

Oct. 14, 1947.

J. E. WILSKE ET AL

2,429,007

PARTITION STRIP ASSEMBLING MACHINE

Filed Sept. 15, 1944

4 Sheets-Sheet 1

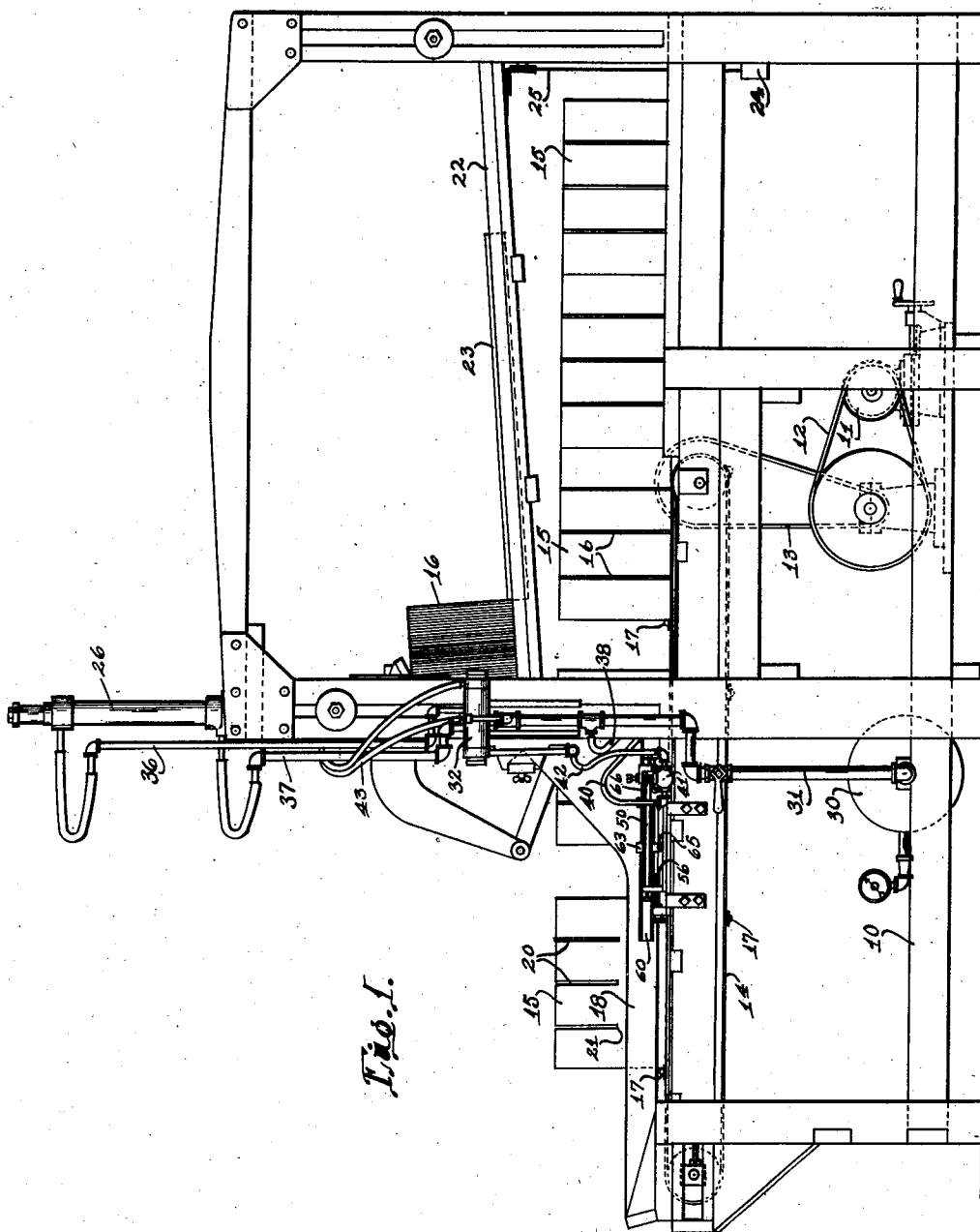


Fig. 1.

Inventors  
J. E. WILSKE  
A. S. JACKSON  
F. A. McCORMICK

By *Rule and Hoge*

Attorneys

Oct. 14, 1947.

J. E. WILSKE ET AL

2,429,007

PARTITION STRIP ASSEMBLING MACHINE

Filed Sept. 15, 1944

4 Sheets-Sheet 2

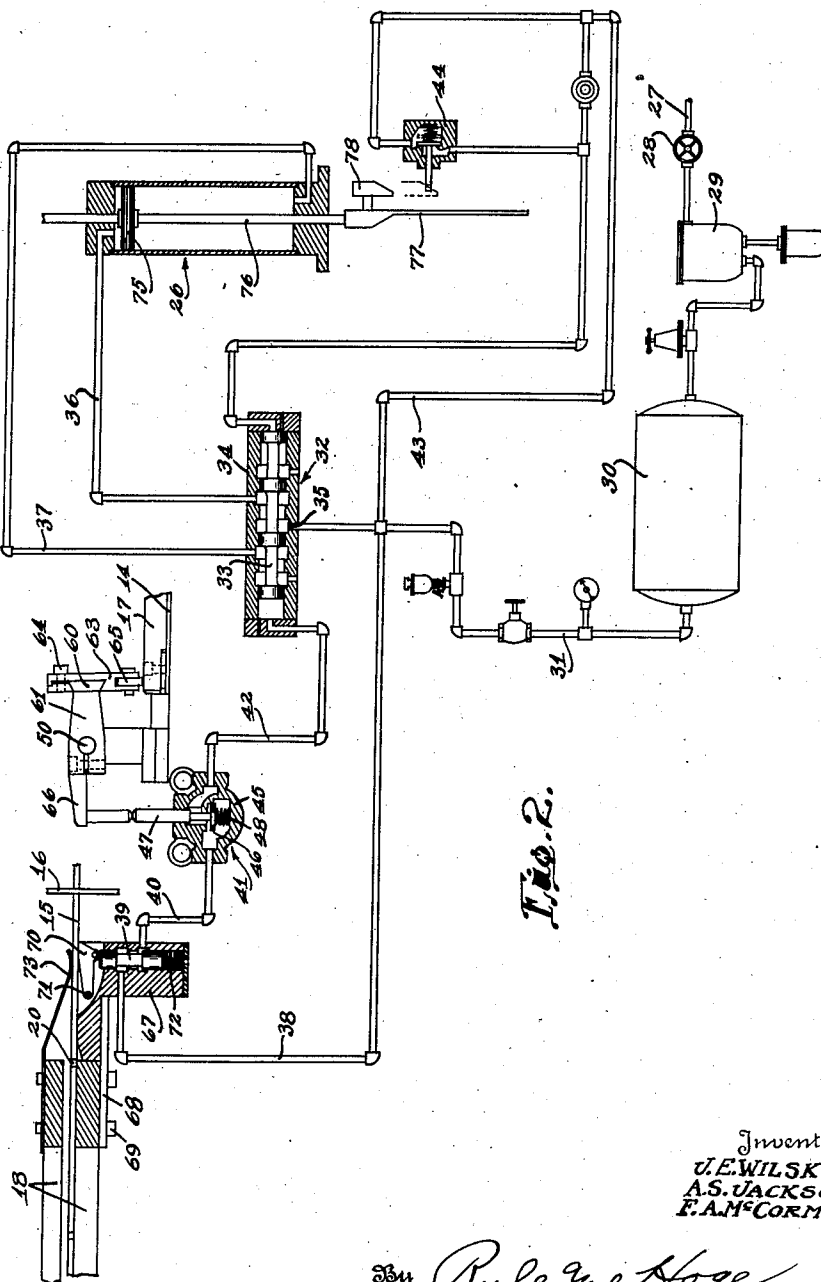


Fig. 2.

Inventors  
J. E. WILSKE  
A. S. JACKSON  
F. A. MC CORMICK

By *Rule and Hoge*

Attorneys

Oct. 14, 1947.

J. E. WILSKE ET AL

2,429,007

PARTITION STRIP ASSEMBLING MACHINE

Filed Sept. 15, 1944

4 Sheets-Sheet 3

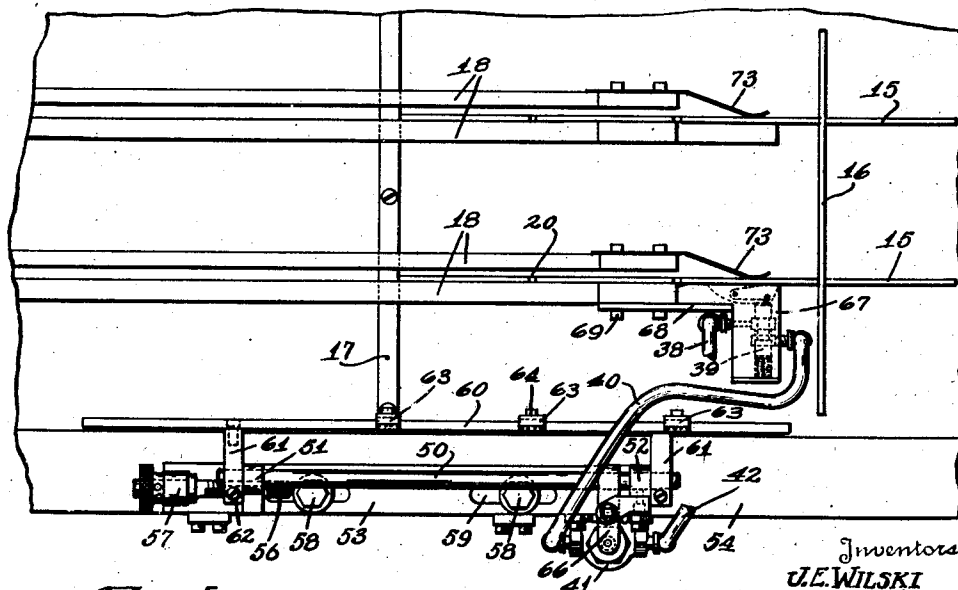
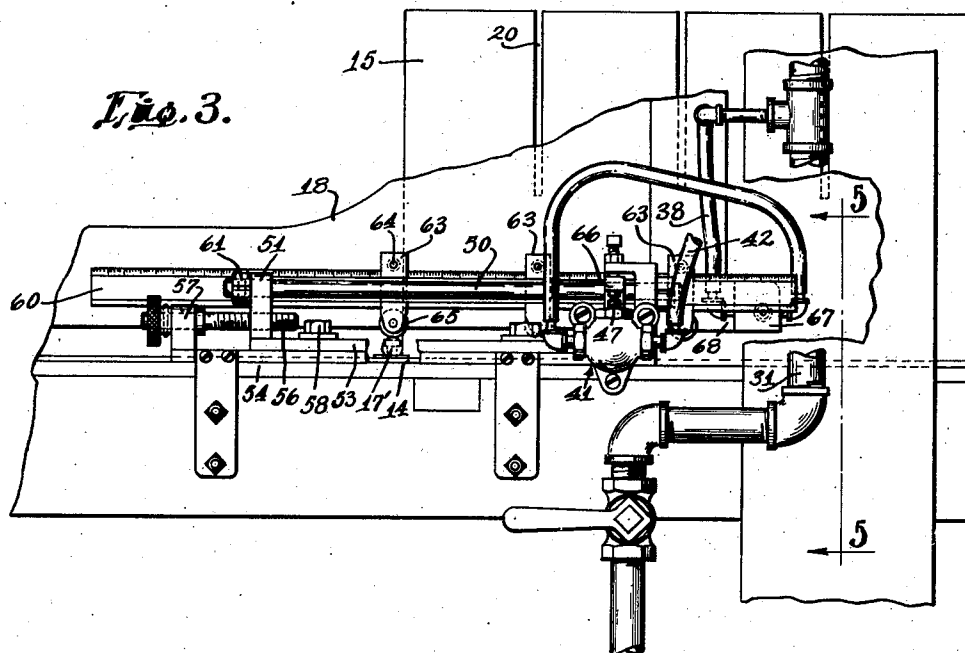


*Fig. 4.*

Inventors  
J. E. WILSKI  
A. S. JACKSON  
F. A. MCCORMICK

By *Rule and Noye,*

Attorneys

Oct. 14, 1947.

J. E. WILSKE ET AL

**2,429,007**

# PARTITION STRIP ASSEMBLING MACHINE

Filed Sept. 15, 1944

4 Sheets-Sheet 4

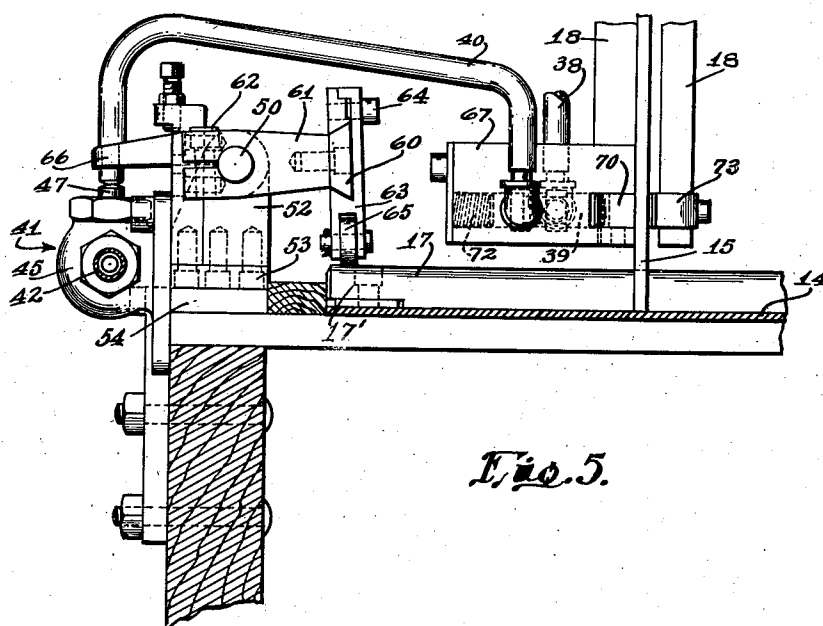


*Fig. 5.*

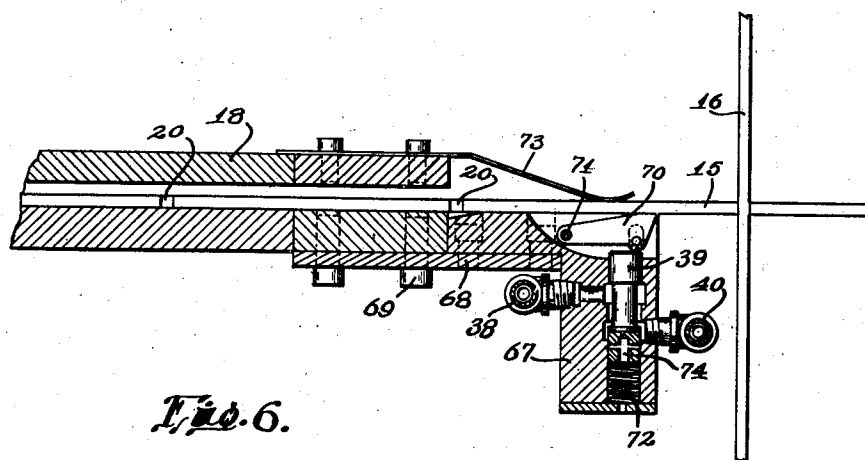


*Fig. 6.*

Inventors  
J.E. WILSKE  
A.S. JACKSON  
F.A. McCORMICK

By Rule and Hoge.  
Attorneys

## UNITED STATES PATENT OFFICE

2,429,007

## PARTITION STRIP ASSEMBLING MACHINE

Julius E. Wilske, Alton, Albert S. Jackson, Wood River, and Francis A. McCormick, Alton, Ill., assignors to Owens-Illinois Glass Company, a corporation of Ohio

Application September 15, 1944, Serial No. 554,214

7 Claims. (Cl. 93-37)

1

Our invention relates to machines for assembling partition strips of cardboard, paper or other material, such as are commonly used to provide individual cells or compartments in cartons and other containers.

The invention in the form herein illustrated, is embodied in a machine of the type in which a piston motor operates to assemble or drive the cross strips in succession into assembled relation with a group of longitudinal strips. A machine of this type is disclosed in U. S. Patent to McLaughlin et al. No. 2,353,842, dated July 18, 1944, for Machines for assembling partitions.

In the machine disclosed in said patent, the operation of the piston motor which assembles the partition strips, is controlled by the strips themselves and particularly by the slots in the strips which control the operation of trip valve mechanism in the air control lines of the assembling motor.

An object of the present invention is to provide a simplified and improved means for controlling the operation of the strip assembling motor.

A further object of the invention is to provide a novel mechanism operable independently of the partition strips for effecting and controlling the successive operations of the strip assembling motor. The invention provides motor controlling air valve mechanism adapted for use in assembling operations in which the partition strips themselves are not adapted for operating the motor control means.

Other objects of the invention will appear hereinafter.

Referring to the accompanying drawings:

Fig. 1 is a side elevation of the machine.

Fig. 2 is a diagrammatic view, with parts shown in section, of the air system including the air-operated piston motor for assembling the partition strips and the valve mechanism controlling the operations of the motor.

Fig. 3 is a fragmentary view in elevation on a comparatively large scale, of parts shown in Fig. 1, particularly the trip valve mechanism.

Fig. 4 is a plan view of the mechanism shown in Fig. 3.

Fig. 5 is a sectional elevation at the line 5-5 on Fig. 3.

Fig. 6 is a sectional plan of an auxiliary valve mechanism for preventing the operation of the motor while there are no partition strips passing through the assembly zone.

Referring to Fig. 1, the operating parts, which are mounted on a framework 10, include an elec-

2

tric motor 11 which operates continuously through speed reduction gearing including belts 12 and 13 to drive an endless belt conveyor 14. The conveyor carries longitudinal partition strips 15 forwardly in a horizontal direction to and through an assembly zone in which they are assembled with cross partition strips 16. Cross bars 17 are attached to the conveyor 14 at intervals therealong for engaging the strips 15 and holding them properly spaced lengthwise on the conveyor. Stationary guide bars 18 extending lengthwise of the conveyor, serve to support the strips 15 in upright position and suitably spaced laterally. The strips 15 are provided with vertical slots 20 to receive the cross partition strips 16, the lower ends 21 of the slots serving as stops for the cross partitions which are likewise provided with corresponding slots to receive the lower halves of the longitudinal strips.

The stack of cross strips 16 is supported on an inclined frame member 22 and fed forward by a pusher bar 23 which is slidably mounted on the frame member 22. A weight 24 is connected through a cord 25 and system of pulleys to the bar 23 for applying a yielding pressure of the bar against the stack of strips 16. The cross partition strips are assembled with the longitudinal strips by a piston motor 26. The parts thus far described are the same as illustrated and described in the patent above mentioned to which reference may be had for a more complete disclosure of the general construction and operation of the machine.

Referring now to Fig. 2, the piston motor 26 is operated by air under pressure or other fluid. The air control system includes a main air supply pipe 27 which supplies air under pressure through a valve 28 and filter 29 to an air pressure tank 30. A pressure line 31 extends from the tank to a master control valve 32 which controls the operation of the motor 26. This valve includes a stem 33 movable lengthwise in the valve casing 34. The pressure line 31 is connected to the valve at a central port 35. Pipes 36 and 37 extend from the valve 32 to the upper and lower ends respectively, of the motor cylinder. The valve stem 33 is operated by puffs of air which are supplied alternately through the opposite ends of the valve cylinder.

Live air is supplied to the left-hand end of the valve cylinder through an auxiliary pipe line including a pipe 38 extending from the pressure line 31 to an auxiliary control valve 39, a pipe 40 extending from valve 39 to a trip valve 41,

and a pipe 42 extending from the trip valve to the motor valve 32. The valves 39 and 41 are thus connected in series and when open, as hereinafter described, admit pressure for throwing the valve stem 33 to the right and thereby admitting air under pressure to the upper end of the motor cylinder. The master valve stem 33 is moved in the opposite direction when air pressure is supplied through a branch pipe line 43 in which is included a poppet valve 44, operated as hereinafter described.

The trip valve 41 includes a valve casing 45 in which is a valve disk 46 having a stem 47 projecting upwardly through the casing. The valve is normally held up in its closed position by a compression spring 48. The valve casing 45 has a stationary mounting on the machine frame.

The trip valve 41 is automatically operated periodically by the flight bars 17 on the continuously traveling belt conveyor, through mechanism which will now be described. Such mechanism includes a rock shaft 50 which extends horizontally in the direction of travel of the conveyor, the rock shaft being journaled in arms 51 and 52 at the ends of a bar 53 parallel with the rock shaft. The bar 53 is slidably mounted for adjustment lengthwise along a longitudinal bar 54 of the machine frame. The rock shaft 50 is adjustable lengthwise by means of an adjusting rod 56 having a screw-threaded connection with the arm 51. The adjusting rod is journaled in an arm 57 attached to the machine frame. Clamping screws 58 extending through elongated slots 59, serve to clamp the bar 53 in its adjusted position.

A finger bar 60 parallel with the rock shaft 50 is connected to the latter by rock arms 61, said rock arms having split ends to receive the rock shaft and being clamped in position by screws 62. A series of vertically disposed trip fingers 63 are mounted on the finger bar 60 and are individually adjustable lengthwise of the bar and clamped in position thereon by screws 64. The trip fingers are spaced to correspond with the spacing of the slots 20 in the longitudinal partition strips 15. Each trip finger carries a contact roll 65 adapted to contact any suitable finger-operating devices connected to travel with the conveyor and spaced lengthwise thereof to correspond with the spacing of the flight bars 17. As shown, the flight bars themselves or end extensions 17' thereof, serve as means for operating the trip fingers, the latter being positioned over the conveyor in the path of the flights 17 so that each flight as it advances, lifts the trip fingers 63 in succession and thereby rocks the shaft 50. This rocking movement of the shaft operates through a tappet 66 secured to the shaft, to lower the trip valve 46 to open position.

The auxiliary valve 39 (Figs. 2 and 6) is mounted in a valve block 67 bolted to a plate 68, the latter being attached by bolts 69 to one of the spacing bars 18. The inner end of the block 67 is recessed to receive a dog 70 mounted therein by a pivot 71. A coil spring 72 held under compression beneath the valve 39 operates to hold the valve closed except when a partition strip 15 is in position to press the dog 70 inwardly and hold the valve open. The guide strips 18 are arranged in pairs for guiding the longitudinal partition strips 15 as they advance through the assembly zone. One of the strips 18 of each pair has a leaf spring 73 attached thereto and bearing against the advancing partition strip. One of said springs is at a point directly opposite the

dog 70 and applies pressure through the partition strip and the dog to hold the valve open. When the strip 15 has passed beyond the dog 70, the valve 39 is closed by its spring, thereby closing the air pressure line leading to the motor control valve. When the valve 39 closes, the pressure in the pipe line 40, 42 is dissipated through a vent 74 (Fig. 6).

The motor 26 comprises a piston 75 and piston rod 76. A pusher plate 77, which functions as a partition strip assembling plate, is attached to the piston rod and operates as the piston descends to slice a cross partition strip from the stack and drive it down into assembled relation with the group of longitudinal strips at the assembly station. As the piston nears its lowered position, a cam 78 on the pusher plate 77 engages the stem of the tappet valve 44, opens the valve, and admits air under pressure to the right-hand end of the master valve 32, thereby moving the valve stem to the left and reversing the motor so that the pusher plate is drawn upwardly.

The operation may be summarized as follows:

Groups of longitudinal partition strips 15 are placed on the belt conveyor and positioned thereon with the rear edges of the strips bearing against a flight bar 17. As the group of strips advances to the assembling zone, one said strip passes between the dog 70 (Fig. 6) and the adjoining spring 73, causing the dog to open the valve 39. This permits air pressure to be supplied to the trip valve 41 which at this time is held closed by its spring. When the group of strips has about reached the position beneath the pusher plate 77 for receiving the first cross strip 16, the flight bar 17 engages the first trip finger 63 and rocks the shaft 50. This causes the tappet 66 to open the trip valve 41, thereby supplying air pressure to the left end of the master valve 32, thus moving the valve stem to the right.

The parts are now in the position shown in Fig. 2 with the upper end of the motor cylinder connected to the pressure line. The piston therefore moves downward and causes the pusher plate 77 to strip the foremost cross partition 16 from the stack and drive it down into assembled position. The cam 78 on the pusher bar opens the valve 44 as the motor is completing its down stroke so that the master control valve is reversed. This operation of the motor is repeated as each of the trip fingers 63 is engaged by the bar 17. The number of the trip fingers and their spacing are adjusted to correspond with the number and spacing of the slots 20 in partition strips so that the down strokes of the strip assembly plate 77 are timed to drive each cross strip into place as it is brought into register with a row of slots 20.

Modifications may be resorted to within the spirit and scope of our invention.

We claim:

1. Apparatus for assembling partition strips, comprising a traveling conveyor for conveying groups of the partition strips through an assembly station, a piston motor, means operated by the motor for assembling cross strips singly and in succession with each said group of strips, a control valve for the motor, a mechanically operable trip valve controlling the operation of said motor control valve, a trip device positioned to engage and operate the trip valve, and means connected to travel with said conveyor for operating said trip device.

2. Apparatus for assembling partition strips comprising a traveling conveyor, means for driving the conveyor and thereby carrying groups of

5

partition strips thereon to an assembly station, a piston motor, a strip assembling plate connected to the motor piston and operable to assemble cross strips with said groups, a motor control valve controlling the operation of said motor, a pressure line extending to said control valve, a trip valve in said pressure line, trip mechanism operable to actuate the trip valve, said trip mechanism including a rock shaft and a series of trip devices connected thereto for rocking said shaft, means on the conveyor for actuating said trip devices singly and in succession, and means providing a mechanical connection between the rock shaft and trip valve and operable to trip the said trip valve when the shaft is rocked.

3. Apparatus for assembling partition strips comprising a traveling conveyor, means for driving the conveyor and thereby carrying groups of partition strips thereon to an assembly station, a piston motor, a strip assembling plate connected to the motor piston and operable to assemble cross strips with said groups, a motor control valve controlling the operation of said motor, a pressure line extending to said control valve, a trip valve in said pressure line and controlling the operation of said motor control valve, trip mechanism for actuating the trip valve including a rock shaft, trip fingers connected to the rock shaft, means connected to the conveyor for operating said fingers in succession and thereby rocking said shaft, and a tappet carried by the rock shaft and positioned to engage and actuate said trip valve when the shaft is rocked.

4. Partition assembling mechanism comprising a traveling conveyor, means for driving the conveyor, a motor, means actuated thereby for assembling cross partition strips with partition strips on the conveyor, means for periodically effecting the operation of the motor including a valve, a rock shaft extending lengthwise of the conveyor, a plurality of trip fingers, means providing operating connection between the trip fingers and the rock shaft and causing said shaft to be rocked when the fingers are actuated, finger actuating means carried on said conveyor, and a tappet on the rock shaft in position to contact and operate the valve when the rock shaft is rocked.

5. Partition assembling mechanism comprising a traveling conveyor, means for driving the conveyor, a motor, means actuated thereby for assembling cross partition strips with partition strips on the conveyor, means for periodically effecting the operation of the motor including a valve, a rock shaft extending lengthwise of the conveyor and having a stationary mounting, a finger bar positioned over the conveyor and connected to and extending parallel with said rock shaft, trip fingers connected to said bar, means on the conveyor for actuating the trip fingers in

6

succession and thereby rocking the rock shaft, and a tappet connected to the rock shaft in position to engage and actuate the valve when the rock shaft is rocked.

6. Partition assembling mechanism comprising a horizontally-disposed endless conveyor, means for driving the conveyor, flight bars extending crosswise of the conveyor and spaced at predetermined intervals lengthwise thereof for positioning groups of partition strips on the conveyor, a finger bar extending lengthwise of the conveyor and mounted separately therefrom, trip fingers connected to said finger bar and extending into the path of said flight bars and operated in succession thereby for actuating the finger bar, a fluid operated motor, means actuated thereby for assembling cross partition strips with the partition strips on the conveyor, a motor control valve controlling the operations of the motor, a trip valve controlling said motor control valve, and a tappet on the said finger bar in position to contact and operate the trip valve when the finger bar is actuated.

7. Partition assembling mechanism comprising a horizontally-disposed endless conveyor, means for driving the conveyor, flight bars extending crosswise of the conveyor and spaced at predetermined intervals lengthwise thereof for positioning groups of partition strips on the conveyor, a finger bar extending lengthwise of the conveyor and mounted separately therefrom, trip fingers connected to said finger bar and extending into the path of said flight bars and operated in succession thereby for actuating the finger bar, a motor, means actuated thereby for assembling cross partition strips with the partition strips on the conveyor, a motor control valve controlling the operations of the motor, an air pressure line extending to the motor control valve, a trip valve in said line, means providing operating connections between the trip valve and the said finger bar, a second valve in said air pressure line in series with the said trip valve, means for automatically closing said second valve, and a valve operating device extending into the path of partition strips on the conveyor and actuated thereby for holding said second valve open.

JULIUS E. WILSKE,  
ALBERT S. JACKSON,  
FRANCIS A. McCORMICK.

#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

| Number    | Name              | Date           |
|-----------|-------------------|----------------|
| 1,643,357 | Wade et al.       | Sept. 27, 1927 |
| 2,353,842 | McLaughlin et al. | July 18, 1944  |