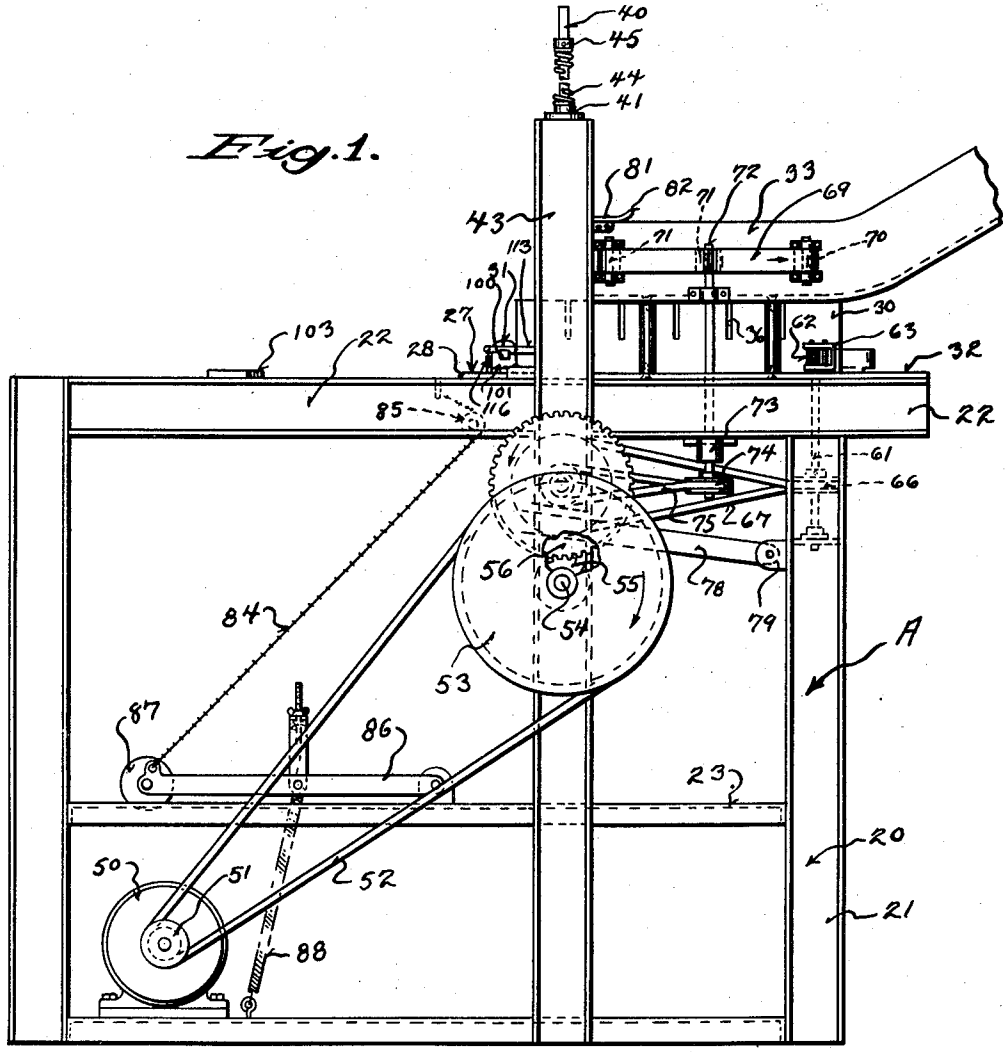
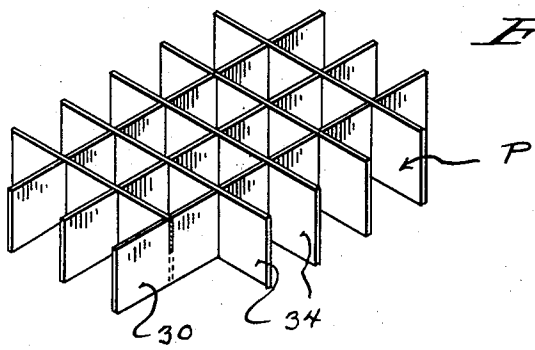


Fig. 13.



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PARTITION ASSEMBLING MACHINE

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Fig. 2.

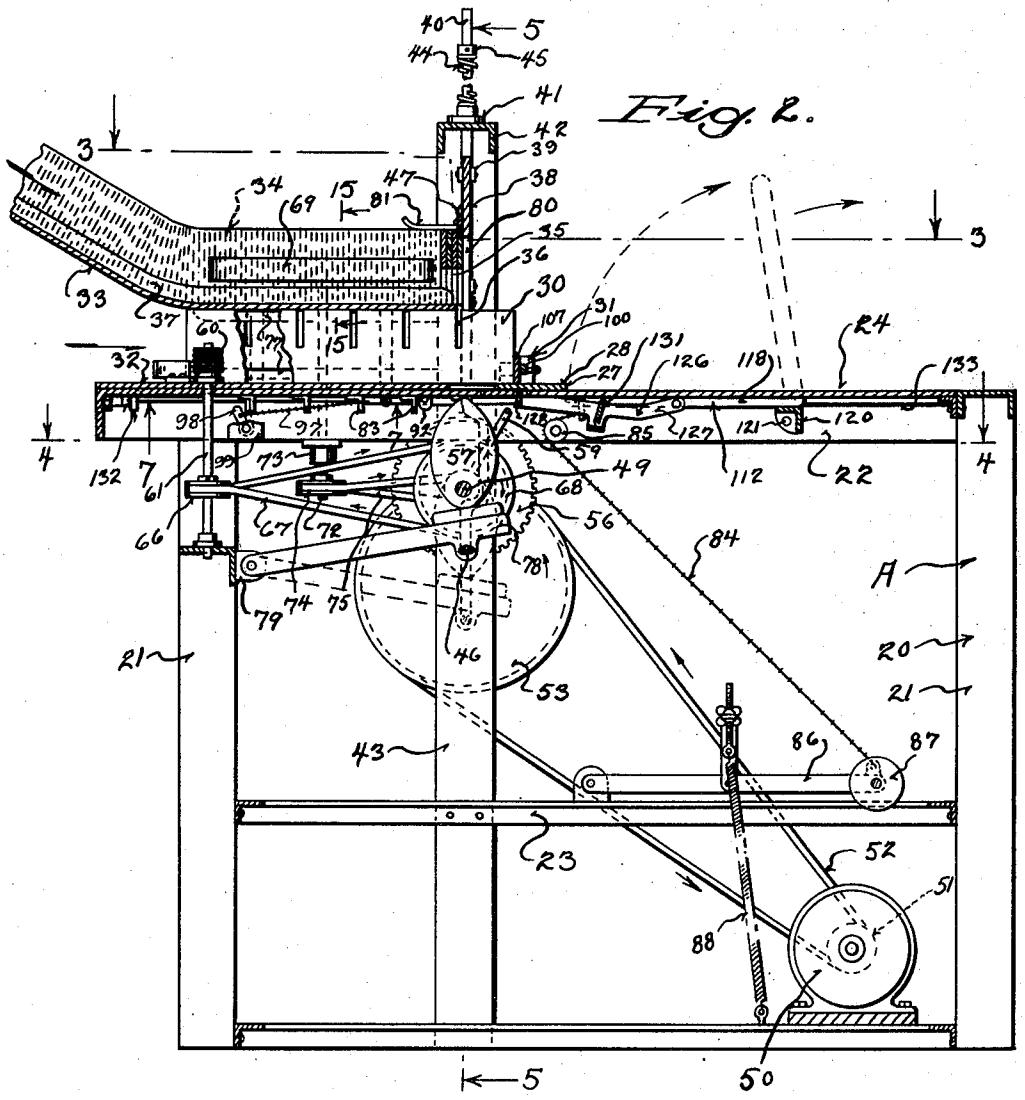
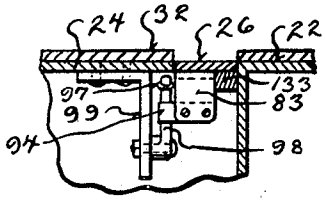


Fig. 14.



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PARTITION ASSEMBLING MACHINE

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Fig. 3.

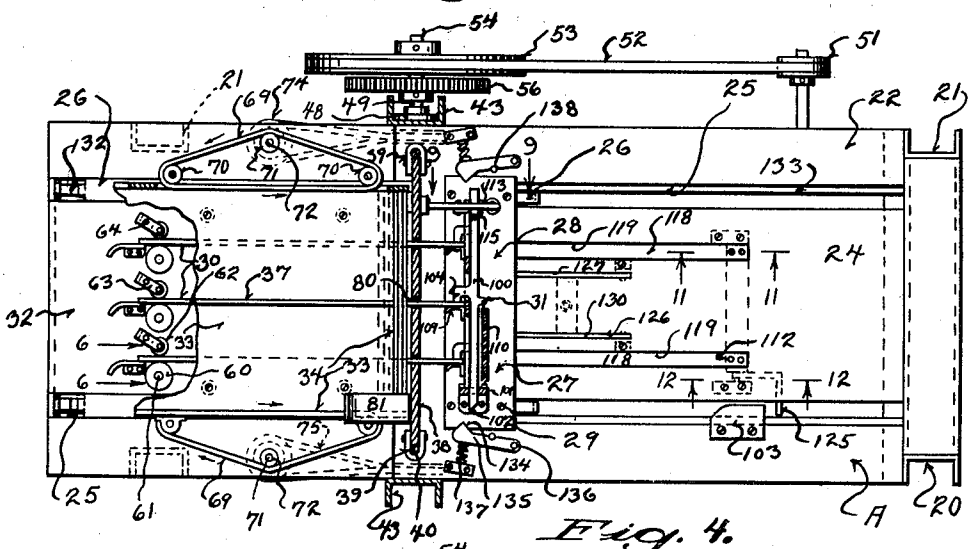


Fig. 4.

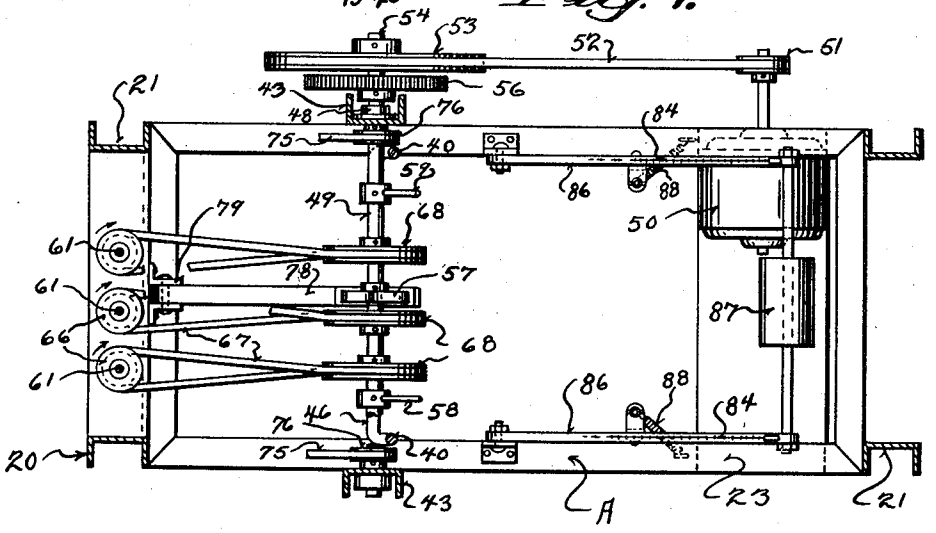
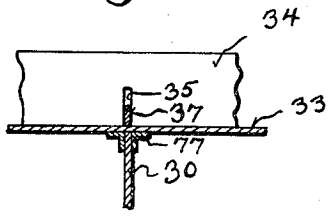


Fig. 15.



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PARTITION ASSEMBLING MACHINE

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Fig. 5.

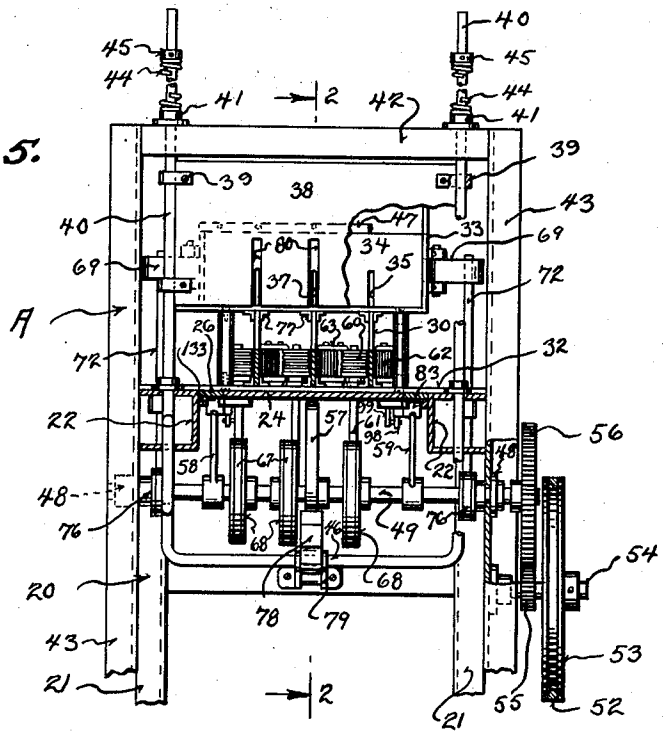
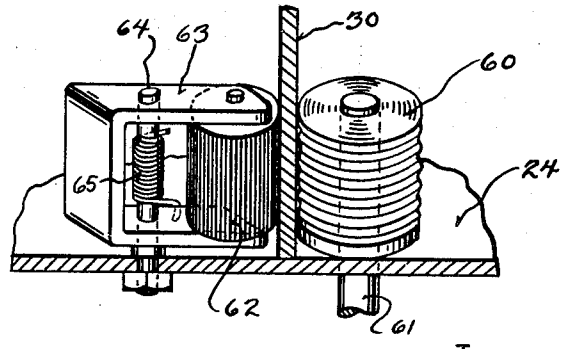


Fig. 6.



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PARTITION ASSEMBLING MACHINE

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Fig. 7.

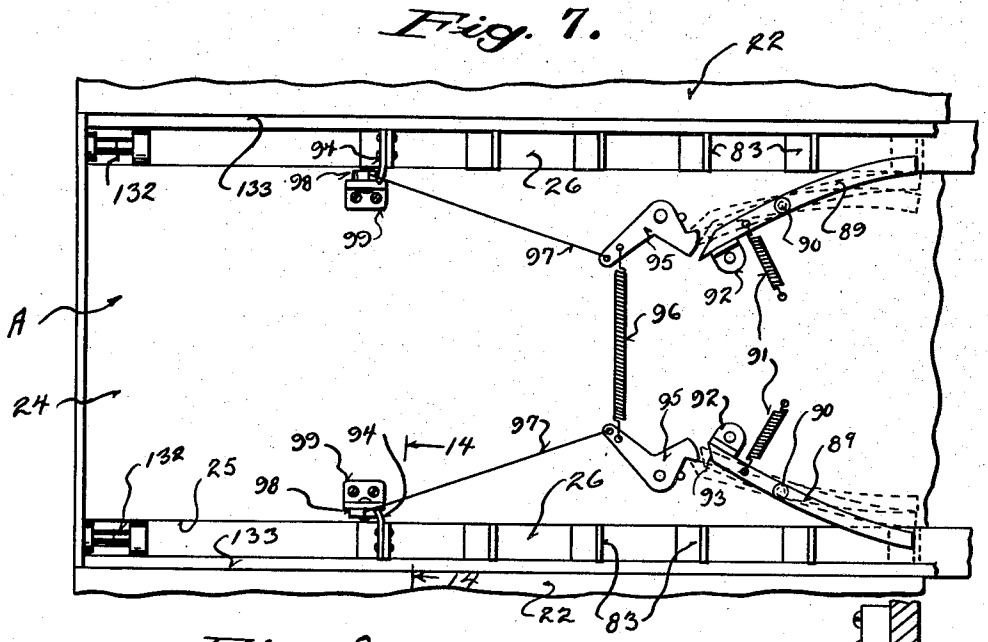


Fig. 8.

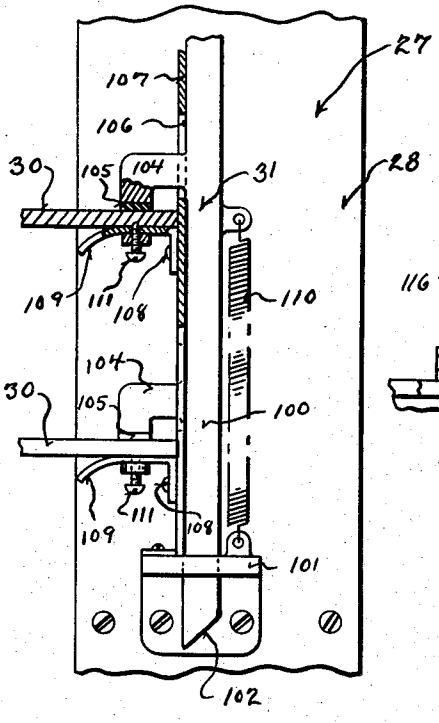
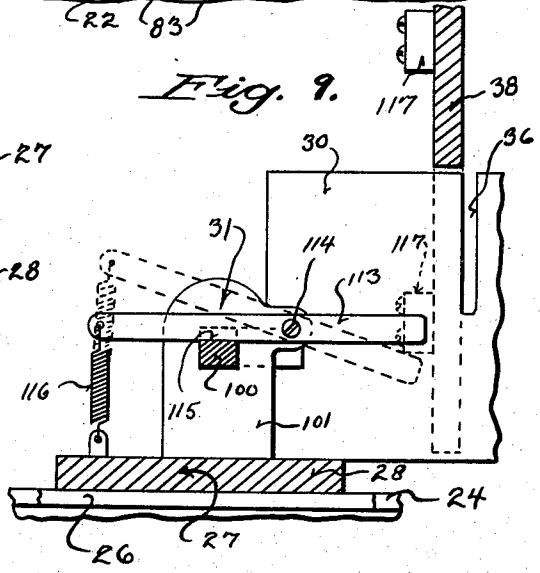


Fig. 9.



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PARTITION ASSEMBLING MACHINE

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Fig. 10.

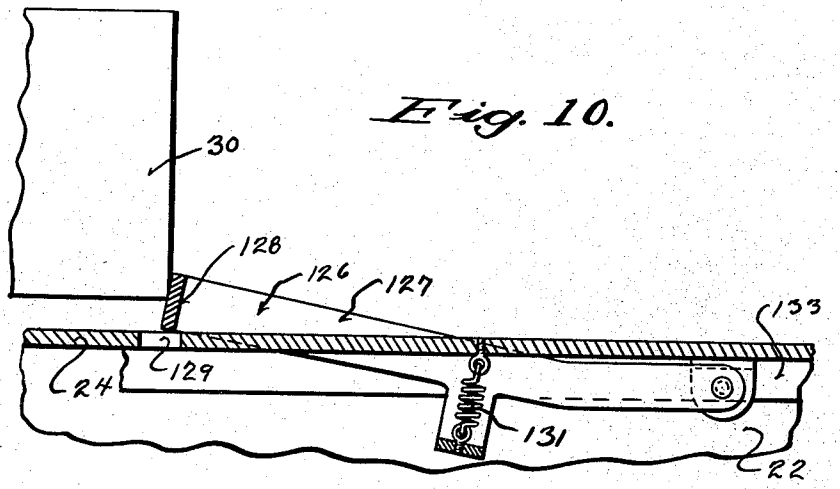


Fig. 11.

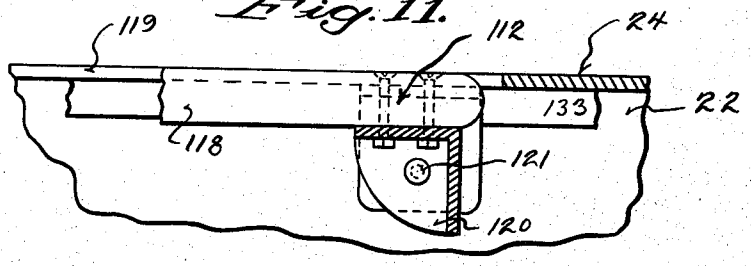
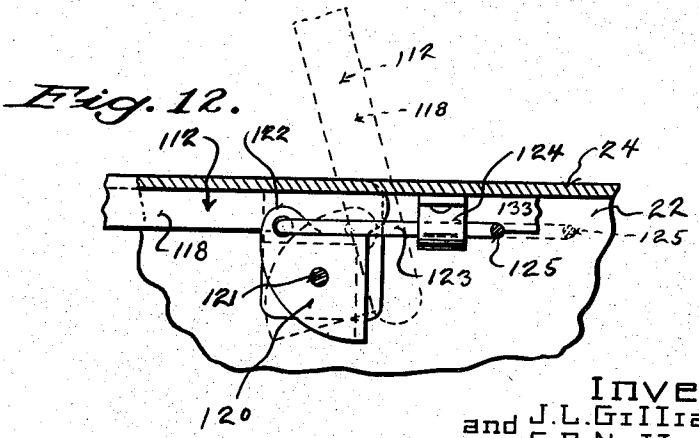


Fig. 12.



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Patented Apr. 1, 1941

2,237,099

UNITED STATES PATENT OFFICE

2,237,099

PARTITION ASSEMBLING MACHINE

Joseph Louis Gillian and Carl Daniel Nellis,
Milwaukee, Wis.

Application February 9, 1940, Serial No. 318,110

28 Claims. (Cl. 93—38)

This invention appertains to the assembling of partitions for use in bottle crates, egg cartons, and the like.

Such partitions consist of longitudinal and transverse cardboard strips having their opposite edges notched or slotted at equidistantly spaced points for the interfitting and connection of the strips to form the partitions of the bottle or egg cells. The longitudinal and transverse strips are assembled by hand, and such assembling is a laborious, expensive, and time-consuming operation.

Therefore, one of the primary objects of the invention is the provision of a machine for automatically assembling the partitions, whereby to reduce the time and cost of the assembling operation.

Another salient object of the invention is the provision of an automatic partition assembly machine embodying means for receiving the longitudinal and transverse strips and for advancing the longitudinal strips in a step-by-step motion and for delivering and connecting one transverse strip to the longitudinal strips on each step thereof.

Another important object of the invention is the provision of novel means for detachably locking the longitudinal strips to the carriage, whereby the strips will be properly advanced as the carriage moves forwardly in its step-by-step movement.

A further object of the invention is to provide means for automatically releasing the longitudinal strips after the complete advancement of the strips and for automatically returning the carriage to its initial position for receiving additional longitudinal strips to form a new partition.

A further important object of the invention is the provision of means for automatically removing a formed partition from the carriage at the moment of the release of the longitudinal strips therefrom and just prior to the return of the carriage to its initial starting position.

Another further object of the invention is the provision of automatic stop means for movement in the path of the longitudinal strips and upon the ejecting of a formed partition, whereby to prevent feeding of the longitudinal strips until the return of the carriage to its strip-receiving position.

A further important object of the invention is the provision of novel means for properly holding the longitudinal strips in alinement and for automatically advancing the strips to the carriage, with means for holding and guiding the transverse strips centralized relative to the longitudinal strips, whereby to insure the proper mating of the slots of the transverse and longitudinal strips upon downward movement of the transverse strip.

A still further object of the invention is the provision of a reciprocating head for stripping one transverse strip at a time from the magazine or hopper for the transverse strips in proper timed relation to the advance of the longitudinal strips, so as to insure the accurate connection of the transverse and longitudinal strips.

A still further important object of the invention is the provision of novel means for driving all of the operative parts from a single drive shaft, whereby all of said operative parts will operate in proper timed relation relative to one another.

A still further object of the invention is to provide an automatic partition assembling machine of the above character, which will be durable and efficient in use, one that will be simple and easy to manufacture, and one which can be placed upon the market at a reasonable cost.

With these and other objects in view, the invention consists in the novel construction, arrangement, and formation of parts, as will be hereinafter more specifically described, claimed, and illustrated in the accompanying drawings, in which drawings:

Figure 1 is a side elevational view of the automatic partition assembling machine.

Figure 2 is a longitudinal sectional view through the machine, taken on the line 2—2 of Figure 5, looking in the direction of the arrows.

Figure 3 is a horizontal sectional view through the machine, taken on the line 3—3 of Figure 2, looking in the direction of the arrows, the view showing the assembly table in top plan.

Figure 4 is a horizontal sectional view taken on the line 4—4 of Figure 2, looking in the direction of the arrows, showing the main operating and timing shaft.

Figure 5 is a transverse sectional view through the machine, taken on the line 5—5 of Figure 2, looking in the direction of the arrows, illustrating the means for feeding the longitudinal strips to the advancing carriage and the head for delivering the transverse strips to the longitudinal strips.

Figure 6 is an enlarged, fragmentary, detail, transverse, sectional view illustrating the feeding and guiding means for one of the longitudinal strips, the view being taken substantially on the

line 6—6 of Figure 3, looking in the direction of the arrows.

Figure 7 is a fragmentary, horizontal, sectional view taken on the line 7—7 of Figure 2, looking in the direction of the arrows, and showing the assembly table in bottom plan and the automatic locking mechanism for the advancing carriage for the longitudinal strips, the view being on a larger scale than Figure 2.

Figure 8 is an enlarged, fragmentary, detail, horizontal, sectional view showing the releasable locking means for detachably connecting the longitudinal strips to the carriage.

Figure 9 is an enlarged, fragmentary, detail, sectional view taken on the line 9—9 of Figure 3, looking in the direction of the arrows, illustrating a part of the releasable locking means for the longitudinal strips.

Figure 10 is an enlarged, detail, fragmentary, longitudinal, sectional view showing the stop mechanism for limiting the forward movement of the longitudinal strips during the return of the carriage to its initial strip-receiving position.

Figure 11 is an enlarged, fragmentary, longitudinal, sectional view taken on the line 11—11 of Figure 3, looking in the direction of the arrows, showing a fragment of the ejecting mechanism for a formed partition.

Figure 12 is a fragmentary, longitudinal, sectional view taken on the line 12—12 of Figure 3, looking in the direction of the arrows, showing another part of the ejecting mechanism for a formed partition.

Figure 13 is a detail, perspective view of a formed or assembled partition.

Figure 14 is an enlarged, fragmentary, transverse, sectional view taken on the line 14—14 of Figure 7, looking in the direction of the arrows, showing a part of the means utilized for automatically releasing the carriage holding means upon return of the carriage to its initial position, the view further illustrating the arrangement of the assembling table and a guide track for the carriage.

Figure 15 is a fragmentary, transverse, sectional view through the hopper or magazine for the transverse strips, taken on the line 15—15 of Figure 2, showing the means for centering the transverse strips relative to the longitudinal strips.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter A generally indicates the novel automatic partition assembling machine, and the same includes a base frame 20, which can be of any desired or preferred construction.

As shown, the base frame 20 includes corner standards or legs 21 preferably formed from channel iron. The upper ends of the corner standards 21 can be connected together by longitudinally extending top rails 22, which can also be formed from channel iron. The standards can also be connected together and braced in any other preferred manner, such as by transverse and longitudinal angle irons 23. The longitudinally extending top rails 22 support the assembly table 24, which can be in the nature of a flat metal plate. The longitudinal edges of the assembly table 24 are preferably spaced from the top rails 22 to form guide slots 25 on each side of the frame of the machine for slidably receiving the longitudinal bars 26 of the reciprocatory carriage 27. The carriage also includes a cross plate 28, which is rigidly connected to the forward ends of the spaced longitudinal bars 26 of the carriage by suitable fastening elements, such as screws 29. The cross plate 28 lies flat on the assembly table 24 and moves over the assembly table, as will be further described.

The carriage is employed for the purpose of advancing the longitudinal strips 30 of the partitions in a step-by-step manner, as will also be later described, and means 31 is provided for detachably locking the strips 30 to the cross plate 28 of the carriage 27.

The longitudinal strips 30 are adapted to partially extend over the cross plate 28, and, hence, a filler plate 32 is secured to the top of the assembly table 24 in rear of the cross plate 28, so that the longitudinal strips will be held in a slightly raised position above the assembly table, whereby the forward ends of the longitudinal strips will ride easily onto the cross plate.

Above the filler plate 32 is arranged a hopper or magazine 33 for receiving a plurality of packed transverse strips 34 for the partitions. The lower edges of these transverse strips are notched or slotted, as at 35, at equidistantly spaced points for receiving the longitudinal strips 30, and the upper edges of the longitudinal strips are equidistantly notched or slotted, as at 36, for receiving the transverse strips. The longitudinal strips are fed in the machine on top of the filler plate 32 and below the hopper 33, and the lower wall of the hopper 33 forms a top guide for the longitudinal strips and prevents the longitudinal strips from riding up. A blade 37 extends longitudinally and centrally of the magazine 33, and the center slots of the transverse partitions 34 receive the blade, and, hence, the blade holds the transverse partitions in proper alinement and centralizes the transverse partitions relative to the longitudinal strips and prevents the transverse strips from moving forward at an angle.

As the longitudinal strips 30 are moved forwardly step by step, the slots 36 are advanced row by row just forwardly of the bottom wall of the magazine 33. As a row of slots 33 is advanced to the front of the lower wall of the hopper, the carriage movement stops, and a stripper head 38 is employed for automatically taking the front transverse strip from the magazine and moving the same downwardly into assembled relation with the longitudinal strips 30. The stripper head 38 reciprocates in a vertical plane transversely of the assembly table and is secured by clips or the like 39 to slide rods 40. These slide rods 40 extend through slide bearings 41 carried by a cross bar 42. The cross bar 42 is arranged above the assembly table and has its ends firmly secured to a pair of spaced upright standards 43, which are, in turn, secured to the frame 20 of the machine, and these standards 43 can form a part of the frame of the machine. The stripper head 38 is normally held in a raised position by means of expansion springs 44 coiled around the upper ends of the guide rods 40. As shown in Figures 1, 2, and 5, the springs 44 are confined between the cross bar 42 and the collars 45 secured to the guide rods 40. The lower ends of the guide rods 40 are connected together by a transverse rod 46, which can be formed integral with the guide rods, if such should be desired. The rear face of the stripper head 38 carries a stripper blade 47, which is the exact thickness or of slightly less thickness than the transverse strips 34.

The standards 43 carry suitable bearings 48 for the main drive shaft 49, which extends trans-

versely across the machine below the assembly table 24. An electric drive motor 50 is employed for driving the machine, and any preferred drive mechanism can be employed between the motor and the drive shaft. As illustrated, the armature shaft of the drive motor has secured thereto a relatively small pulley wheel 51 around which is trained a drive belt 52. This drive belt 52 is also trained about a relatively large drive pulley 53, which is keyed or otherwise secured to a stub shaft 54. The stub shaft 54 is mounted in a suitable bearing carried by the frame, and the shaft or pulley wheel 53 has connected therewith a drive pinion 55, which meshes with a drive gear 56 keyed or otherwise secured to the main drive shaft 49.

The main drive shaft 49 carries a timing cam 57 for automatically operating the stripper head 38, and wiper arms 58 and 59 for automatically advancing the carriage 27. This operative connection will be more specifically described.

As illustrated in Figure 13, a partition (generally indicated by the reference character P) includes three equidistantly spaced longitudinal strips 30 and a number, say five, of transverse strips 34. Hence, means is provided for simultaneously receiving, guiding, and feeding three of the longitudinal strips to the carriage. This means can consist of equidistantly spaced feed rollers 60. These rollers are preferably ribbed or otherwise roughened and are three in number and are keyed to three spaced driven shafts 61. These drive rollers 60 engage one side of each longitudinal strip 34, and the other sides of the strips 34 are engaged and normally urged toward the roller 60 by idle rollers 62. These idle rollers 62 can also be milled or otherwise serrated, and each idle roller is carried by a frame 63 mounted for swinging movement upon a supporting shaft 64. Springs 65 are employed for urging the frames in one direction and the rollers 62 toward the strips. The shafts 61 are mounted in suitable bearings on the frame 20, and each shaft carries a pulley wheel 66 around which is trained a drive belt 67. The drive belts 67 extend toward the main drive shaft 49, and these belts are trained over spaced guide pulleys 68 secured to the main shaft 49.

The transverse strips 34 are also automatically urged and fed toward the stripper head 38, and this means can consist of endless friction belts 69 arranged on opposite sides of the magazine 33. The side walls of the magazine are slotted for receiving runs of the friction belts 69. The ends of the belts 69 are trained over idle rollers 70 rotatably carried by the sides of the magazine, and an intermediate portion of each belt is engaged by a drive pulley 71. These drive pulleys 71 are rigidly secured to vertical shafts 72, which are mounted in bearings 73 carried by the frame of the machine. The lower ends of the shaft 72 have keyed or otherwise secured thereto drive pulley wheels 74, around which are trained pulley belts 75. The pulley belts 75 are, in turn, trained about pulley wheels 76 keyed or otherwise secured to the main drive shaft 49.

In actual practice, a stack of the transverse strips 34 is placed in the magazine 33, and an operator feeds the longitudinal strips 30 by hand between the feed roller 60 and the idle roller 62. The feed rollers carry the strips 30 forwardly, and the lower face of the bottom wall of the magazine carries spaced guide tracks 77 between which the upper edges of the longitudinal strips are received.

In order to properly reciprocate the stripper head 38, the timing cam 57 operates against a lever 78 pivotally mounted at its rear end on a bracket 79 carried by the frame of the machine. The forward end of the swinging lever 78 is connected by a slotted lug with the cross bar 46 of the guide rods 40. Hence, as the timing cam 57 moves downwardly, the lever 78 will be swung down, and the lever will carry the guide rods 46 therewith and the stripper head. The stripper head 38 extends in front of the magazine 33 at all times, and the lower edge of the head is slotted, as at 80, so as to receive the longitudinal strips 30. This allows the proper riding down of the stripper head. The blade 47 carried by the rear face of the stripper head carries one transverse strip with the head. The transverse strips are held down in the magazine by top stationary guide shoes 81, which can be secured to the sides of the magazine 33. The guide shoes 81 have their forward ends curved upwardly, as at 82, and the guide shoes function to push down any strips which may tend to ride up. Hence, the transverse strips are held in proper place during the reciprocation of the stripper head 38.

Referring specifically to the carriage 27, it is to be noted that the side bars 26 thereof have their lower surfaces provided at spaced points with depending strike plates or angle brackets 83. These strike plates or angle brackets 83 are in transverse alinement and are adapted to be engaged by the wiper arms 59 for advancing the carriage 27 one space, or the distance between the slots 36 on each revolution of the shaft 49.

The carriage is normally urged back toward its initial starting position by pull cables 84, which are secured at their upper ends to the forward end of the carriage. An intermediate part of each cable is trained over a guide pulley 85, and the lower ends of the cables are attached to a swinging frame 86. This frame has its outer end provided with a weight 87 for normally exerting a downward pull on the cables. In order to further add the desired pull on the cables, contractile coil springs 88 can be connected to the swinging frame 86 and the frame 20 of the machine. The tension of the springs 88 can be adjusted in any preferred manner.

Upon the advancing of the carriage in its step-by-step movement against the pull of the cables 84, the carriage is held against retrograde movement by spring-pressed dogs 89. These dogs are rockably mounted intermediate their ends on pivot pins 90 carried by the lower surface of the assembly table, and the dogs in rear of the pins have connected thereto contractile coil springs 91. These springs 91 are also connected to the assembly table and tend to pull the inner ends of the dogs toward one another and the outer ends of the dogs toward the side bars 26 of the carriage 27.

Stops 92 can be carried by the assembly table and arranged in the path of the inner ends of the dogs for limiting the inward swinging movement thereof, and the dogs have their inner ends tapered or inclined, as at 93. The dogs are urged in the path of the strike plates or angle brackets 83, and as the carriage is moved forward one step, the plates push in on the outer ends of the dogs, and as a pair of the angle brackets 83 rides past the dogs, the dogs will snap outwardly and engage in rear of the angle brackets and prevent the return of the carriage. When the carriage reaches its full forward position, cams 94 carried by the side bars 27 will engage the

outer ends of the dogs and swing the same inwardly entirely beyond the inner edges of the side bars. This movement carries the dogs beyond their normal operating position, and the inner inclined ends 93 thereof will ride against and wipe past spring-pressed latches 95.

The latches 95 act to hold the dogs 89 away from the side bars of the carriage, so that the carriage can return back to full starting position. The inner ends of the latches 95 are connected by a coil spring 96, which normally urges the latches into their dog-holding position. The inner ends of the latches also have connected thereto pull cables 97, which are connected to swinging levers 98. These levers 98 are hingedly connected to brackets 99, which depend from the assembly table 24 of the machine.

When the carriage returns to its normal position, the cams 94 will strike the levers 98 and pull the levers back. This rearward movement of the levers will pull on the cables 97 and swing the latches 95 out of engagement with the dogs 89. This allows the dogs 89, under the influence of their springs 91, to again return to their normal operative position for engaging the depending angle brackets 83 of the carriage.

The means 31 for detachably locking the longitudinal strips 30 to the carriage 27 embodies a reciprocatory bolt 100 movable in guides 101. One end of the bolt is provided with a tapered cam face 102 for cooperation with a stationary release cam plate 103 mounted upon the frame of the machine adjacent the outer end thereof. The sliding bolt 100 carries right-angularly extending gripping jaws 104 on its outer face, and these gripping jaws can be provided with friction pads 105 for engaging the strips. These jaws 104 extend through guide slots 106 formed in the upright stop plate 107 secured to the upper face of the cross plate 28 of the carriage. The strips 30 are adapted to abut against the stop plate 107, and this stop plate can carry stationary guides or jaws 108. The outer ends of the guides or rigid jaws 108 are flared outwardly, as at 109, so as to guide the strips 30 in position, and the jaws 104 are adapted to urge the strips into firm contact with the rigid jaws 108.

A contractile coil spring 110 is connected with the bolt 100 and one of the guide brackets 101. Hence, the bolt is normally urged in one direction with the jaws 104 into gripping contact with the strips. If preferred, the rigid jaws and guides 108 can carry adjustable pointed screws 111, so as to provide means for biting into the longitudinal strips 30 and, thus, insure the proper holding thereof during the step-by-step advancing of the carriage 27.

When the carriage reaches its complete forward position, the inclined cam face 102 of the bolt will engage the cam shoe or plate 103, and the bolt will be moved to the right (see Figures 3 and 8) against the tension of its coil spring 110, and, hence, the longitudinal strips 30 will be released so as to permit the ejecting of a formed or assembled partition P by the ejecting mechanism 112, which will be later described.

During the return of the carriage to its initial position, it is desirable and essential that the bolt 31 be held in its released position against the tension of the spring 110, so that the strips 30 will be permitted to ride on the cross plate 28 into engagement with the stop plate 107 and the guide and rigid jaws 108. The means for holding the bolt 100 in its retracted released position consists of a latch lever 113 rockably mounted intermediate its ends on a pivot pin 114 carried by one of the guides 101. The bolt 100 has formed therein a keeper groove 115, which is adapted to aline with the swinging latch lever 113 when the bolt is in its released position. A spring 116 is employed for normally urging the swinging latch into contact with the bolt, and, hence, when the bolt moves to its released position, the latch will spring into the keeper slot or groove 115 and hold the bolt against return movement. When the carriage reaches its initial position and the stripper head 38 moves downwardly for bringing a transverse strip into position, the latch 113 will be swung on its pivot 114 out of the keeper groove by the operating lug 117 carried by the outer face of the stripper head 38. Thus, as the first transverse strip 34 is brought into position, the latch lever 113 will be actuated, and the bolt 100 will return to its normal position for permitting the gripping of the longitudinal strips 30. Hence, upon the first step movement of the carriage, the longitudinal strips 30 will be locked therewith and drawn along thereby.

Upon the movement of the bolt 100 to its released position by the cam plate or shoe 103 upon the completion of a partition P and just prior to the return of the carriage to its normal position, the assembled or formed partition P is ejected from the assembly table and carriage by the ejecting mechanism 112.

The ejecting mechanism 112 includes a pair of swinging ejecting arms 118, which move through a pair of spaced, parallel, longitudinal slots 119 formed in the work table 24. The rear ends of the ejecting arms 118 are rigidly secured to a common cross shaft or head 120. This cross shaft or head 120 carries pintles 121 at its ends, which are rockably mounted in bearings carried by the frame of the machine. As best shown in Figures 11 and 12, the cross shaft or head 120 is of an angle shape in cross section, and the upper inner end of the head or shaft has formed thereon an apertured ear 122, which pivotally receives a slide rod 123. The slide rod 123 is guided in its movement by a depending guide bracket 124 secured to the lower face of the assembly table 24. The outer forward end of the slide rod 123 has formed thereon a right-angularly extending, laterally disposed strike arm 125. This strike arm 125 is arranged slightly beyond the cam plate or shoe 103 employed for operating the bolt 100, and the strike arm is arranged in one of the slots or guide grooves 25 for the side bars 26 of the carriage 27.

Thus, as the carriage moves forwardly and the bolt 100 is moved to its released position by the cam shoe or plate 103, the forward end of one of the rails 26 of the carriage will forcibly strike the strike arm 125, which will pull back on the slide rod 123 and rock the cross shaft or head 120. This movement will swing up the ejecting arms 118, and, thus, the arms will carry a completed partition P off the assembly table. The weight of the ejecting arms 118 will return all parts of the ejecting mechanism immediately to their normal positions upon retrograde movement of the carriage.

Upon the ejecting of a formed partition P and upon the return of the carriage to its initial position, the longitudinal strips 30 being advanced by the feed rollers 60 might inadvertently be carried to a too far advanced position, so that upon the downward movement of the stripper head a transverse strip would not properly register with the first slots 36 in the longitudinal strips 30.

To prevent this condition, a U-shaped yoke 126 is provided.

This U-shaped yoke 126 includes spaced, parallel arms 127 and a front cross piece 128, which is adapted to move through a transverse slot 129 formed in the assembly table 24 when the cross plate 28 of the carriage 27 moves forwardly. Likewise, the work table 24 is provided with spaced parallel slots 130 to allow movement of the arms 127 of the yoke through the table when the cross piece 128 extends up through the transverse slot 129. The cross piece 128 is normally urged up through the slot 129 above the upper surface of the table by a contractile coil spring 131, which is connected respectively to the assembly table 24 and the yoke. As best shown in Figure 10, when the carriage 27 with the formed partition rides past the yoke 126 and a formed partition has been ejected, the cross piece 128 of the yoke will be immediately raised by its spring 131 in the path of the longitudinal strips 30, and, hence, the strips will be held against further forward movement, and the strips will be held in proper alinement until the return of the carriage. Upon the return of the carriage, the cross plate 28 thereof will push down on the arms 127 of the yoke 126, and, thus, the yoke will be returned to its normal position, and the plate 28 will ride under the forward ends of the strips 30 until the stop plate 107 engages the front edges of the strips.

As the carriage 27 is rather forcibly returned to its normal position by the pull chains 84 and the swinging arms 86 with its weight 87 and spring 88, means is provided for absorbing shock of the return of the carriage and to reduce any consequent noise. Thus, dashpots or rubber or other bumpers 132 are carried by the frame of the machine, and these bumpers are disposed in the path of the side bars 26 of the carriage. The bumpers can be of any desired character.

As the side bars 26 of the carriage 27 strike the bumpers 132, the carriage may have a tendency to move back and forth before coming to a rest. To eliminate this, the cross plate 28 of the carriage can have its side edges provided with keeper notches 134 into which are adapted to spring temporary holding dogs 135. These dogs are rockably mounted at their forward ends on pivot pins 136 carried by the side rails 22 of the frame. The inner ends of the dogs are urged toward the cross plate 28 by expansion springs 137. Inward movement of the dogs is limited by stop pins 138. When the cross plate 28 returns to its normal position, the dogs 135 will immediately snap into the keeper notches 134 and hold the cross plate against movement. As the teeth of the dogs are of a V-shape, the dogs will be readily forced out of the keeper notches 134 as the carriage is forcibly advanced in its step-by-step movement.

As brought out in the first part of the specification, the side bars 26 of the carriage 27 slide back and forth in the guide slots or ways 25 formed between the work table 24 and the U-shaped side rails 22. In order to support and guide the bars 26, the frame carries longitudinally extending guide tracks 133, which engage the lower surface of the side bars 26 of the carriage. As best shown in Figure 7, the angle lugs 83 carried by the side bars engage the inner faces of the guide tracks 133, so as to prevent side movement of the carriage.

Briefly, the operation of the machine is as follows. The stack of transverse strips 34 is forced at all times toward the stripper head 38 by the feed belts 69, and operators constantly feed the longitudinal strips 30 between the feed rollers 60 and the idle rollers 62, and these feed rollers function to continuously urge the longitudinal strips forwardly. The front ends of the strips 30 are locked on the carriage by the bolt 100, and the carriage is advanced in a step-by-step movement by the wiper arms 59 on the main shaft 49. As the carriage advances and comes to a stop, the cam 57 moves down against the swinging lever 78, which, in turn, brings down the slide and guide rods 40 carrying the head 38 to a lower position. The stripper blade 47 thereon takes one transverse strip 34 from the magazine and carries the same into its assembled position on the longitudinal strips 30. This movement continues until the partition is completely formed and the longitudinal strips 30 thereof have ridden beyond the stripper head 38 and the forward end of the magazine or hopper 33.

At this time, the bolt 100 is released and immediately the ejecting arms 118 of the ejector 112 carry the formed partition P off the assembly table. As the formed partition is moved off the assembly table, the trip arms 94 carried by the side bars 26 of the carriage engage the holding dogs 89 and move the same out of the path of the angle lugs 83. Hence, the carriage returns immediately to its normal position under the influence of the pull cables 84 and the swinging frame 86 with its weight 87 and its spring 88.

As soon as the carriage returns to its normal position, the trip cams 94 then engage the levers 98, and the swinging movement of the levers operate the catches 95, so as to release the dogs 89, whereby the same can again perform their function of holding the carriage against its return movement as the same is advanced in its step-by-step movement.

From the foregoing description it can be seen that we have provided an exceptionally simple and durable machine which will effectively bring about the assembling of the transverse strips with longitudinal strips of a partition, whereby to effectively form complete partitions for use in bottle crates, egg crates, and the like.

Changes in details may be made without departing from the spirit or the scope of the invention, but what we claim as new is:

1. A partition assembling machine comprising, an assembly table, a carriage movable in a step-by-step movement over the table, means for momentarily holding the carriage against movement on each step thereof, means for detachably connecting longitudinal partition strips to the carriage, means for supporting a pack of transverse strips above the carriage and table, and means for stripping one strip at a time from said pack and delivering the same to the longitudinal strips upon each step movement of the carriage and while the carriage and longitudinal strips are held stationary.

2. A partition assembling machine comprising, an assembly table, a carriage reciprocally mounted on the assembly table, means for intermittently moving the carriage in one direction over the table in a step-by-step movement, means for detachably securing longitudinal strips thereto in spaced upright position, means for feeding transverse strips to the longitudinal strips on each step movement of the carriage, and means for releasing the longitudinal strips from the carriage after the carriage has reached its limit of movement in

one direction and after the completion of the assembly of a partition unit.

3. A partition assembling machine comprising, an assembly table, a carriage reciprocally mounted on the assembly table, means for intermittently moving the carriage in one direction over the table in a step-by-step movement, means for detachably securing longitudinal strips thereto in spaced upright position, means for feeding transverse strips to the longitudinal strips on each step movement of the carriage, means for releasing the longitudinal strips from the carriage after the carriage has reached its limit of movement in one direction and after the completion of a partition, and means for ejecting a completed partition from the carriage after the release of the longitudinal strips from the carriage.

4. A partition assembling machine comprising, an assembly table, a carriage reciprocally mounted on the assembly table, means for intermittently moving the carriage in one direction over the table in a step-by-step movement, means for detachably securing longitudinal strips thereto in spaced upright position, means for feeding transverse strips to the longitudinal strips on each step movement of the carriage, means for releasing the longitudinal strips from the carriage after the carriage has reached its limit of movement in one direction and after the completion of a partition, and means for automatically ejecting a completed partition from the carriage and assembly table upon the release of the longitudinal strips from the carriage.

5. A partition assembling machine comprising, an assembly table, a carriage reciprocally mounted on the assembly table, means for intermittently moving the carriage in one direction over the table in a step-by-step movement, means for detachably securing longitudinal strips thereto in spaced upright position, means for feeding transverse strips to the longitudinal strips on each step movement of the carriage, means for releasing the longitudinal strips from the carriage after the carriage has reached its limit of movement in one direction and after the completion of a partition, means for automatically ejecting a completed partition from the carriage and assembly table upon the release of the longitudinal strips from the carriage, and means for automatically returning the carriage to its initial starting position upon the ejecting of a completed partition therefrom.

6. A partition assembling machine comprising, an assembly table, a carriage slidably mounted on the table, means for releasably locking longitudinal partition strips to the carriage, means for intermittently moving the carriage and the strips therewith in one direction on the table, means for automatically releasing the strips from the carriage after a predetermined travel of the carriage in said mentioned direction, means returning the carriage to its initial position on the table after the release of said strips, and means for feeding strips to the carriage and strip locking means.

7. A partition assembling machine comprising, an assembly table, a carriage movable longitudinally of the table, means intermittently moving the carriage in one direction in a step-by-step movement along the table, means normally functioning to return the carriage to its initial position in one continuous movement, automatic means for holding the carriage against movement after each step thereof, means for releasably locking spaced, parallel, longitudinal strips to the carriage, means for automatically releasing the strips after the carriage reaches a predetermined position, and means for automatically delivering transverse partition strips to the longitudinal strips during the holding of the carriage after each step movement thereof.

8. A partition assembling machine comprising, an assembly table, a carriage movable longitudinally of the table, means intermittently moving the carriage in one direction in a step-by-step movement along the table, means normally functioning to return the carriage to its initial position in one continuous movement, automatic means for holding the carriage against movement after each step thereof, means for releasably locking spaced, parallel, longitudinal strips to the carriage, means for automatically releasing the strips after the carriage reaches a predetermined position, means for automatically delivering transverse partition strips to the longitudinal strips during the holding of the carriage after each step movement thereof, and means for automatically releasing the carriage holding means after the carriage has completed its movement in one direction and after the release of the longitudinal strips, whereby to permit the automatic return of the carriage to its initial position.

9. A partition assembling machine comprising, an assembly table, a carriage movable over the table, a magazine for transverse strips arranged in spaced parallel relation to the carriage and table, transverse strips movable in the magazine toward the forward end thereof, the magazine and table defining a guideway for longitudinal partition strips, means for feeding longitudinal partition strips in said way to the carriage, means for detachably locking the longitudinal strips to the carriage, means for automatically releasing the locking means for the longitudinal strips when the carriage reaches a predetermined position, and means for automatically stripping one transverse strip at a time from the magazine and delivering the same to the longitudinal strips at predetermined intervals.

10. A partition assembling machine comprising, an assembly table, a magazine arranged above the table, transverse partition strips arranged in the magazine, the magazine and table defining a way for longitudinal partition strips, a carriage movable longitudinally of the table, means releasably locking the longitudinal strips to the carriage, means feeding the longitudinal strips along said way to the carriage, means for intermittently advancing the carriage in a step-by-step movement in one direction along the table, means for feeding the transverse strips toward the front of the magazine, a stripper head normally disposed in front of the magazine for preventing forward movement of the transverse strips out of the magazine, a stripper blade carried by said head for moving one transverse partition at a time down from said magazine, and means for reciprocating the head at predetermined intervals toward and away from the carriage and longitudinal strips.

11. A partition assembling machine comprising, an assembly table, a carriage movable over the table, means for intermittently advancing the carriage in a step-by-step movement in one direction along the table, means normally tending to return the carriage to its initial starting position, a magazine disposed above the carriage and table, a plurality of transverse partition strips disposed in said magazine having their lower

edges provided with spaced slots, means for feeding the transverse partitions along the magazine toward the front thereof, a stripper head normally disposed in front of the magazine for holding the transverse partitions against movement out of the front of the magazine, a stripper blade carried by the head for moving one transverse strip at a time down from the magazine, means for reciprocating the head in proper timed relation relative to the movement of the carriage, and means for holding the transverse strips in an upright position in the magazine against twisting movement and centralized relative to the longitudinal strips.

12. A partition assembling machine comprising, an assembly table, a carriage movable over the table, means for intermittently advancing the carriage in a step-by-step movement in one direction along the table, means normally tending to return the carriage to its initial starting position, a magazine disposed above the carriage and table, a plurality of transverse partition strips disposed in said magazine having their lower edges provided with spaced slots, means for feeding the transverse partitions along the magazine toward the front thereof, a stripper head normally disposed in front of the magazine for holding the transverse partitions against movement out of the front of the magazine, a stripper blade carried by the head for moving one transverse strip at a time down from the magazine, means for reciprocating the head in proper timed relation relative to the movement of the carriage, and means for holding the transverse strips in an upright position in the magazine against twisting movement and centralized relative to the longitudinal strips, said last-named means including a blade extending longitudinally of the magazine and engaged in one of the slots of the transverse strips.

13. A partition assembly machine comprising, an assembly table, a carriage movable over the table, a main operating shaft, means for continuously rotating the shaft in one direction, means for advancing the carriage in a step-by-step movement in one direction along the table from the shaft, means for releasably locking longitudinal partition strips to the carriage, a magazine for transverse partition strips arranged above the table, carriage, and longitudinal strips, a reciprocally mounted stripper head mounted transversely of the table in front of the magazine, a stripper blade on the head for engaging one transverse strip at a time in the magazine, and means for reciprocating the head from the main operating shaft in proper timed relation to the operating means for the carriage.

14. A partition assembly machine comprising, an assembly table, a carriage movable over the table, a main operating shaft, means for continuously rotating the shaft in one direction, means for advancing the carriage in a step-by-step movement in one direction along the table from the shaft, means for releasably locking longitudinal partition strips to the carriage, a magazine for transverse partition strips arranged above the table, carriage, and longitudinal strips, a reciprocally mounted stripper head mounted transversely of the table in front of the magaz'ne, a stripper blade on the head for engaging one transverse strip at a time in the magazine, means for reciprocating the head from the main operating shaft in proper timed relation to the operating means for the carriage, means for feeding the longitudinal strips to the carriage, means for feeding the transverse strips along the magazine, and means for operating the feeding means for the longitudinal strips and the transverse strips from the main operating shaft.

15. A partition assembling machine comprising, an assembly table, a carriage slidably mounted on the table, means for positively moving the carriage in a step-by-step movement along the table in one direction, means for releasably locking longitudinal partition strips to the carriage whereby the strips will be moved along the table with the carriage, and means for feeding longitudinal strips to the carriage including power-driven friction wheels for engaging one side of the partition strips, and spring-urged idle rollers for engaging the other sides of the partition strips, said driven and idle friction rollers being disposed adjacent the front end of the machine and in spaced relation to the initial position of the carriage.

16. A partition assembling machine comprising, an assembly table, a magazine arranged in spaced parallel relation to the table, longitudinal partition strips movable over the table below the magazine, a reciprocating stripper head disposed in front of the magazine and movable in a vertical plane in front of the magazine, a stripper blade carried by the head for engaging one transverse strip at a time in the magazine during downward movement of the head, and means for normally urging the transverse strips in the magazine toward the head including power-driven friction belts carried by the opposite sides of the magazine and engaging the opposite ends of the transverse strips.

17. A partition assembling machine comprising, an assembly table, a magazine arranged in spaced parallel relation to the table, longitudinal partition strips movable over the table below the magazine, a reciprocating stripper head disposed in front of the magazine and movable in a vertical plane in front of the magazine, a stripper blade carried by the head for engaging one transverse strip at a time in the magazine during downward movement of the head, means for normally urging the transverse strips in the magazine toward the head including power-driven friction belts carried by the opposite sides of the magazine and engaging the opposite ends of the transverse strips, and guide shoes carried by the upper forward end of the magazine having curved inner leading terminals for holding said transverse strips down against the bottom wall of the magazine during reciprocation of the stripper head.

18. A partition assembling machine comprising, an assembly table, a carriage movable longitudinally of the table, means for detachably locking spaced longitudinal partition strips to the carriage, an operating shaft, means for driving the operating shaft, means for intermittently advancing the carriage in a step-by-step movement in one direction from the operating shaft, a magazine for transverse partition strips disposed above the carriage and table, a reciprocating stripper head arranged transversely of the table and movable in a vertical plane in front of the magazine, a stripper blade on the head for engaging one transverse partition at a time for carrying a transverse partition down from the machine, guide rods connected with the stripper head, a yoke connecting the lower ends of the guide rods together, spring means engaging the guide rods normally urging the rods, yoke, and head to a raised position, a swinging lever rockably mounted on the machine operatively con-

nected to the yoke, and a wiper cam on the operating shaft for engaging and operating the lever.

19. A partition assembling machine comprising, an assembly table, a carriage movable over the table, means releasably connecting longitudinal partition strips to the carriage, an operating shaft, means for intermittently moving the carriage in a step-by-step movement from the shaft including wiper arms secured to and extending radially from the shaft, and equidistantly spaced depending lugs on the carriage arranged in the path of the arms.

20. A partition assembling machine comprising, an assembly table, a carriage movable over the table, means releasably connecting longitudinal partition strips to the carriage, an operating shaft, means for intermittently moving the carriage in a step-by-step movement from the shaft including wiper arms secured to and extending radially from the shaft, equidistantly spaced depending lugs on the carriage arranged in the path of the arms, means normally tending to return the carriage to its normal position in one continuous movement, and spring-pressed dogs for releasably engaging the lugs for holding the carriage against retrograde movement after the advancement thereof in its step-by-step movement.

21. A partition assembling machine comprising, an assembly table, a carriage movable over the table, means releasably connecting longitudinal partition strips to the carriage, an operating shaft, means for intermittently moving the carriage in a step-by-step movement from the shaft including wiper arms secured to and extending radially from the shaft, equidistantly spaced depending lugs on the carriage arranged in the path of the arms, means normally tending to return the carriage to its normal position in one continuous movement, spring-pressed dogs for releasably engaging the lugs for holding the carriage against retrograde movement after the advancement thereof in its step-by-step movement, and means for moving the dogs out of engagement with the lugs when the carriage reaches the limit of its movement in one direction, whereby to permit the automatic return of the carriage to its initial starting position.

22. A partition assembling machine comprising, an assembly table, a carriage movable over the table, means releasably connecting longitudinal partition strips to the carriage, an operating shaft, means for intermittently moving the carriage in a step-by-step movement from the shaft including wiper arms secured to and extending radially from the shaft, equidistantly spaced depending lugs on the carriage arranged in the path of the arms, means normally tending to return the carriage to its normal position in one continuous movement, spring-pressed dogs for releasably engaging the lugs for holding the carriage against retrograde movement after the advancement thereof in its step-by-step movement, means for moving the dogs out of engagement with the lugs when the carriage reaches the limit of its movement in one direction, whereby to permit the automatic return of the carriage to its initial starting position, and means for rendering the dogs operative again after the return of the carriage to its initial position.

23. A partition assembling machine comprising, an assembly table, a carriage movable over the assembly table, means for releasably locking longitudinal partition strips to the carriage, means for automatically releasing the longitudinal strip locking means after the carriage reaches a predetermined position, and means for automatically ejecting the partition strips from the carriage after the release thereof including swinging arms movable through the table, and means for operating the arms from the carriage at the end of the travel of the carriage.

24. A partition assembling machine comprising, an assembly table, a carriage movable over the table, means for intermittently operating the carriage in a step-by-step movement toward one end of the table, means for automatically returning the carriage to its initial starting position after the carriage has completed its travel in one direction, means for releasably locking longitudinal partition strips to the carriage, means for automatically releasing the strips from the carriage just prior to the end of the travel of the carriage in one direction, means for ejecting the strips from the carriage after the release thereof and upon the completion of the movement of the carriage in one direction including arms movable through the table, a rockable cross shaft connecting the arms, a pull rod connected to the forward end of the cross shaft, and a laterally extending foot on the pull rod disposed in the path of the carriage.

25. A partition assembling machine comprising, an assembly table, a carriage movable over the table, means for advancing the carriage intermittently over the table in a step-by-step movement in one direction, means for releasably connecting longitudinal partition strips to the carriage, means for continuously feeding strips toward the carriage, means for automatically releasing the strip-holding means from the carriage when the carriage reaches a predetermined position, means for automatically returning the carriage to its initial starting position upon the release of the partitions from the carriage, and means movable in the path of oncoming strips from the strip-feeding means for holding the strips in predetermined position until the return of the carriage to its initial position.

26. A partition assembling machine comprising, an assembly table, a carriage movable over the table, means for advancing the carriage intermittently over the table in a step-by-step movement in one direction, means for releasably connecting longitudinal partition strips to the carriage, means for continuously feeding strips toward the carriage, means for automatically releasing the strip-holding means from the carriage when the carriage reaches a predetermined position, means for automatically returning the carriage to its initial starting position upon the release of the partitions from the carriage, and means movable in the path of oncoming strips from the strip-feeding means for holding the strips in predetermined position until the return of the carriage to its initial position, said means including a swinging yoke, spring means normally urging the yoke above the table and in the path of oncoming strips, the yoke being movable below the table by said carriage.

27. A partition assembling machine comprising, an assembly table, a carriage movable over the table including a cross plate slidably engaging the table for receiving the front ends of longitudinal strips, an upright stop plate for the strips carried by the cross plate, rigid stop jaws on the stop plate for engaging one side of the strips, and movable jaws for engaging the opposite sides of the strips for holding the strips

against the rigid jaws and releasably locked to the carriage, and means for moving the releasable jaws to a released position when the carriage reaches the end of its travel in one direction.

28. A partition assembling machine comprising, an assembly table, a carriage movable over the assembly table including a cross plate slidably engaging the upper face of the table, means for intermittently moving the carriage in one direction over the table, a stop plate extending upright from the cross plate, the cross plate being adapted to receive the front lower corners of longitudinally extending partition strips, stationary clamping jaws on the stop strip for engaging one face of each strip, a bolt slidably carried by the carriage having a plurality of jaws movable toward and away from the rigid jaws for engaging the other faces of the longitudinal strips for releasably locking the strips against the rigid jaws, spring means normally urging the bolt and the movable jaws toward the rigid jaws, and a cam plate arranged in the path of the bolt for moving the bolt against the tension of its spring means and the movable jaws away from the rigid jaws to release the longitudinal strips when the carriage reaches a predetermined position.

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