May 1, 1928. 1,667,738

A. S. NICHOLS

CONVEYER AND DOOR CONSTRUCTION

Filed Feb. 21, 1924 3 Sheets-Sheet 1

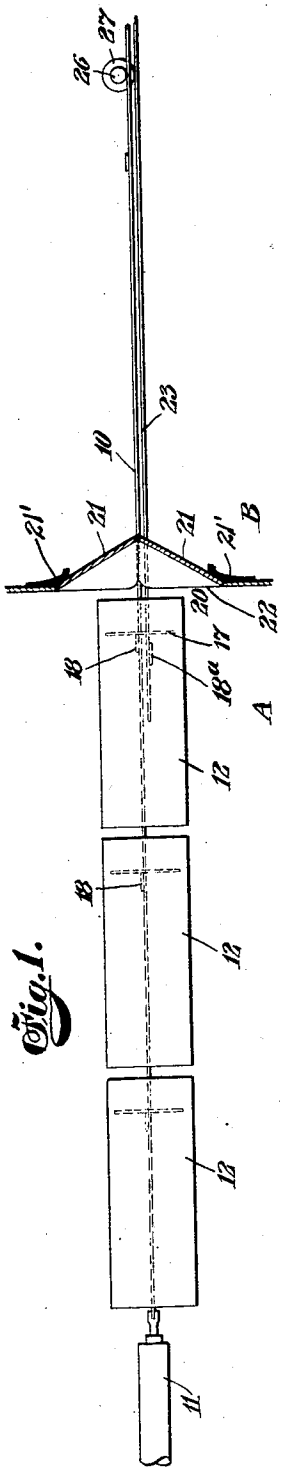


Fig. 1.

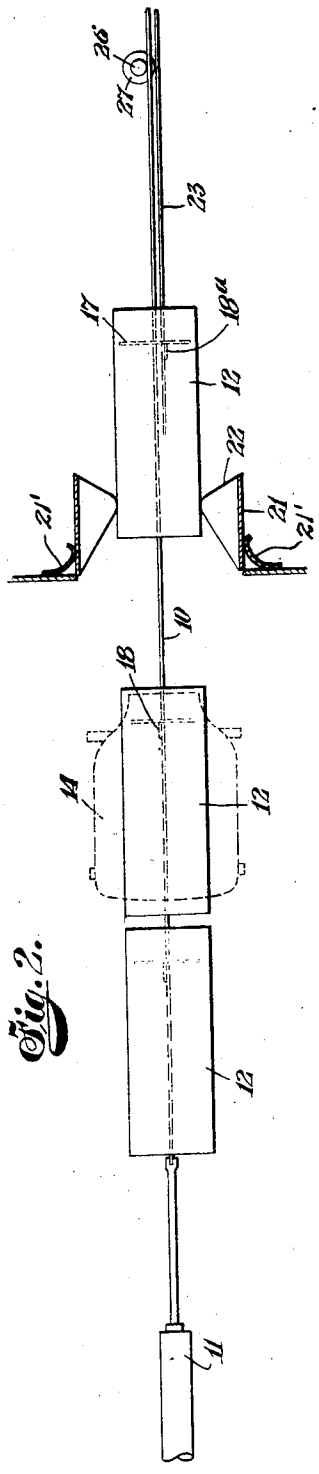


Fig. 2.

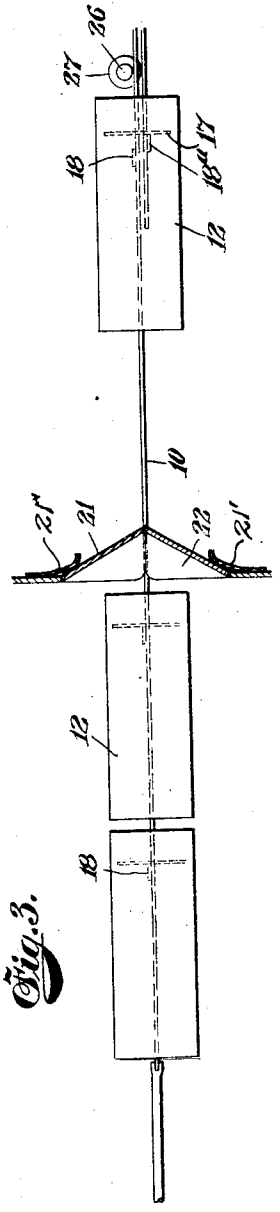


Fig. 3.

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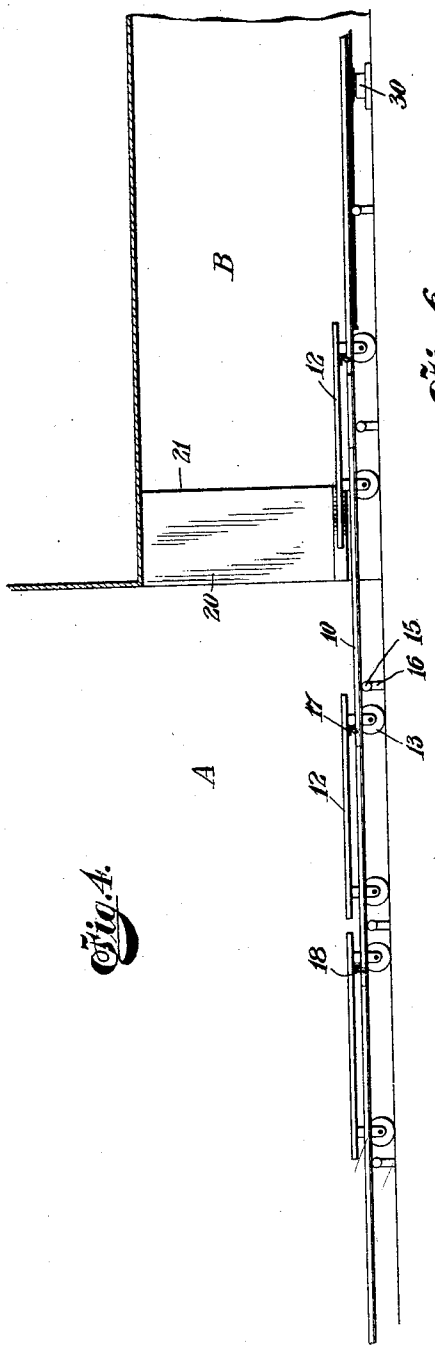


Fig. 4.

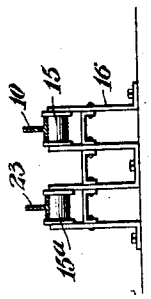


Fig. 6.

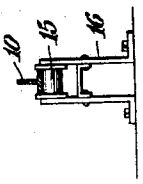


Fig. 7.

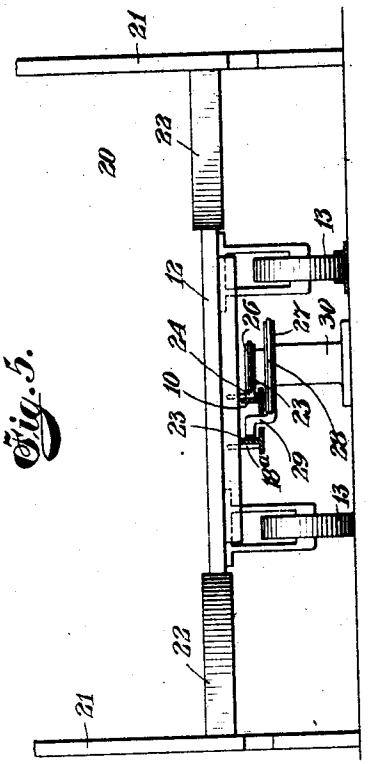


Fig. 5.

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CONVEYER AND DOOR CONSTRUCTION

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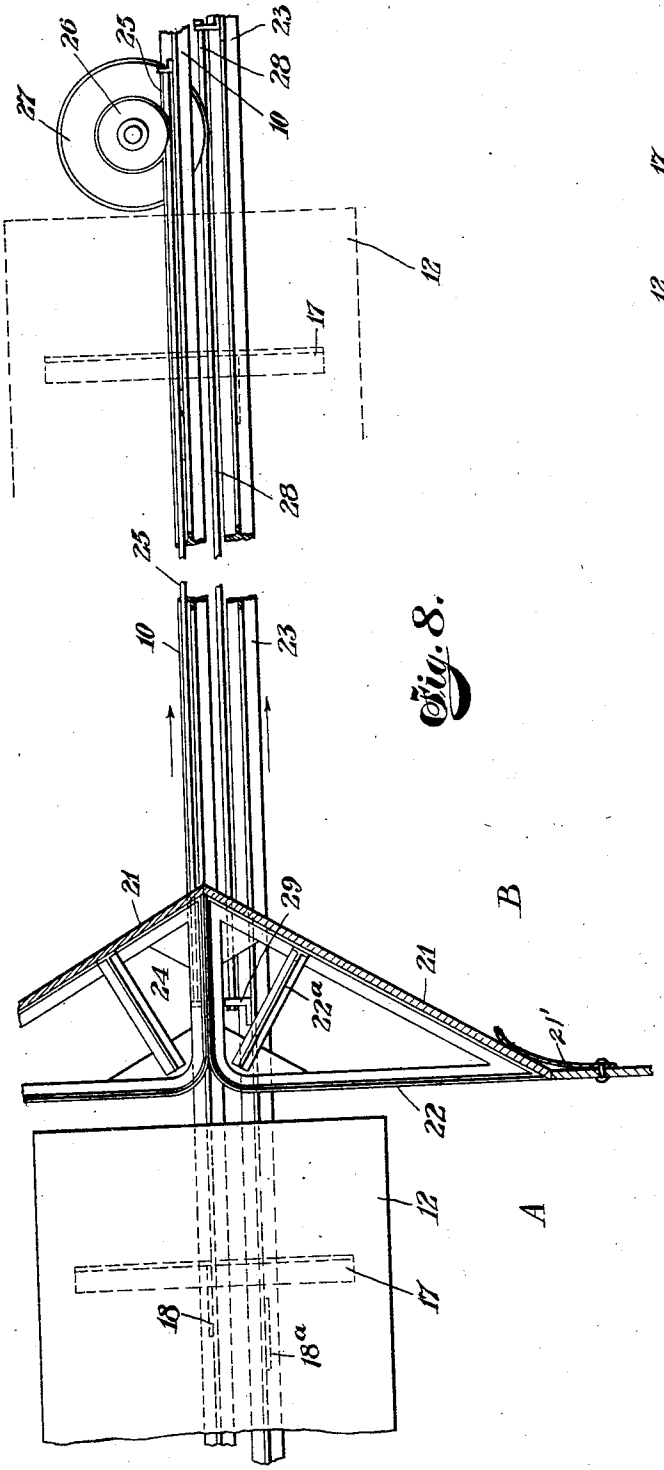


Fig. 8.

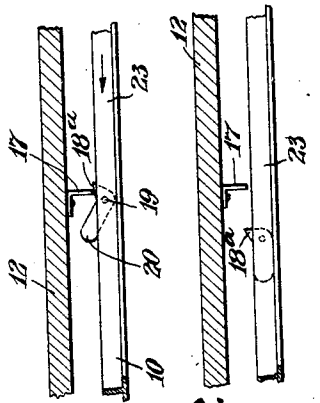


Fig. 11.

Fig. 12.

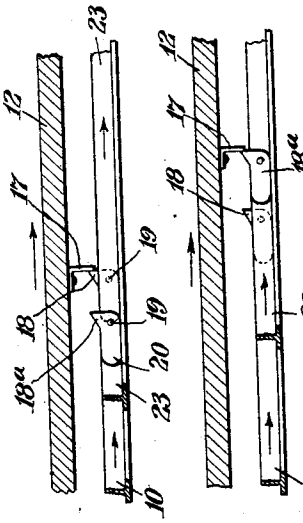


Fig. 9.

Fig. 10.

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Patented May 1, 1928. 1,667,738

UNITED STATES PATENT OFFICE.

AARON S. NICHOLS, OF NEW YORK, N. Y.

CONVEYER AND DOOR CONSTRUCTION.

Application filed February 21, 1924. Serial No. 694,309.

My invention relates to improvements in an organization of conveyers and doors through which the conveyer or conveyers pass. My invention is intended to provide means whereby a conveyer can pass from one room to another, operate the doors to permit passage of the conveyer through, and providing for the quick closure of the doors as each conveying element passes through the door, thus preventing the atmosphere from one room from passing to any appreciable extent into the next. This is desirable for many reasons. Frequently work is conveyed from one room where workmen are engaged upon it into another room, which may, for instance, be a drying room, and in which the atmospheric conditions may be entirely different and the temperature much higher. It is obviously desirable to save expense by preventing the outrush of heated air, and further, it is desirable to prevent unnecessary changing of atmospheric conditions. As an example I have shown in the accompanying drawings an application of my invention to a plant in which vehicle bodies, such as automobile bodies, are carried by a conveyer from one room to the other, the first being the room where work is done on the bodies, and the second a dry room. The mechanism is organized so that as the conveyers carry the bodies from one room to the other, the doors are automatically opened and closed, and the bodies and parts of the conveyer passing through the doors, are speeded up so as to close the opening as quickly as possible.

In an accompanying application filed simultaneously herewith, Serial No. 694,308 I have shown a conveyer operated by a plunger, and in which the back stroke of the plunger separates the carrying elements of the conveyer as they pass through the door, thus permitting the quick closure of the door. In the present instance, my invention is similar to that described in the other application, but the carrying elements of the conveyer which are independently movable, are speeded up through the door by a movement imparted from the conveyer actuating mechanism, while the latter is moving forward, the difference in speed being by a differential connection described. It will be evident from the description which follows that the invention is not limited to the particular form of conveyer described, or to any precise form of conveyer, so long as the carrying elements of the conveyer, or separable parts of the conveyer, can be moved independently and at a different speed through the doors to facilitate the operation of the latter. This will appear more clearly from the description which follows.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar reference characters indicate corresponding parts in all the views.

Figure 1 is a diagrammatic plan partly in section showing my invention with the forward carrying elements of the conveyer about to open the doors between adjacent rooms.

Figure 2 is a view similar to Figure 1, but showing a carrying element separated from the ones following and in the act of passing through a door.

Figure 3 is a similar view but showing the position of a carrying element after it has passed the door and the latter is closed.

Figure 4 is a side elevation of the apparatus as a carrying element is passing through a door.

Figure 5 is an end view partly in section showing an element of the conveyer passing through the door.

Figure 6 is a detail sectional view showing how the main and auxiliary rails or plungers can be mounted.

Figure 7 is a detail section showing the general scheme of mounting the main rail.

Figure 8 is a broken enlarged detail plan of the invention showing the means for accelerating the speed of a carrying element, and showing the latter about to contact with the door to open it.

Figure 9 is a detail section showing the means of advancing a carrying element with the main rail at the forward limit of its stroke and the auxiliary rail in position to engage and carry forward the conveyer element released by the main rail.

Figure 10 is a view similar to Figure 9 but showing the auxiliary rail engaged to a carrying element to move it forward.

Figure 11 is a view similar to Figures 9 and 10 but showing the action of one of the actuating dogs as it passes beneath its engaging catch on the back stroke of the main rail, and

Figure 12 is a similar view showing the

normal position of the engaging dog of the main rail as it is about to contact with the catch of the conveyer element.

To illustrate the use of my invention I have shown it in connection with a conveyer system operating between a work room "A" and a dry room "B", and without any idea of restricting the invention to this arrangement or to the precise form of conveyer illustrated. The conveyer in itself is similar to one of known construction used for the purpose indicated, and each conveyer, as shown, comprises a reciprocating main plunger or rail 10 which is actuated by mechanism 11 not shown, and which moves the platforms or trucks 12, each being a carrying element of the conveyer, and each being suitably mounted to render it easily movable. As shown each platform or truck 12 has wheels 13 on which it runs, and in the illustration given, each is adapted to carry a car body 14. In operation a stroke of the rail 10 is of the length of one of the elements or platforms 12. The actuating rail 10 is suitably mounted, and can be supported on rollers 15 (see Figure 7) these being journaled in a suitable support 16.

As a means of imparting the step by step movement to the conveying elements 12, each of the latter has on the under side a transverse member 17 usually in the form of an angle iron, which is engaged by the dog 18 on the rail 10. The dog is pivoted as shown at 19, and has an extended tail piece 20 heavy enough to cause it to normally lie in position to engage the member 17, and it lies on the web of the rail 10 so that when the latter is pushed forward, the dog will engage the member 17 and carry the platform or element 12 with it, while on the return stroke of the plunger or rail 10, the back of the dog will strike the member 17 and tilt up the dog, as shown in Figure 11, permitting it to pass the engaging member 17.

Uusually the conveyers are arranged in parallel relation as shown in Figures 1, 2 and 3 as a whole, but more or less conveyers can be used, and each is arranged to pass through a door which is preferably in the form of two members 21, which are self closing, and which have triangular abutments 22 (see Figures 1 and 8) arranged so that when the doors are closed the inner faces thereof will be parallel with the partition separating the rooms A and B, and in a plane to be struck by the advancing platform 12; and as the platform or element moves forward, the abutment 22 rides along the edge of the platform, and the doors are preferably self closing so that they close immediately behind the platform 12 which is separated from the following platforms, and advanced at a higher rate of speed through the door, as illustrated in Figure 2. To render the doors self-closing, spring elements such as shown at 21′ may be used but the invention is not restricted to the use of spring elements, as obviously other means might be provided within the scope of the present invention which would accomplish the same result.

The means illustrated for individually actuating the elements or platforms 12 is an auxiliary rail, 23 which moves parallel with the rail 10, and is arranged near and preferably a little behind the doorway, moving in unison with the rail 10 but at a higher rate of speed. The auxiliary rail can be mounted on rollers 15ª as shown in Figure 6.

As a means of imparting the desired and more rapid reciprocation of the auxiliary rail, the main rail 10 is provided with a cable 25 which connects with the main rail by means of a bracket 24 or the like, and this cable is wound around a drum 26, and then extended forward and similarly attached to the rail 10 at another point. The drum 26 turns a larger drum 27 which carries a cable 28, this being wound around the drum 27 and connecting with the auxiliary rail 23 by a bracket 29 (see Figure 8), and it also extends in the opposite direction and is similarly attached at another place to the auxiliary rail. Thus it will be seen that as the rail 10 moves backward and forward, it will rotate the members 26 and 27, and the latter by reason of its larger size, will impart a much faster movement to the auxiliary rail 23, any desired increase of speed within reasonable limits being possible, and it is arranged also so as to give ample movement to the auxiliary rail, so that when the rail moves backward it will pass well behind the member 17 of a platform 12, as shown in Figure 9, so as to be sure to make engagement with said member 17 to advance the platform or truck through the door. The members 26 and 27 are supported on a suitable pedestal 30, and while this differential arrangement shown forms a convenient means of making an operative connection between the main rail 10 and a platform 12, the invention is not limited to this means, as obviously other mechanical devices might be substituted with the same effect. As shown, however, it will be seen that when the conveyer is advanced to the position indicated in Figure 1 where the dog 18 of the main rail 10 is about to leave its engagement with the member 17 of the front platform or element 12, the similar dog 18ª which is attached to the auxiliary rail 23 will have come to a position behind the said members as indicated in Figure 1 and in Figure 9. At this point the auxiliary rail will start its forward stroke, moving much faster than the main rail, so that the auxiliary rail carries the element 12 through the door, opening the two members of the door as indicated in Figure 2, and permitting the mem-

ber 17 to slide over the dog 18 of the main rail as shown in Figure 11. Thus the forward movement of the two rails will cause the auxiliary rail, because of its speed, to quickly pass the forward element through the door to the position shown in Figure 3, thus permitting the door to close quickly as there is no interference with it, and so the door is open for a comparatively brief time, and the atmospheric conditions of the adjoining rooms are not seriously changed.

From the description given it will be evident that the form and construction of the conveyer may be changed to adapt it to different purposes, and the doors and operating mechanism may be changed considerably without departing from the principle of my invention.

I claim:—

1. A conveyer having spaced carrying elements, a sliding rail to move said elements, a door through which the conveyer passes, and a speeding-up driving connection between the rail and the carrying elements to carry said elements quickly through the door.

2. A conveyer having spaced carrying elements, a reciprocating rail to move the elements, a door through which the conveyer passes, a reciprocating auxiliary rail adapted to connect with the carrying elements, and a differential driving connection between the main rail and the auxiliary rail.

3. A conveyer having spaced carrying elements, a door through which the conveyer passes, a reciprocating main rail releasably connected to the carrying elements to move them, and a more rapidly moving auxiliary rail arranged to connect with the carrying elements as they pass through the door and move them independently of the main rail.

4. A conveyer having spaced carrying elements, a door through which the conveyer moves, a reciprocating main rail detachably connected with the carrying elements to move them, a reciprocating auxiliary rail adjacent the door and detachably connecting with the carrying elements to move them through the door, and a differential driving connection between the main rail and the auxiliary rail whereby both rails reciprocate together but at different speeds.

5. An apparatus of the kind described comprising a reciprocating element, carrying elements actuated by said reciprocating element, a door through which said carrying elements pass, an auxiliary reciprocating element actuated by said first mentioned reciprocating element in unison therewith but at a greater rate of speed than said first mentioned reciprocating element and adapted to move said carrying elements through said door.

6. Apparatus of the kind described comprising a reciprocating member, carrying elements actuated thereby, a second reciprocating member operated by said first named reciprocating member and arranged adjacent said first named reciprocating member for a portion of the length of the latter and reciprocating at a different rate of speed from said first named reciprocating member, and means on said second named reciprocating member for engaging said carrying elements whereby to advance the same at a different rate of speed from the former speed.

7. Apparatus of the kind described comprising a reciprocating member, spaced carrying elements moved forwardly thereby, and an advancing member actuated by said reciprocating member and so arranged as to advance the carrying elements through a portion of the apparatus at an increased rate of speed.

8. Apparatus of the class described comprising an element, a reciprocating member for moving said element step by step, and a second reciprocating member for independently moving said element through a portion of its travel, the second member reciprocating in phase with the first member but having a longer stroke whereby the independent movement of the element occurs at an increased rate of speed.

In testimony whereof, I have signed my name to this specification this 5th day of February, 1924.

AARON S. NICHOLS.