

Nov. 11, 1941.

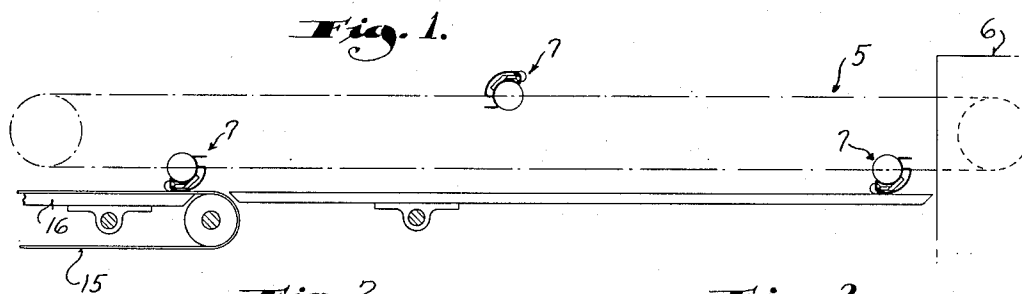
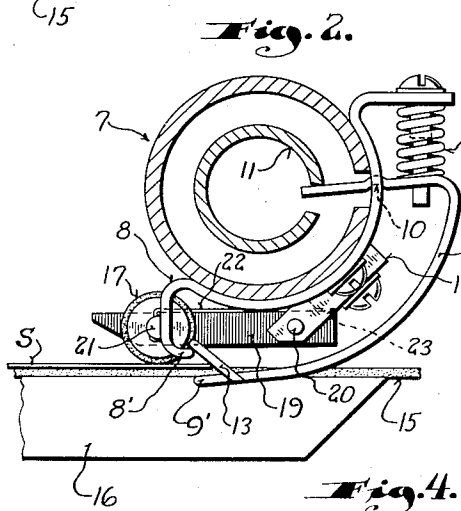
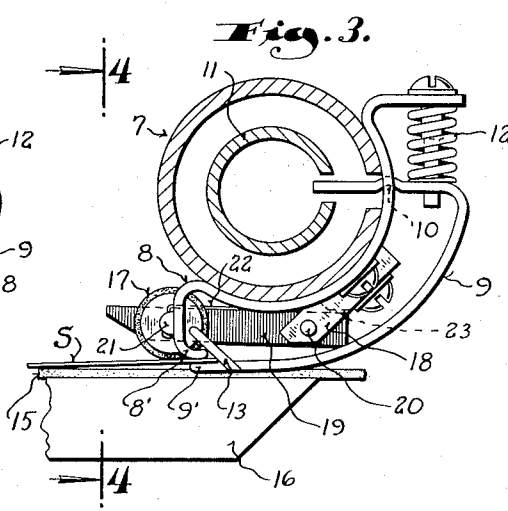
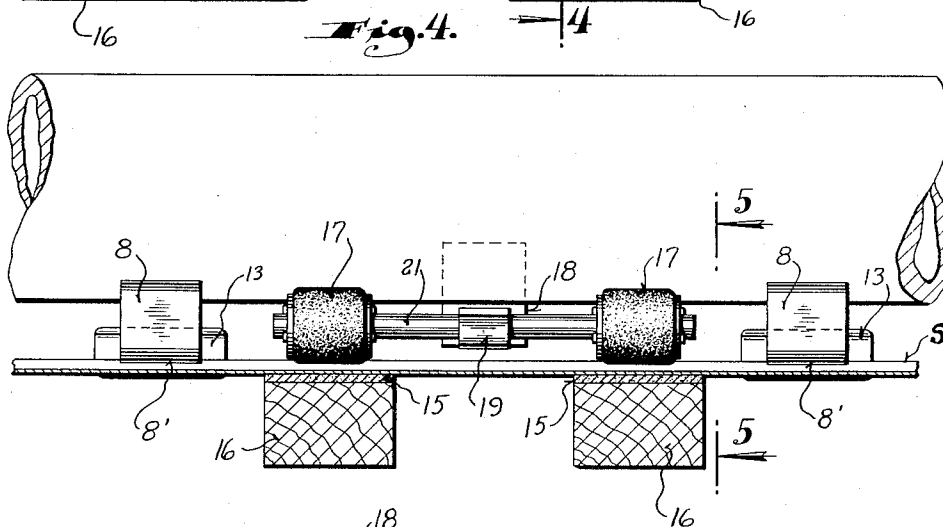
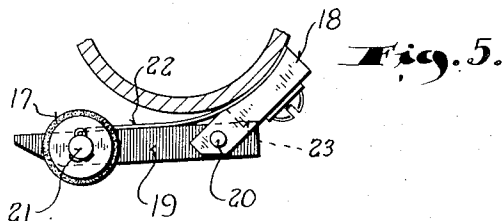
F. R. BELLUCHE

2,262,631

SHEET CONVEYER

Filed Sept. 14, 1940

2 Sheets-Sheet 1



Inventor
 Frank R. Belluche
 by *W. H. Jones*
 Attorney

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SHEET CONVEYER

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2 Sheets-Sheet 2

Fig. 6.

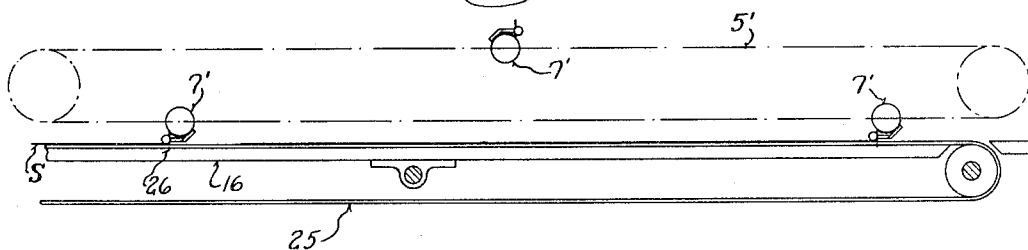


Fig. 7.

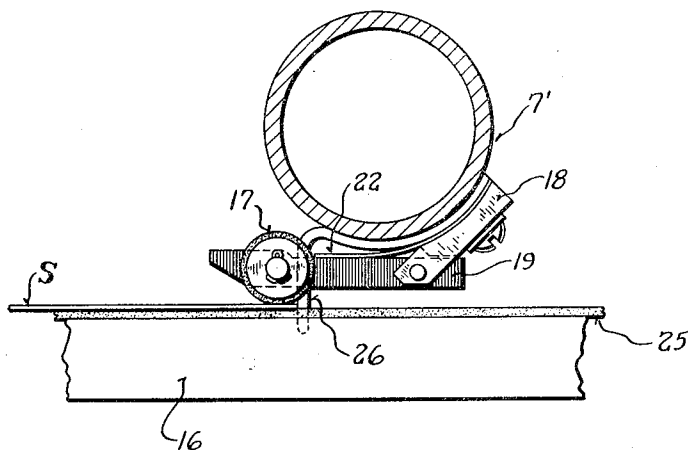
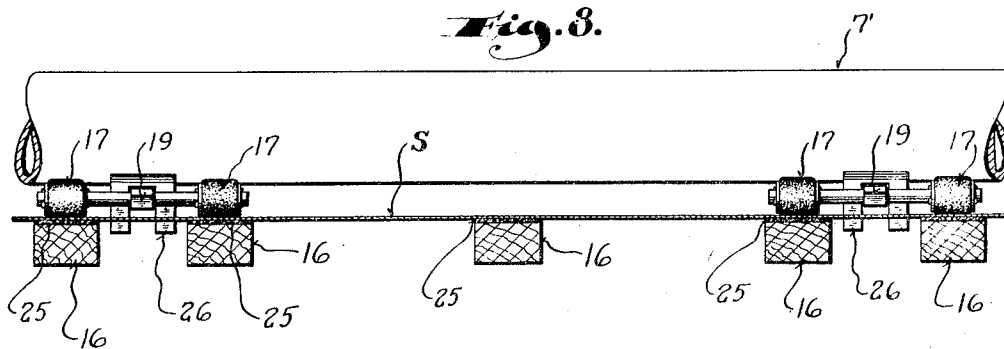


Fig. 8.



Inventor
Frank R. Belluche
by *Donald H. Jones*
Attorney

UNITED STATES PATENT OFFICE

2,262,631

SHEET CONVEYER

Frank R. Belluche, Racine, Wis.

Application September 14, 1940, Serial No. 356,768

11 Claims. (Cl. 271—46)

This invention relates to sheet conveyers and refers particularly to the transfer of sheets from one conveyer to another, and specifically to the transfer of sheets to the grippers of an endless chain conveyer.

As is well known in the art, these chain conveyers consist of a pair of spaced apart endless chains trained about sprockets and suitably guided and connected by gripper bars upon each of which a series of complementary jaws constituting the grippers per se are mounted.

This type of conveyer has a wide application in the printing art and is very often used to transfer sheets from one machine to another.

For instance, it may be employed to carry sheets from a printing press to a bronzer. In such cases the sheets issuing from the press are forwarded to the grippers of the chain conveyer which then carries them to the bronzer.

In certain types of presses the speed of the sheets is extremely high, as for instance, in a flat bed two revolution press. Consequently, as the sheets are delivered from the press they strike the stops on the grippers with considerable force so that the sheets often bounce away from the stops, even to the extent that they escape entirely the bite of the grippers.

This situation obviously is undesirable, and in the past has proved to be a source of serious trouble.

The present invention, therefore, has as an object the provision of means for preventing rebound of the sheets as they are presented to the grippers.

Another object of this invention is to provide means for preventing the sheets from bouncing away from their stops on the grippers which in nowise complicates the conveyer or involves the addition of expensive mechanism.

Another object of this invention resides in the provision of simple means for straightening and properly locating the sheets on a tape conveyer by which the sheets are being conveyed.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate two complete examples of the physical embodiment of the invention constructed in accordance with the

best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a diagrammatic view of a sheet conveyer embodying this invention;

5 Figure 2 is an enlarged cross sectional view through one of the gripper bars, illustrating its grippers open and the sheet in position therein;

Figure 3 is a view similar to Figure 2 but showing the grippers closed;

10 Figure 4 is a sectional view through Figure 3 on the plane of the line 4—4;

Figure 5 is a detail sectional view taken through Figure 4 on the plane of the line 5—5;

15 Figure 6 is a diagrammatic view illustrating the use of this invention for straightening and properly locating the sheets on an endless tape conveyer;

Figure 7 is a cross sectional view through one of the sheet straighteners; and

20 Figure 8 is a front view thereof.

Referring now particularly to the accompanying drawings, in which like numerals indicate like parts, the numeral 5 designates generally an endless chain type sheet conveyer arranged to present sheets to a given designation 6 which may be a bronzer, a printing press, or any other machine or unit to which sheets are to be fed.

25 The chain conveyer comprises a pair of sprocket chains trained about sprockets and connected by gripper bars 7, each of which has a series of complementary stationary and movable jaws 8 and 9, respectively, mounted thereon.

30 While the specific construction of the grippers per se or the manner of their actuation forms no part of this invention, it is to be noted that the stationary jaws partially embrace the gripper bars and that the movable jaws 9 are hinged to the stationary jaws as at 10, with a portion thereof entering the outer tube of the gripper bar to be engageable by a rotatable actuating shaft or tube 11.

The manner in which the actuating shaft or tube 11 is rotated at the proper time to open the grippers, closure thereof being effected by springs 12, is described at length in Patent No. 2,024,140, issued to Frank R. Belluche, December 17, 1935.

35 The complementary jaws have sheet engaging portions 8' and 9' and the movable jaws carry stops 13 against which the leading edges of the sheets S are brought to bear during their presentment to the grippers. The stops 13 properly locate the sheets in the bite of the grippers.

40 For presenting the sheets to the grippers, a tape conveyer 15 is provided which, as is customary, consists of a plurality of tapes trained

about rollers and having a portion thereof traveling in the path of the grippers. This overlap of the two conveyers defines a transfer zone within which the leading edges of the sheets move into the bite of the open grippers and the gripper jaws close down on the sheets.

Within this zone, the tapes are supported by sticks or other suitable means 16, and to insure complete entry of the leading edges of the sheets into the bite of the grippers, the tape conveyer 15 travels at a speed in excess of that of the gripper bars.

As pointed out hereinbefore, the machine from which the sheets are taken to be presented to the chain conveyer may have an exceedingly high rate of sheet motion so that the sheets carried forwardly by the tape conveyer 15 may strike the stops 13 with considerable force, and if the speed differential is high enough, which is often the case, the sheets are apt to bounce away from the stops causing a "tie up" and considerable inconvenience.

The present invention entirely eliminates this objectionable possibility.

To this end one or more rollers 17 are mounted to ride on the tape conveyer and on top of the sheets as they are presented to the grippers to frictionally hold them against bouncing away from the stops.

These rollers are carried by the gripper bars and are located slightly in advance of the sheet engaging portions of the jaws.

A simple manner of mounting these rollers comprises a base 18 secured to the gripper bar and having a bifurcated end portion in which an arm 19 is pivotally mounted as at 20. The outer end of the arm 19 has a shaft 21 fixed thereto on which the rollers 17 are freely journaled.

The surface of the rollers is formed of rubber or some other material having a high coefficient of friction.

A light leaf spring 22 having one end anchored by being confined between the base 18 and the gripper bar, and having its other end bearing on the arm 19, yieldingly urges the arm and consequently the rollers carried thereby, outwardly and downwardly toward the tape conveyer.

The spring propelled motion of the arm 19 and the rollers carried thereby is limited by the engagement of the tail end portion of the arm with a stop abutment 23 formed by the closed end of the bifurcation in the base 18.

With this arrangement, the leading edge portions of the sheets as they are presented to the open grippers first ride under the rollers, which thus cooperate with the moving tapes to hold the sheets against bouncing away from the stops 13 during the time the gripper jaws are closing.

The number of rollers carried by the gripper bars depends of course upon the width of the conveyer.

It is also possible to utilize this invention as a timing device by properly locating and straightening the sheets on the tape conveyer, and in Figures 6, 7 and 8, one manner of so using the inventive concept is illustrated.

In this embodiment of the invention, transfer of the sheet from one conveyer to the other is not contemplated. The top stretch of the tape conveyer 25 and the bars 7' carried by the endless chains 5' when moving along the lower stretch, travel the same path for a substantial

distance. The bars 7' in this construction, however, carry no grippers, but only stops 26 and the pull-up rollers 17.

As best shown in Figure 7, each stop 26 is formed by the downwardly or outwardly directed end portion of an arm partially embracing the cross bar 7'. The stop is bifurcated as shown in Figure 8 to accommodate the lever 19 upon which the pull-up rollers are mounted, and the entire unit is attached to the cross bar 7' by the attachment of the supporting base 18 thereto.

As in the embodiment of the invention previously described, a light leaf spring 22 yieldingly urges the lever 19 and consequently the pull-up rollers outwardly a limited extent so that as the sheets are brought forwardly on the tape conveyer they are pulled up against the stops 26.

It is, of course, to be understood that the tape conveyer 25 travels slightly faster than the sprocket chains 5' carrying the cross bars 7'. Hence, by virtue of this speed differential the leading edges of the sheets carried by the tape conveyer ride under the pull-up rollers to be brought firmly against the stops 26, and inasmuch as at least two stops are used across the width of the sheet, proper positioning and straightening of the sheet on the tape conveyer is assured.

From the foregoing description, taken in connection with the accompanying drawings, it will be readily apparent that this invention provides a valuable improvement in sheet conveyers for it completely eliminates the possibility of failure during the transfer of the sheets to the grippers resulting from having the sheets bounce out of the bite of the gripper jaws. It is also apparent that this invention provides an exceedingly simple manner of straightening and properly locating the sheets on a tape conveyer.

What I claim as my invention is:

1. In a sheet conveyer: a gripper; means for moving the gripper along a defined path; a conveyer for carrying sheets to the gripper, said conveyer moving in the direction of forwarding motion of the gripper but at a rate of speed in excess of that of the gripper so as to carry the sheets into the bite of the gripper; and said means for moving the gripper including means for holding the sheets down on the conveyer to preclude their bouncing out of the bite of the gripper prior to closure of the gripper.

2. In a sheet conveyer: a gripper having complementary jaws to grip the leading edge of a sheet presented thereto and having a stop against which the leading edge of the sheet is brought in its presentment to the gripper; means for feeding sheets to the gripper, said means forwarding the sheets to the gripper at a rate of speed in excess of the forwarding motion of the gripper so as to bring the leading edges thereof against the stop; and means movable with the gripper and exerting a holding action on the sheets prior to closure of the gripper jaws to thereby preclude bouncing of the sheets away from the stop.

3. In a sheet conveyer: a gripper constrained to movement in a defined path and having complementary jaws adapted to grip the leading edges of sheets presented thereto; a stop against which the leading edges of the sheets are brought in their presentment to the gripper; sheet advancing means for presenting sheets to the gripper; and means movable with the gripper and cooperating with the sheet advancing means for

holding the sheets against bouncing away from the stop.

4. In a sheet conveyor: gripper means having complementary jaws adapted to grip the leading edges of sheets presented thereto and having stop means for locating the sheets in the bite of the gripper means; means for moving the gripper means along a defined path; a tape conveyor for presenting sheets to the gripper means, said tape conveyor having a portion thereof movable along the path of the gripper means but at a rate of speed in excess of that of the gripper means so that the leading edges of sheets carried by the tape conveyor are presented to the gripper means and brought to bear against the stop means; and means movable with the gripper means and co-operable with the tape conveyor to hold the sheets against bouncing away from the stop means.

5. In a sheet conveyor: gripper means having complementary jaws adapted to grip the leading edges of sheets presented thereto and having stop means for locating the sheets in the bite of the gripper means; means for moving the gripper means along a defined path; a tape conveyor for presenting sheets to the gripper means, said tape conveyor having a portion thereof movable along the path of the gripper means but at a rate of speed in excess of that of the gripper means so that the leading edges of sheets carried by the tape conveyor are presented to the gripper means and brought to bear against the stop means; and spring pressed roller means movable with the gripper means and yieldingly urged toward the tape conveyor to cooperate therewith in holding the sheets against bouncing away from the stop means.

6. In a sheet conveyor: a gripper bar carrying a plurality of complementary jaws forming sheet grippers and carrying stop means for locating the sheets with relation to the jaws by having the leading edges of the sheets engage the same; means for moving the gripper bar along a defined path; a tape conveyor for presenting sheets to the grippers, said tape conveyor having a portion thereof traveling along the defined path of the grippers but at a rate of speed in excess of that of the grippers so that the leading edges of the sheets carried by the tape conveyor are introduced into the bite of the open grippers and against the stop means; a roller arranged to ride on top of the leading edge portion of a sheet as it is presented to the grippers to cooperate with the tape conveyor in holding the sheets against bouncing from the stop means; and means movably supporting the roller from the gripper bar.

7. In a sheet conveyor: a gripper bar carrying a plurality of complementary jaws forming sheet grippers and carrying stop means for locating the sheets with relation to the jaws by having the leading edges of the sheets engage the same; means for moving the gripper bar along a defined path; a tape conveyor for presenting sheets to the grippers, said tape conveyor having a por-

tion thereof traveling along the defined path of the grippers but at a rate of speed in excess of that of the grippers so that the leading edges of the sheets carried by the tape conveyor are introduced into the bite of the open grippers and against the stop means; a roller arranged to ride on top of the leading edge portion of a sheet as it is presented to the grippers to cooperate with the tape conveyor in holding the sheets against bouncing from the stop means; means movably supporting the roller from the gripper bar; and spring means yieldingly urging the roller toward the tape conveyor.

8. In a sheet conveyor: a sheet stop; means for moving the sheet stop along a defined path; a conveyor for carrying sheets to the stop; said conveyor moving in the same direction as the stop but at a rate of speed in excess of that of the stop so as to carry sheets thereto; and said means for moving the sheet stop including means for holding sheets down on the conveyor to preclude their bouncing away from the sheet stop.

9. In a sheet conveyor: a movable sheet stop against which the leading edge of a sheet being conveyed is adapted to be brought; means for moving the sheet stop along a defined path; means for forwarding sheets from a source of supply to said sheet stop; said means traveling in the direction of movement of the stop at a rate of speed in excess of the motion of the stop so as to bring the leading edges of the sheets against the stop; and said means for moving the sheet stop including means for exerting a holding action on the sheets adjacent to the stop to preclude bouncing of the sheets away from the stop.

10. In a sheet conveyor: an endless tape arranged to carry sheets along a defined path; a sheet stop; means for moving the sheet stop along said defined path but at a rate of speed slower than that of the tape so that the leading edge of the sheet carried by the tape is brought against the stop; and a roller movable with the sheet stop and engaging the tape ahead of the stop so that the leading edge portion of the sheet advanced by the tape rides under the roller to be held thereby against bouncing away from the stop and to be drawn toward the stop to insure proper positioning of the sheet on the tape.

11. In a sheet conveyor: an endless tape arranged to carry sheets along a defined path; a sheet stop; means for moving the sheet stop along said defined path but at a rate of speed slower than that of the tape so that the leading edge of the sheet carried by the tape is brought against the stop; a roller movable with the sheet stop and engaging the tape ahead of the stop so that the leading edge portion of the sheet advanced by the tape rides under the roller to be held thereby against bouncing away from the stop and to be drawn toward the stop to insure proper positioning of the sheet on the tape; and spring means yieldingly urging the roller toward the tape.

FRANK R. BELLUCHE.