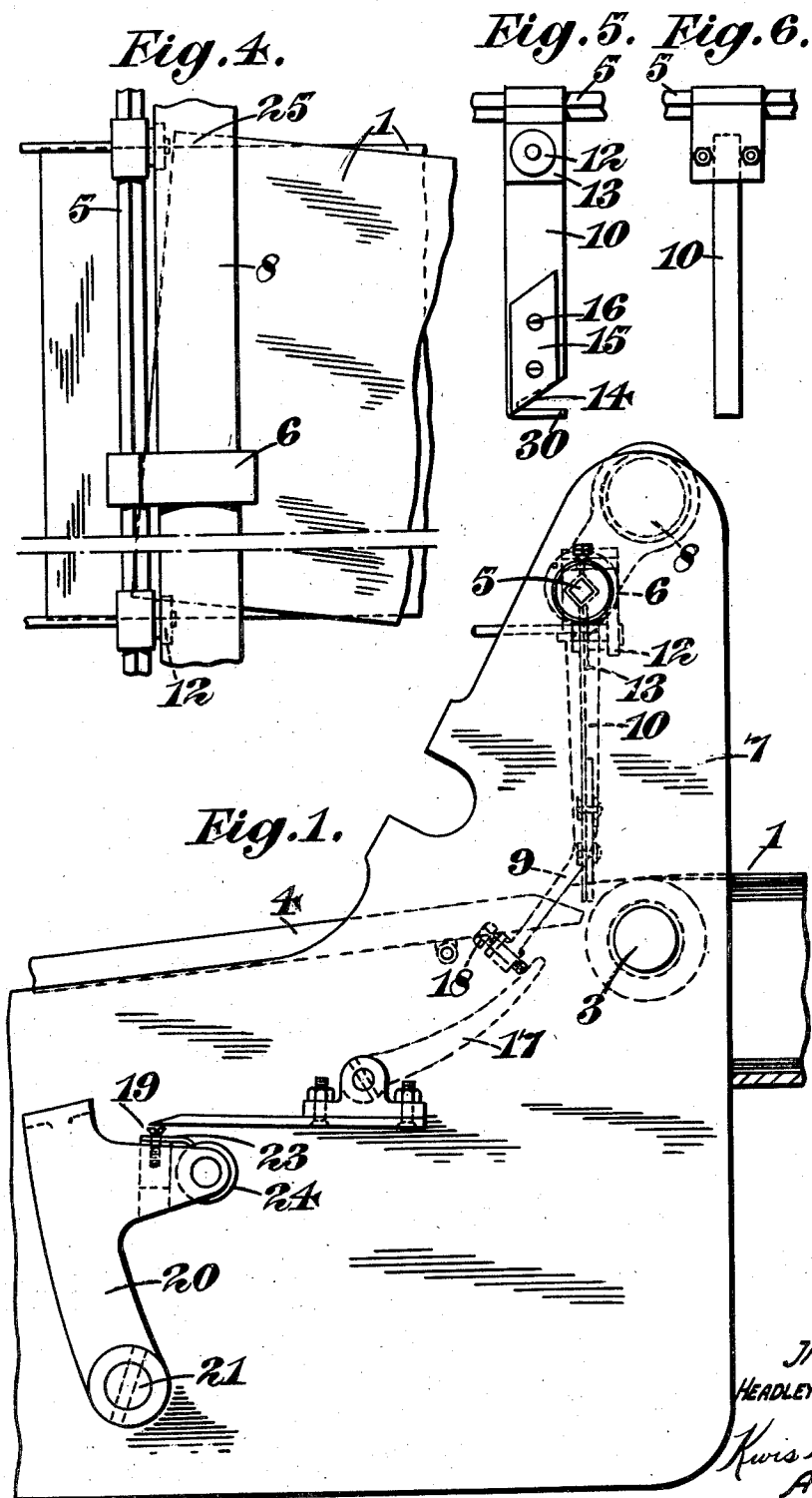


April 11, 1939.

H. T. BACKHOUSE
DEVICE FOR AUTOMATICALLY STOPPING SHEET CONVEYERS
FOR PRINTING OR LIKE MACHINES
Filed Feb. 12, 1935

2,154,022

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

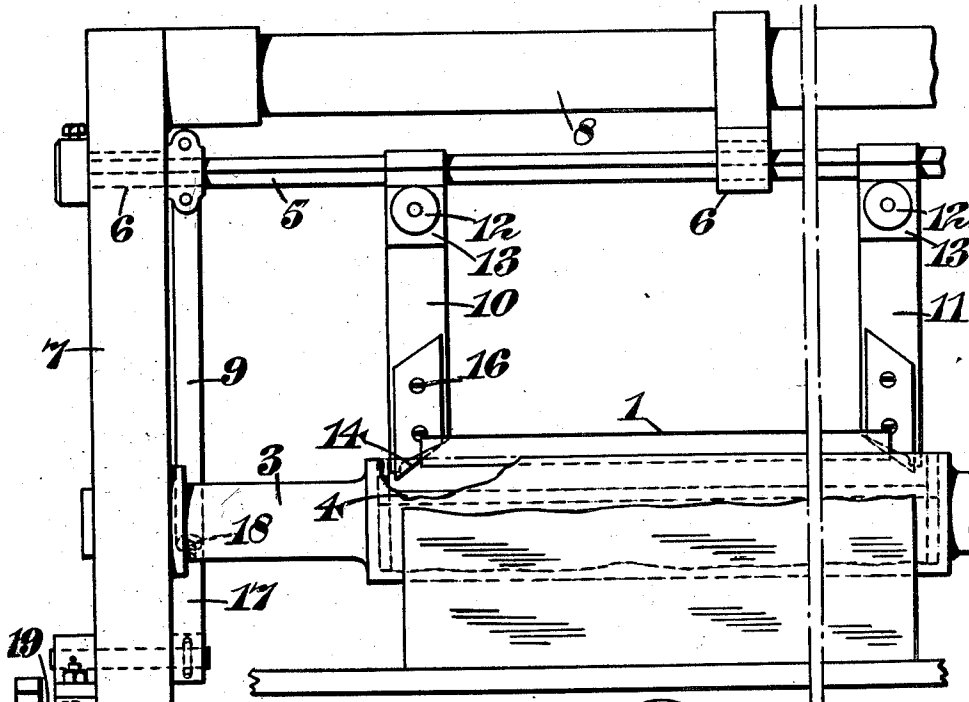


Fig. 2.

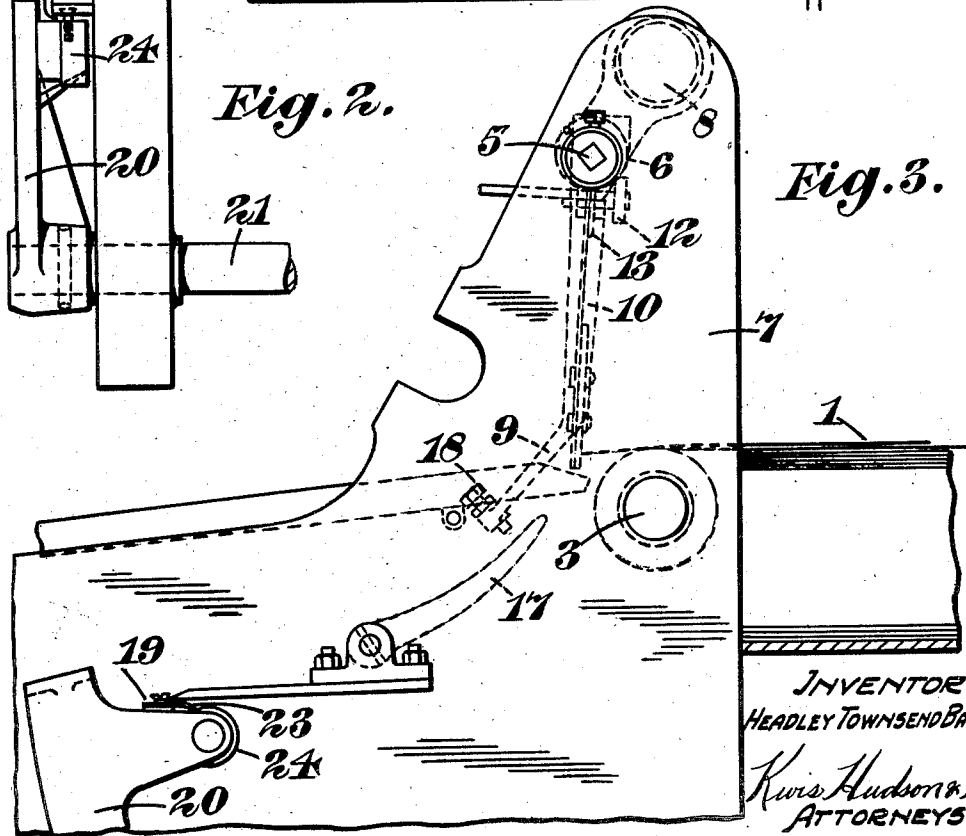


Fig. 3.

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3 Sheets-Sheet 3

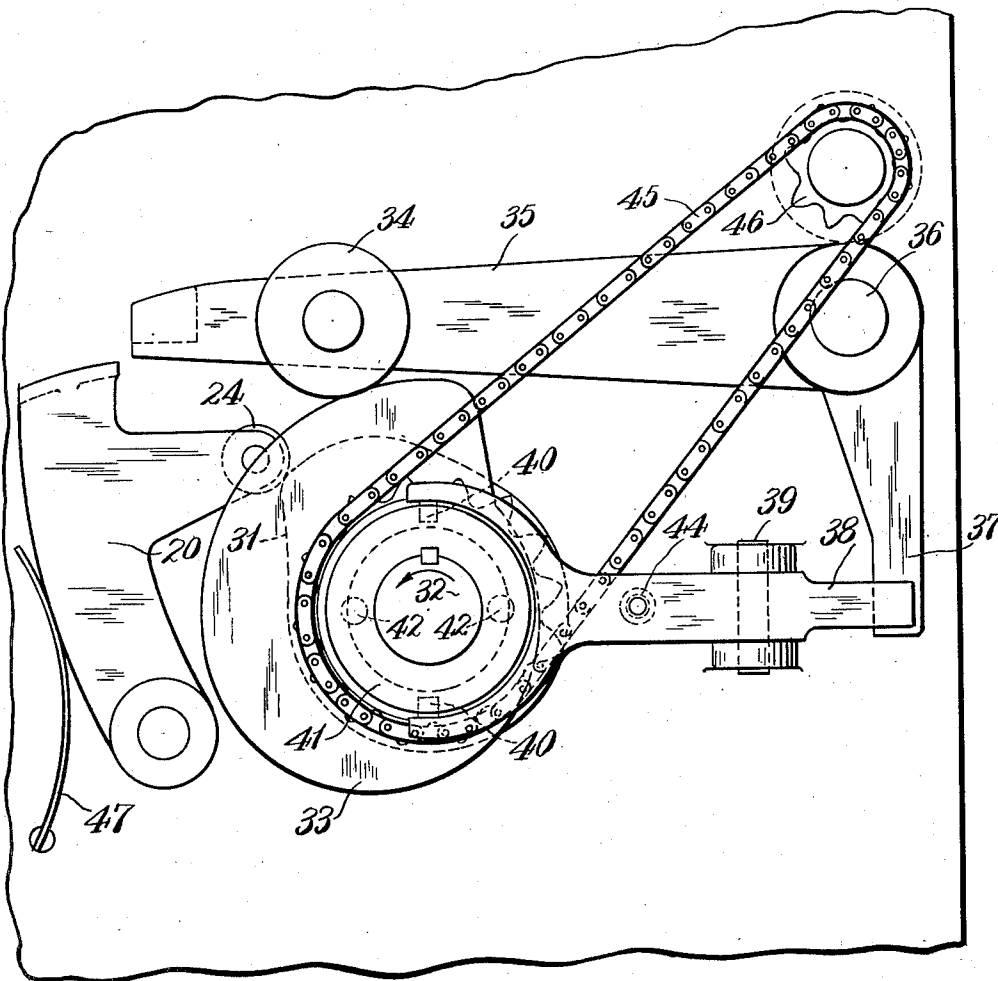


FIG. 7

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2,154,022

DEVICE FOR AUTOMATICALLY STOPPING
SHEET CONVEYERS FOR PRINTING OR
LIKE MACHINES

Headley Townsend Backhouse, London, England

Application February 12, 1935, Serial No. 6,224
In Great Britain March 3, 1934

18 Claims. (Cl. 192—126)

This invention consists in improvements in or relating to devices for automatically stopping sheet conveyers for printing or like machines and relates particularly, although not exclusively, to conveyers operating to convey the sheets in partly overlapping formation. Such conveyers are frequently employed in conjunction with sheet separating devices to carry the separated sheets to a printing or like machine, and it is an object of this invention to provide mechanism which stops the operation of the conveyer and, if desired, also the separating device and the printing machine when a sheet is misplaced on the conveyer.

The invention comprises, in the feeding in succession of sheets of paper or the like along a track from one operating station to a second operating station by conveyer mechanism, the use of trip mechanism to stop the conveyer operable on conveyance of a misplaced sheet by that part of the misplaced sheet which extends laterally of the track beyond the normal line of the edges of the sheets.

When the sheets are being conveyed in partly overlapped formation it is desirable that the conveyer should be stopped immediately a sheet is misplaced thereon since the subsequent sheets will be misplaced in correcting the faulty sheet and the trip mechanism according to the invention is therefore preferably placed near the commencement of the conveyer.

In one form of the invention the trip mechanism comprises two detector elements located on opposite sides of the supporting surface over which the sheets are conveyed and forming a gateway through which the sheets may pass freely when conveyed within a predetermined lane on the surface, said detector elements being constructed and arranged as movable abutments adapted to intercept one or each edge of any sheet misplaced from the lane aforesaid and to be moved by said misplaced sheet, combined with mechanism operated by movement as aforesaid of a detector element to stop the conveyer.

The detector element may comprise an arm, arranged on partial rotation to stop the conveyer, located at the side of the conveyer close to the normal line of the edges of the sheets and pivoted about an axis remote from the plane of the sheets and extending across the conveyer and the arm may be adjustable in position across the width of the conveyer.

Preferably the parts of the detector elements which intercept a misplaced sheet are formed of rubber or like material having a greater coefficient

of friction than metal. In one form of the invention the arm has a tapering notch through which the edges of the sheets normally pass and one or both of the edges of the notch may be of rubber or like material having a greater coefficient of friction than metal.

A specific embodiment of the trip mechanism according to the invention will now be described, by way of example, with reference to the accompanying drawings and as applied to a conveyer carrying sheets of paper from a sheet separator to a printing machine.

In these drawings—

Figure 1 represents a side view of the end of the conveyer adjacent to the sheet separator, and showing the trip mechanism with the parts in their normal position;

Figure 2 is an end view of the conveyer, with one side frame and adjacent parts omitted;

Figure 3 is a view similar to Figure 1 but showing the trip mechanism after operation by a misplaced sheet;

Figure 4 is a plan view of part of the mechanism shown in Figure 1 showing a misplaced sheet about to operate the trip mechanism, and

Figures 5 and 6 illustrate alternative forms of detector elements.

Figure 7 is a side elevational view showing one example of means for stopping the feeding of sheets when the trip mechanism is actuated.

Referring to Figures 1 and 2 the normal operation of the machine is that the sheets of paper are fed in succession and in partly overlapped formation from a pack 2 by a sheet separator, not shown, over a roller 3 onto the conveyer surface 4 and are conveyed thereby to the printing machine.

Extending across the conveyer at the end nearer the sheet separator and above the conveying surface 4 is a bar 5 of square cross-section supported near each end and at the middle in circular bearings 6 of slightly greater diameter than the length of the diagonal of the bar. The end bearings are carried by the side frames 7 of the conveyer while the centre bearing is supported from a rod 8 extending between the side frames. The bar is arranged so that in the normal position one of its diagonals is approximately vertical as shown in Figures 1 and 3 and one of its edges consequently provides a "knife edge" bearing in the supporting bearings. Hanging from the bar are three arms 9, 10 and 11 one of which (9) is located at an end of the bar adjacent to the supporting bearing and is rigidly attached to the bar and the other two (10 and 11) of which

form the detector elements and are located between the supporting bearings. These detector elements are slidable along the length of the bar for adjustment to sheets of different widths and can then be securely clamped to the bar by means of knurled screws 12 and clamps 13. Each detector arm has an inclined edge 14 the centre of which is at the level of the sheets on the conveyor and located so that the edges of the sheets normally pass close to the edge. This inclined edge slopes upwardly, the higher part extending partly over the sheets on the conveyor, at an angle of 15° to 20° and is formed by the edge of a piece of rubber 15 secured to the arm by screws 16. The arms 10 and 11 are so located that the inclined edge is between the roller 3 and the conveyor surface 4 but the arrangement is such that the inclined edge in combination with the general surface of the mechanism forms a notch through which the sheets normally pass. The arm 9 adjacent to the supporting bearings contacts with a lightly weighted trip lever 17 through an adjusting screw 18 and normally prevents the trip lever engaging with a stop 19 on an arm 20 attached to a shaft 21.

The arm 20 is part of the control mechanism embodied in the normal feeder, and is oscillated at each cycle of the machine by a cam 31 keyed to a shaft 32, the cam 31 engaging the roller 24 which is held against the cam by a spring 47 bearing upon the arm 20. A second cam 33 also keyed to shaft 32 engages a roller follower 34 on a bell crank 35 pivoted at 36 to the frame of the machine. The extremity of the horizontal arm of lever 35 is adapted to rest upon and be supported by the upper extremity of lever 20 at times when the cam 33 is out of engagement with the roller 34.

The vertical arm 37 of lever 35 normally engages behind one extremity of a clutch shifting lever 38 mounted upon a vertical pivot 39. This lever is provided with bifurcated arms having pins 40 running in a groove in the periphery of a collar 41 which is keyed to shaft 32 but is slidable thereupon. A pair of dogs 42 project from the rear side of the collar 41 and normally engage correspondingly shaped sockets in a sprocket wheel 43 that is loose upon the shaft 32. A coil spring 44 tends to throw the left end of lever 38 forward, and thereby to disengage collar 41 from sprocket wheel 43. The sprocket wheel 43 drives a chain 45 which also runs over a sprocket wheel 46 on shaft 3 which carries a paper feeding roller. The shaft 3 may be taken as representative of the sheet feeding and forwarding mechanism.

Normally the lever 20 moves under the lever 35 at each revolution of the shaft 32 to hold the latter lever substantially in the position illustrated at times when it would otherwise fall because of the low spot in cam 33. Accordingly the vertical arm 37 of the bell crank lever remains in position behind lever 38 and works against the action of spring 44 to hold the clutch in engagement. When however the trip mechanism heretofore described causes the forward part of lever 17 to hold lever 20 away from the lower parts of its cam 31, as shown in Fig. 3, then the lever 35 is free to follow its cam, whereupon the vertical portion 37 of the lever 35 disengages the lever 38, and the spring 44 acts to disengage the clutch. Driving force to sprocket 46 is thereby interrupted, and the feeding of sheets is stopped.

The weight of the various parts is kept as low as possible and is wherever possible balanced so that the pressure on the detector elements re-

quired to rotate the trip lever is very small. An adjustable weight (not shown) on the trip lever may be provided for adjusting this pressure by sliding the weight along one arm of the lever and the adjusting screw 18 is provided for ensuring that the arms may be arranged to hang vertically when the mechanism is in the normal position.

In the operation of the device so long as the sheets pass along the conveyor in normal position they do not contact with the detector elements but if a sheet is twisted as shown at 25 in Figure 4 or laterally misplaced then it engages with the inclined edge of one element, carries the element forward and rotates the bar 5 thus causing the arm 9 also to rotate and to allow the trip lever 17 to rotate under its own weight in the anti-clockwise direction until it contacts with the arm 20 which is normally oscillated on shaft 21 through a small arc. If the lever 17 drops onto the arm when it is in the position shown in Figure 1 it rests on the stop 19 until the arm has moved to the left when it drops further onto the slide 23. On the return movement of the arm the lever engages under the stop 19 as shown in Figure 3 thus preventing further movement of the arm causing it to operate stopping mechanism as previously described.

Alternative forms of detector elements 10-11 are shown in Figures 5 and 6. The element shown in Figure 5 is similar to that described above except that it is provided with a horizontal portion 30 forming with the edge 4, a notch in which a misplaced sheet will tend to jam. This notch is, in use, located at the level of the sheets. In the form shown in Figure 6 the element consists of a plain rod of rubber or of suitable material coated with rubber and is so located that it will intercept the edge of a misplaced sheet.

It is to be understood that the invention is not restricted to the precise constructional details described and shown in the drawings. If it is desired to employ electrical operation, movement of arm 9 may be utilised to close or open an electric circuit whereby mechanism is operated to control the movement of the separator or the conveyor or both.

I claim:

1. In a machine for feeding in succession sheets of paper or the like along a track from one operating station to a second operating station by conveyor mechanism, trip mechanism to stop the conveyor operable on conveyance of a misplaced sheet, said trip mechanism comprising a side arm positioned alongside said track adapted to be engaged by that part of the misplaced sheet which extends laterally of the track beyond the normal line of the edges of the sheets.

2. Trip mechanism for a sheet conveyor comprising two detector elements located on opposite sides of the supporting surface over which the sheets are conveyed and forming a gateway through which the sheets may pass freely when conveyed within a predetermined lane on the surface, said detector elements being constructed and arranged as movable abutments adapted to intercept an edge of any sheet misplaced from the lane aforesaid and to be moved by said misplaced sheet, combined with mechanism operated by movement as aforesaid of a detector element to stop the conveyor.

3. Trip mechanism for a conveyor for separated sheets of paper or the like and operable by that part of a misplaced sheet which extends laterally beyond the normal line of the edges of the sheets

on the conveyer comprising a frame member, a pivot axis supported from the frame member and extending across the conveyer at a position remote from the plane of the sheets, an arm supported on the pivot axis and arranged for rotation about that axis by the part of a misplaced sheet aforesaid and on rotation to release devices arranged to stop the conveying action.

4. Trip mechanism for a conveyer for separated sheets of paper or the like and operable by that part of a misplaced sheet which extends laterally beyond the normal line of the edges of the sheets on the conveyer comprising a frame member, a pivot axis supported from the frame member and extending across the conveyer at a position remote from the plane of the sheets, an arm supported on, and adjustable along the length of, the pivot axis and arranged for rotation about that axis by the part of a misplaced sheet aforesaid and on rotation to release devices arranged to stop the conveying action.

5. A conveyer for separated sheets of paper or the like and arranged to convey the sheets along a plane, combined with trip mechanism operable by that part of a misplaced sheet which extends laterally beyond the normal line of the edges of the sheets on the conveyer and comprising a frame member, a pivot axis supported from the frame member and extending across the conveyer at a position remote from the said plane, an arm supported on the pivot axis with its lower end so shaped and located that it forms with the said plane a tapering notch through which the sheets normally pass while the part of a misplaced sheet as aforesaid will rotate the arm about the pivot axis and control means arranged to operate on rotation of the arm as aforesaid to initiate stopping of the conveying action.

6. Trip mechanism for a conveyer for separated sheets of paper or the like and operable by that part of a misplaced sheet which extends laterally beyond the normal line of the edges of the sheets on the conveyer comprising a frame member, a pivot axis supported from the frame member and extending across the conveyer at a position remote from the plane of the sheets, an arm having a tapering notch in its length and supported on the pivot axis with the notch so located that while the sheets normally pass through the notch the arm serves as a movable abutment adapted to intercept the extended edge of a misplaced sheet and to be rotated about the pivot axis thereby, combined with control means arranged on rotation of the arm as aforesaid to initiate stopping of the conveying action.

7. Trip mechanism for a sheet conveyer as claimed in claim 2 wherein those parts of the detector elements which intercept a misplaced sheet are of material having a greater coefficient of friction than metal.

8. Trip mechanism for a sheet conveyer as claimed in claim 2 wherein those parts of the detector elements which intercept a misplaced sheet are of rubber.

9. Trip mechanism for a conveyer for separated sheets of paper or the like and operable by that part of a misplaced sheet which extends laterally beyond the normal line of the edges of the sheets on the conveyer comprising a frame member, a bar pivotally supported on the frame member by knife edge bearings and extending across the conveyer at a position remote from the plane of the sheets, an arm attached to the bar and arranged for rotation with the bar on the said bearings by the part of a misplaced

sheet aforesaid combined with control means operable on rotation of the arm to initiate stopping of the conveying action.

10. Trip mechanism for a conveyer for separated sheets of paper or the like and operable by that part of a misplaced sheet which extends laterally beyond the normal line of the edges of the sheets on the conveyer comprising a frame member, a shaft supported in bearings on the frame member and extending across the conveyer at a position remote from the plane of the sheets, an arm attached to the shaft and arranged for rotation with the shaft by the part of a misplaced sheet as aforesaid, a second arm attached to the shaft and contacting with a trip lever which it normally prevents from engaging with mechanism for stopping the conveyer, the arrangement being such that rotation of the shaft by the part of a misplaced sheet as aforesaid engaging the first arm moves the second arm and allows the trip lever to engage the said stopping mechanism.

11. Trip mechanism for a conveyer for separated sheets of paper or the like and operable by that part of a misplaced sheet which extends laterally beyond the normal line of the edges of the sheets on the conveyer comprising a frame member, a pivot axis supported from the frame member and extending across the conveyer at a position remote from the plane of the sheets, an arm supported on the pivot axis and arranged for rotation about that axis by the part of a misplaced sheet aforesaid, the arm being located so close to the commencement of the conveyer that it will be engaged by a misplaced sheet before the sheet is wholly on the conveyer, combined with control means arranged for operation on rotation of the arm to initiate stopping of the conveying action.

12. In sheet handling apparatus, means for feeding sheets in a given path, and stop control means arranged along an edge of said path and adapted to be actuated by any sheet which extends beyond the path laterally, said control means being arranged when actuated to stop said paper feeding means.

13. In sheet handling apparatus, means for feeding sheets in a given path in partly overlapped formation, stop control means arranged along an edge of said path in a position to be engaged by a sheet which extends beyond the path laterally, said control means being adapted to be moved on its mounting when engaged by a moving sheet, and means connected with the control means for stopping said sheet feeding means when the control means is actuated.

14. In sheet handling apparatus, means for feeding sheets in a given path, side guides arranged adjacent said path on opposite sides thereof, one of said side guides being movably mounted and adapted to be shifted when a diagonally arranged sheet passes between the two guides, and means operatively connected with said movable side guide adapted when said guide is actuated to stop said sheet feeding means.

15. In sheet handling apparatus, means for feeding sheets in a given path, stop control means comprising a side guide arranged along an edge of said path and mounted to swing in a vertical plane parallel to the direction of movement of the sheets in said path, said guide carrying a friction pad adapted to be engaged by any sheet which extends beyond the path laterally on the side of said guide, said control means also com-

prising connections adapted to stop said sheet feeding means when the side guide is actuated.

16. In sheet handling apparatus, means for feeding sheets in a given path, side guides arranged adjacent said path on opposite sides thereof, one of said side guides being movably mounted to swing in a vertical plane parallel to the direction of movement of the sheets in said path, said guide carrying a friction pad adapted to be engaged by a disarranged sheet when it travels between the two guides, and means operatively connected with said movable side guide adapted when the latter is actuated to stop said sheet feeding means.

17. In a sheet handling apparatus, means for feeding sheets in a given path, a transverse shaft mounted for oscillation above said path, a pair of side guides secured to said shaft depending

therefrom on either side of said path, whereby a sheet extending laterally beyond the path on either side will engage at least one of said side guides and turn said shaft, and means adapted to be set in motion by the turning of said shaft for stopping said sheet feeding means.

18. In a mechanism for feeding in succession sheets of paper or the like along a track from one operating station to a second operating station by conveyer mechanism, trip mechanism to stop the conveyer operable on conveyance of a misplaced sheet, said trip mechanism comprising means positioned alongside said track adapted to be actuated by that part of the misplaced sheet which extends laterally of the track beyond the normal line of the edges of the sheet.

HEADLEY TOWNSEND BACKHOUSE.