April 7, 1953 L. C. WILLIAMS 2,634,126

SHEET CONTROLLING MECHANISM

Filed Nov. 19, 1947 3 Sheets-Sheet 1

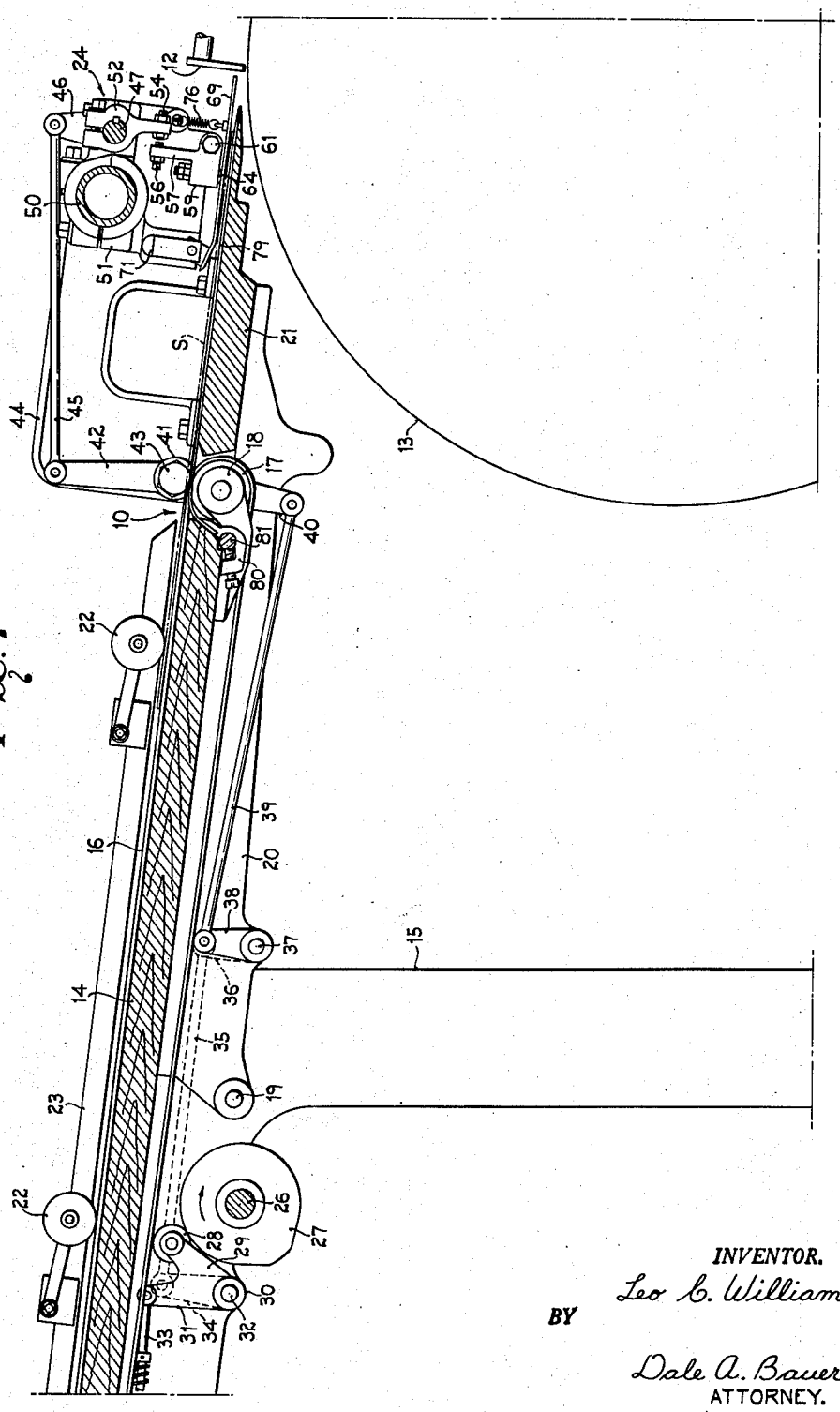


Fig. 1

INVENTOR.
Leo C. Williams

BY

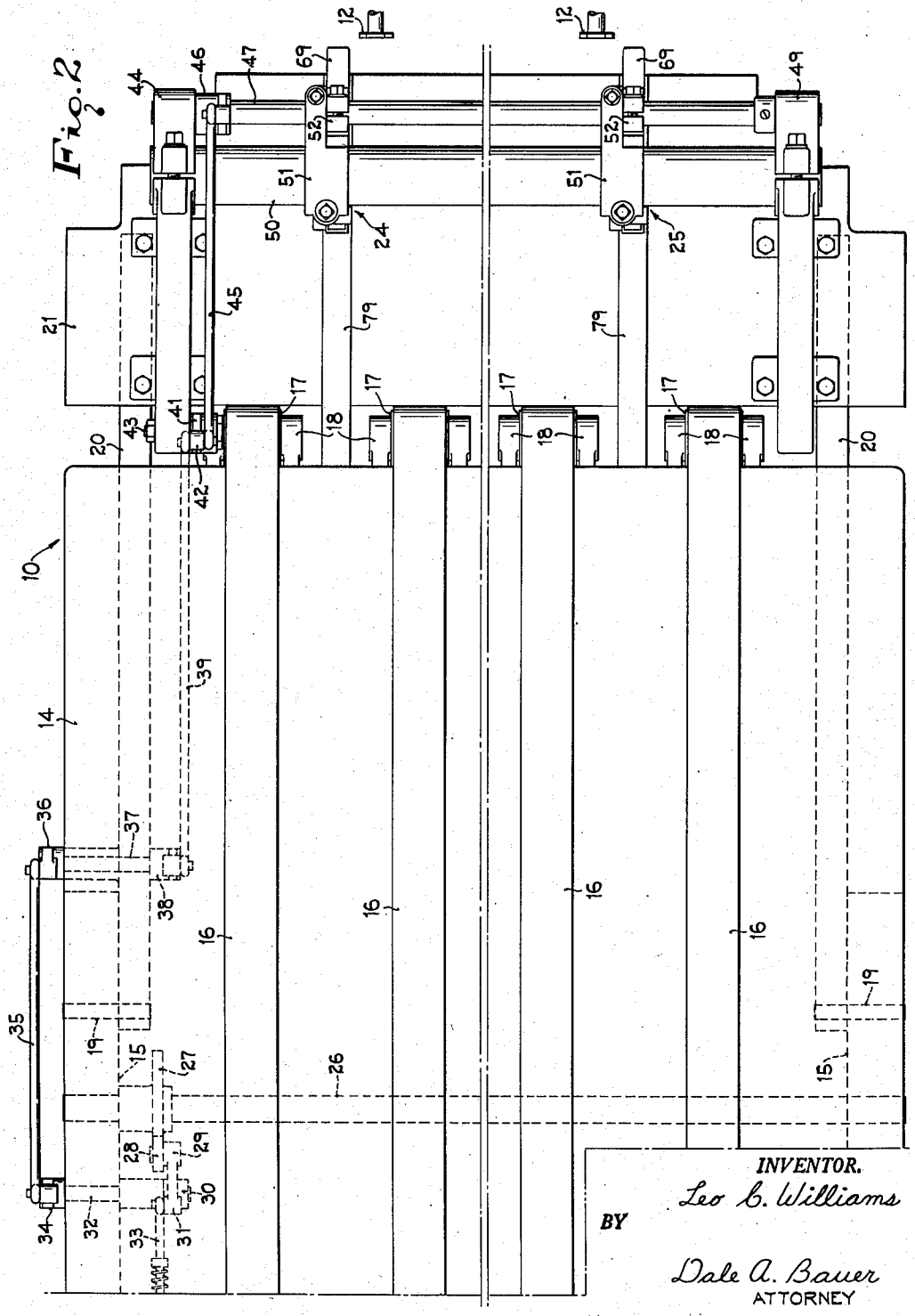
Dale A. Bauer
ATTORNEY.

April 7, 1953 L. C. WILLIAMS 2,634,126

SHEET CONTROLLING MECHANISM

Filed Nov. 19, 1947 3 Sheets-Sheet 2

Fig. 2



INVENTOR.
Leo C. Williams

BY

Dale A. Bauer
ATTORNEY

April 7, 1953 L. C. WILLIAMS 2,634,126

SHEET CONTROLLING MECHANISM

Filed Nov. 19, 1947 3 Sheets-Sheet 3

Fig. 3

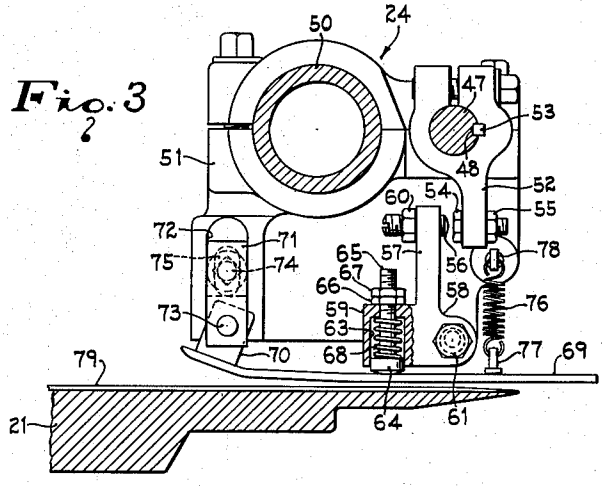


Fig. 4

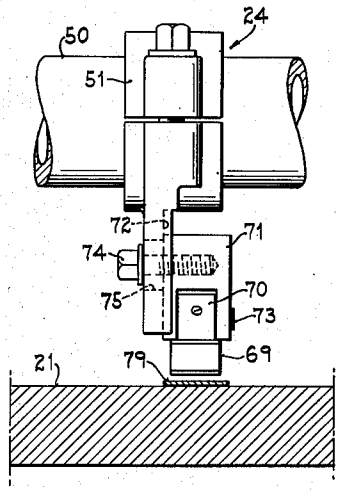
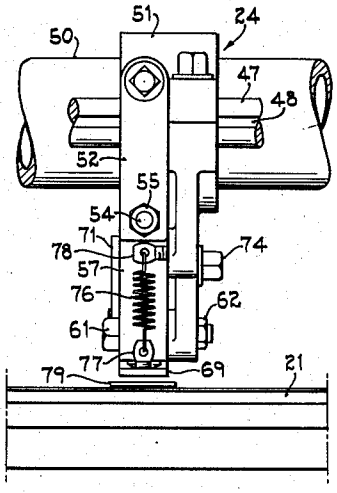


Fig. 5



INVENTOR.
Leo C. Williams

BY

Dale A. Bauer
ATTORNEY.

Patented Apr. 7, 1953 2,634,126

UNITED STATES PATENT OFFICE

2,634,126

SHEET CONTROLLING MECHANISM

Leo C. Williams, Pearl River, N. Y., assignor to Dexter Folder Company, Pearl River, N. Y., a corporation of New York

Application November 19, 1947, Serial No. 786,830

14 Claims. (Cl. 271—46)

1

This invention relates to sheet slow-down devices or retarders and while capable of general use, is more particularly adapted for embodiment in sheet feeders to enable the latter to feed sheets accurately at fast speed to printing presses or other machines.

One object of the present invention is to provide a novel method of retarding the movement of cardboard, metal, or other sheets as the same are rapidly conveyed toward a printing press or other machine for action thereon.

Another object is to provide a novel method of retarding the movement of sheets which, through application of a frictional drag thereon, enables large or heavy sheets to be more readily and accurately retarded.

Another object is to provide a novel sheet slow-down mechanism for retarding rapidly moving sheets without interrupting the forward movement thereof and without partaking in the movement of said sheets.

A further object is to provide a novel mechanism for retarding rapidly moving large or heavy sheets just prior to engagement thereof with front registering stops, whereby buckling, rebounding, and damage to the front edges of the sheets is entirely eliminated and accurate registration is obtained.

A still further object is to provide a novel sheet slow-down mechanism which is simple in construction, and is relatively inexpensive to manufacture and install.

The above and further objects and novel features of the present invention will more fully appear from the following detailed description when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only, and are not intended as a definition of the limits of the invention, reference for this latter purpose being had primarily to the appended claims.

In the drawings, wherein like reference characters refer to like parts throughout the several views,

Fig. 1 is a fragmentary vertical longitudinal section of the conveyor of a sheet feeder embodying sheet slow-down or retarding mechanism constructed and arranged in accordance with the present invention;

Fig. 2 is a top plan view of the conveyor and sheet slow-down mechanism shown in Fig. 1, with parts omitted for purposes of clearer illustration;

Fig. 3 is an enlarged side elevation, partly in

2

section, of one of the sheet slow-down devices shown in Figs. 1 and 2;

Fig. 4 is an end elevation, partly in section, of the sheet slow-down device shown in Fig. 3, looking from the left thereof; and

Fig. 5 is an end elevation of the sheet slow-down device shown in Fig. 3, looking from the right thereof.

Referring to the drawings, the cardboard or other sheets of similar stiff material are delivered one after another in timed relation onto a conveyor indicated generally at 10 from a supply of such sheets by a sheet feeder (not shown), and advanced by said conveyor into front registering position against conventional front stops 12 which are mounted in cooperative relation to the feed cylinder 13 of a printing press or other machine to which the sheets are fed. As well understood in the art, the front stops 12 are operated in synchronism with the feed of the sheets and the action of the printing press or other machine so as to be engaged by the leading edge of each sheet upon its arrival at the forward end of the conveyor 10. After the sheet is front registered by stops 12, said sheet is side registered by a side registering device (not shown) in a manner well understood in the art, whereupon stops 12 are moved upwardly and the registered sheet is gripped along its front edge by grippers (not shown) on cylinder 13 and taken into the printing press or other machine for performance of the printing or other operations thereon.

As herein shown, conveyor 10 comprises a feed board 14 which extends forwardly and downwardly from the sheet feeder proper and is supported in any suitable manner on side frames 15 disposed rearwardly of the printing press or other machine. Extending forwardly from the sheet feeder proper and over feed board 14 are tapes or belts 16 the front ends of which pass around anti-friction idler rollers 17 carried by brackets 18 which are secured to the underside of feed board 14 and project beyond the front edge thereof. The rear ends of tapes 16 pass around a driven roller (not shown) which is carried by the sheet feeder proper, as well understood in the art, and drives said tapes at a high surface speed whereby the successive sheets delivered thereto are rapidly advanced along feed board 14 and toward the front stops 12.

Secured to the underside of feed board 14 and further anchored to side frames 15 as indicated at 19, are side brackets 20 which project beyond the front edge of said feed board and the front ends of tapes 16. Secured to the projecting ends

of brackets 20 is a transversely extending sheet supporting plate 21 which forms an extension of feed board 14 and projects over cylinder 13 and into close proximity to the front stops 12. The upper surface of plate 21 is flush with the upper surface of feed board 14 and, as shown in Fig. 1, said plate is bevelled along its rear upper edge in order to insure that the sheets will not be obstructed by the plate as they move thereover from feed board 14.

Movement of the cardboard or other similar stiff sheets along feed board 14, onto and along plate 21 and into engagement with stops 12 is assured by a plurality of spring-pressed rider wheels 22 which cooperate with tapes 16. These wheels are spaced along a plurality of top rods or bars 23 that extend longitudinally of the feed board above the tapes and serve to prevent upward displacement of the sheets therefrom, as well understood in the art. Top rods 23 are supported in any suitable manner on the sheet feeder proper and on the feed board 14. The rider wheels 22 are so positioned with respect to the size of sheet being conveyed that engagement of the same with the sheet will be maintained until the front edge of said sheet contacts the stops 12.

It will thus appear that with the construction thus far described, the sheets delivered at timed intervals to the conveyor 10 will be advanced one after another at fast speed by the tapes 16 and rider wheels 22 along said conveyor and into engagement with the front stops 12. It will be apparent that if the fast moving sheets were permitted to engage the front stops 12 at such high velocity they would not only rebound and tend to buckle, resulting in poor registration, but the front edges thereof would also become bent, nicked, or otherwise damaged by impact with said stops which is objected to.

In accordance with the present invention, each sheet advanced by the driven tapes 16 is, prior to engagement thereof with the front stops 12, retarded by novel sheet slow-down mechanism. In this manner, each sheet will contact the front stops 12 at a comparatively slow speed, whereby rebounding and buckling of the sheet, and damage to the front edge thereof is completely eliminated, and accurate front registration is obtained. As herein shown, said sheet slow-down mechanism comprises at least two transversely spaced sets of slow-down devices indicated generally at 24 and 25 (Fig. 2) which are mounted at the front end of the conveyor 10 adjacent stops 12. The slow-down devices 24, 25 may, as desired, be operated either from the sheet feeder or the printing press or other machine to which the sheets are fed by suitable operating means which, as herein shown, comprises a cam shaft 26 that is driven continuously in any suitable manner and makes one complete revolution during each cycle of operation of the feeder and press or other machine. Cam shaft 26 extends transversely of conveyor 10 beneath feed board 14 and is journalled in suitable bearings in side frames 15.

Fixed on cam shaft 26 for rotation therewith in the direction of the arrow indicated in Fig. 1 is a cam 27 which engages a roller 28 that is journalled on the arm 29 of a double-armed lever 30, the other arm of which is indicated at 31 (Fig. 1). Lever 30 is secured to a pin 32 which is journalled in a suitable bearing in the adjacent side frame 15 and projects outwardly beyond said frame. Roller 28 is maintained in engagement

with cam 27 by a spring-pressed rod 33 having one end pivotally connected to the arm 31 of lever 30, and the opposite end guided by suitable well-known means (not shown) such as, a stud or post secured in the adjacent side frame 15.

Secured to the outwardly projecting end of pin 32 is an arm 34 to which is pivotally connected the rear end of a forwardly extending connecting rod 35. The front end of connecting rod 35 is pivotally connected to an arm 36 which is secured to a pin 37 that is journalled in a suitable bearing in the adjacent side bracket 20 and projects inwardly beyond said bracket. Secured to the inwardly projecting end of pin 37 is an arm 38 having pivotally connected thereto the rear end of a forwardly extending connecting rod 39. The front end of connecting rod 39 is pivotally connected to the lower arm 40 of a vertically extending double-armed lever 41, the upper arm of which is indicated at 42. Lever 41 is pivotally mounted at 43 on a side bracket 44 which is secured to the upper side of plate 21 adjacent one end thereof, the arm 40 of said lever projecting downwardly from pivot 43 through the space between said plate and feed board 14 to receive connecting rod 39.

Pivotally connected to the upper arm 42 of lever 41 is the rear end of a forwardly extending connecting rod 45, the front end of which is pivotally connected to an arm 46 that is keyed or otherwise suitably secured to a shaft 47 extending transversely of conveyor 10 above and in spaced relation to plate 21. Shaft 47 is provided with a longitudinally extending keyway 48 (Figs. 3 and 5), for purposes to appear hereafter, and is journalled at opposite ends thereof in suitable bearings in side bracket 44 and in a similar side-bracket 49 (Fig. 2) which is also secured to the upper side of plate 21 but adjacent the opposite end thereof. Brackets 44 and 49 are connected together by a transversely extending tie tube 50 that is clamped at opposite ends thereof in said brackets.

It will thus appear that shaft 47, through the described connections therefor with cam lever 30 and continued rotation of cam 27, will be rocked in a clockwise direction, as viewed in Figs. 1 and 3, by said cam, and in the opposite direction by spring-pressed rod 33, to operate the slow-down devices 24, 25 once for each sheet delivered to the conveyor 10 and advance thereby towards the front stops 12. The slow-down devices 24, 25 are identical in construction and operation and a description of one of said slow-down devices will therefore be sufficient for both of the same.

As herein shown, each of these slow-down devices 24, 25 comprises a split bracket 51 which is releasably clamped to the tie tube 50 to enable adjustment of said bracket and parts carried thereby hereinafter described along said tube transversely of conveyor 10 to various positions to accommodate sheets of different widths capable of being handled in the feeder. If desired, the slow-down devices 24, 25 may be positioned centrally of conveyor 10 and spaced to accommodate the minimum width of sheet capable of being handled in the feeder or which is to be handled in a specific installation and left in such position for action on all of the sheets from the minimum to the maximum width. Bracket 51 is formed to provide an additional bearing and support for rock shaft 47.

Disposed adjacent bracket 51 and releasably clamped to shaft 47 for adjustment therealong with said bracket is an arm 52 which extends

downwardly from said shaft (Fig. 3). Arm 52 is connected to shaft 47 for rocking movement therewith by a key 53 which is fixed in said arm and is slidably engaged in the keyway 48 in said shaft. Arm 52 may thus be adjusted along shaft 47 with bracket 51 without disturbing its operating position and the driving connection with said shaft. Carried by arm 52 at the lower free end thereof is a contact element 54 in the form of a bolt which extends through a clearance hole in said arm and is fixed therein by a lock nut 55.

Contact element 54 is adapted to engage an adjustable abutment member 56 in the form of a screw which is threaded in a suitable threaded opening in the upper free end of the vertically extending arm 57 of a bell crank lever 58, the other arm of which is indicated at 59 and extends at right angles to arm 57. Abutment member or screw 56 is held in adjusted position by a lock nut 60 threaded thereon. Bell crank lever 58 is pivotally mounted on an eccentric stud 61 (Figs. 3 and 5) which extends through a suitable opening in bracket 51 and is held in adjusted position by a nut 62 threaded thereon. Eccentric stud 61 provides for adjustment of bell crank lever 58 in a vertical plane relatively to bracket 51 to accurately align abutment member 56 with the contact element 54.

Arm 59 of bell crank lever 58 is provided in the lower surface thereof with an annular recess 63 (Fig. 3) within which is slidably mounted a plunger 64 having an externally threaded stem 65 that projects through a suitable opening in the upper surface of said arm and has threaded thereon an adjusting nut 66 and a lock nut 67. A compression coil spring 68 surrounds stem 65 within recess 63 and has one end engaged with plunger 64 and the opposite end engaged with the upper wall of said recess. Spring 68 urges plunger 64 downwardly, and yieldingly resists upward movement of said plunger for purposes to be hereinafter described. The downward movement of plunger 64 by spring 68 is limited by adjusting nut 66 which is also utilized to axially adjust said plunger and thereby the tension of said spring.

Plunger 64 is in continuous engagement with a flat elongated sheet engaging friction shoe 69 which is disposed above and in spaced relation to the front portion of the sheet supporting plate 21 and extends in the direction of travel of the sheets into close proximity to the front stops 12, (Fig. 1). As shown in Fig. 3 of the drawings, the front portion only of the friction shoe 69 is substantially straight so that only part of the length of said shoe is utilized to engage and apply a frictional drag on each sheet passing beneath the same and thereby effectively retard the movement of each sheet as it approaches the front stops 12. The intermediate portion of shoe 69 is slightly inclined upwardly and rearwardly to gradually guide the sheets beneath the straight portion, and the rear end of said shoe is further inclined upwardly and rearwardly at a greater angle so that the sheets will not be obstructed by the shoe as they move beneath the same. The lower surface of friction shoe 69 is highly polished so that it is free of any burrs or rough spots which might impede the normal forward movement of the sheets. It will be understood that the shape of the friction shoe 69 may be varied, as desired, to increase or decrease the contacting area of said shoe on the sheets.

The friction shoe 69 is mounted on bracket 51

for movement toward and away from the sheet supporting plate 21 under the action of bell crank lever 58. For this purpose, shoe 69 is pivotally mounted on bracket 51 by means of a block 70 which is welded or otherwise suitably secured to said shoe adjacent the rear end thereof and is received in the bifurcated lower end of a block 71 that is slidably fitted for vertical adjustment in a groove 72 formed in bracket 51. Block 70 on shoe 69 has secured therein a pin 73 which projects beyond opposite sides thereof and is journalled in suitable bearings in block 71. The latter is held in adjusted positions on bracket 51 by a screw 74 which extends through a slot 75 formed in said bracket and is threaded in block 71.

Friction shoe 69 is yieldingly urged upwardly and held in engagement with plunger 64 by a light extension spring 76 having one end connected to an anchor stud 77 threaded into said shoe adjacent the front end thereof, and the opposite end connected to a similar anchor stud 78 threaded into bracket 51. The tension of spring 76 is less than the tension of spring 68 and is of a degree sufficient to raise shoe 69 and therewith bell crank lever 58 through plunger 64 and spring 68 to their normal inoperative positions shown in Fig. 3, the tension of plunger spring 68 being such that it will carry the weight of bell crank 58 without yielding thereto. Accordingly, the bell crank lever 58, plunger 64 and spring 68 will be raised as a unit by spring 76 through friction shoe 69, and will also be lowered as a unit by cam 27 through arm 52 and engagement of contact 54 with abutment 56 until shoe 69 contacts the upper surface of the advancing sheet at which time and then only will plunger 64 yield upwardly so that a uniform pressure is applied on the sheet by shoe 69 and of a degree to impose a frictional drag thereon sufficient to slow down the sheet without interrupting the forward movement thereof. The required degree of pressure of the shoe 69 on the sheets to effectively retard the same is determined by the size, weight and speed of movement of the sheet, which may be regulated for the different sheets by adjusting abutment member 56 and/or the tension of plunger spring 68.

Cooperating with friction shoe 69 is a bottom friction tongue 79 which extends along and rests on the upper surface of the sheet supporting plate 21. This tongue 79 is made of a hardened metal, such as spring steel, and serves to prevent wearing of plate 21 by the frictional drag of the sheets thereover, said plate being usually made of aluminum or other soft and light metal. Hardened steel inserts embedded in the upper surface of plate 21 may be used in place of tongues 79, or the latter may be dispensed with if plate 21 is made of steel or some other wear resisting material. The front end of tongue 79 is bevelled to a feather edge, and the rear end of said tongue is curved downwardly to extend into the space between feed board 14 and plate 21 and has secured thereto a bracket 80 which is releasably clamped to a rod or pin 81 that is secured to the underside of said feed board.

In operation, the friction shoes 69 of the slow-down devices 24, 25 are first adjusted relative to the respective tongues 79 so that a clearance space slightly greater than the thickness of the cardboard or other sheet to be acted upon is left between said shoes and said tongues when the shoes are in their normal raised position, shown in Figs. 1 and 3, for the free forward travel of

the sheets toward and into engagement with the front stops 12. This adjustment is accomplished by loosening screws 74 and placing one of the sheets between the shoes 69 and tongues 79 and then vertically adjusting blocks 71 and therewith said shoes until the latter are just clear of the upper surface of the sheet. Screws 74 are then tightened to hold shoes 69 in their adjusted positions. Plungers 64 are then vertically adjusted, if necessary, by nuts 66 to bring the straight portions of the shoes 69 substantially parallel with the sheet whereupon said plungers and the arms 57 of bell crank levers 58 will be disposed substantially at right angles to said straight portions. The shoes 69 and associated parts are shown in Fig. 3 in the positions they occupy for action on the maximum thickness sheet capable of being handled.

With the high part of cam 27 in engagement with roller 28 so that arms 52 are rocked rearwardly and shoes 69 are moved downwardly into contact with the test sheet through engagement of contacts 54 with abutments 56 and rocking of bell crank levers 58, said abutments are then adjusted in either direction to increase or decrease the pressure of the shoes 69 on the sheet whereby the proper frictional drag is obtained to slow down the rapidly moving sheets as they approach the front stops 12.

Asssuming now that the above described adjustments have been made and that a sheet has been delivered to conveyor 10 and is being rapidly advanced by the tapes 16 and rider wheels 22 beneath the raised friction shoes 69. When the leading edge of the rapidly moving sheet is approximately two inches away from the front stops 12, as shown in Fig. 1 by the sheet S in broken lines, the friction shoes 69 are lowered into contact with the moving sheet under a uniform yielding pressure and thereby apply a frictional drag thereon in opposition to the driving force applied by the tapes 16 and rider wheels 22 on the trailing portion of the sheet, thus slowing down the sheet and causing the same to proceed slowly toward the front stops 12 under the urging action of said tapes and rider wheels, said tapes slipping relative to the sheet when and while said frictional drag is applied thereon. This frictional drag is effective for approximately twenty degrees of rotation of cam 27 at which time the sheet will have advanced to approximately one-half inch of the front stops 12. Thereupon, the friction shoes 69 are raised clear of the sheet and the latter is advanced by the tapes 16 and rider wheels 22 the remaining short distance at a comparatively slow speed and gently engaged with the front stops 12 in accurate front registering position. The front registered sheet is then side registered in a known manner whereupon the front stops 12 are raised and the sheet is carried into the printing press or other machine by the cylinder 13 for performance of the printing or other operation thereon. These operations are repeated in the order named once during each cycle of operation for each succeeding sheet delivered to conveyor 10

There is thus provided a novel and simplified method of and mechanism for retarding rapidly moving cardboard and other relatively stiff sheets prior to engagement thereof with sheet stops, whereby rebounding and buckling of said sheets and damage to the front edges thereof upon impact with said stops is completely eliminated, and accurate registration is obtained.

While the present invention is herein illustrated and described in connection with sheet feeders and enables the latter to feed relatively stiff sheets accurately to high speed printing presses and other machines, and to obtain a high output of accurately fed sheets, said invention is equally adaptable to other machines wherein relatively stiff sheets are rapidly conveyed and it is desired to slow down said sheets prior to performance of one or more operations thereon. Additionally, the sheet slow-down mechanism may be effectively employed to retard the movement of paper and similar light sheets by merely locating said mechanism to act on the rear or trailing portion of such sheets instead of on the front or leading portion of the sheets as herein illustrated and described. Various changes may also be made in the mechanical details some of which have been mentioned in the foregoing description, and in the design and arrangement of the parts illustrated without departing from the spirit and scope of the invention, as will now be clear to those skilled in the art. For a definition of the limits of the invention reference is had primarily to the appended claims.

What is claimed is:

1. In apparatus for operating on sheets, conveying means for receiving and advancing sheets in succession along a predetermined path, normally inoperative means fixed against movement with the successive sheets for engaging each advancing sheet in turn under pressure sufficiently to apply a sliding frictional drag thereon and thereby slow down the same at a predetermined point in said path while permitting continued advancing movement of the sheet at slow speed by said conveying means, and means operative when each advancing sheet is disposed in operative relation with said last-named means for moving said last-named means from a normal position spaced clear of the sheet into engagement with said sheet and for applying said pressure thereon.

2. In apparatus for handling sheets, a constant speed conveyor for receiving and advancing sheets successively along a defining path, friction means fixed against movement with the successive sheets and arranged and operated to engage the upper surface of each advancing sheet in turn and thereby apply a sliding frictional drag thereon to slow down the same while permitting continued movement of the sheet at slow speed by said conveyor, and means operative when each advancing sheet is disposed in operative relation with said friction means for moving said friction means from a normal position spaced clear of the sheet into engagement with said sheet and for applying a yieldable pressure thereon.

3. In apparatus of the class described, a conveyor including a plurality of belts for receiving and advancing sheets one after another along a defined path, friction means held against movement with the successive sheets and arranged and operated to engage the upper surface of each advancing sheet in turn and thereby apply a sliding frictional drag thereon to slow down the same at a predetermined point while permitting continued movement of the sheet at slow speed by said belts, means operative when each advancing sheet is disposed in operative relation with said friction means for moving said friction means from a normal position spaced clear of the sheet into engagement with said sheet and means for thereafter returning said friction means to said normal position and moving said friction

means out of engagement with the slowed down and still advancing sheet to release said sheet for free further movement by said belts.

4. In a sheet feeder, front stops, means for advancing sheets successively toward and into engagement with said front stops, and means for slowing down each sheet in turn as it approaches said front stops comprising, a friction member fixed against movement with the successive sheets and mounted for movement from a normal position spaced clear of the sheets into engagement with each advancing sheet to apply a sliding frictional drag thereon while permitting continued movement of the sheet by said advancing means and means operative when each advancing sheet is disposed in operative relation with the friction member for operating said friction member to engage the same with the sheet and to release the slowed down and still advancing sheet before its leading edge contacts said front stops.

5. In a sheet feeder, front stops, a constant speed conveyor for receiving and advancing sheets in succession toward and into engagement with said front stops, and means for slowing down each sheet in turn as it approaches said front stops comprising, a friction member fixed against movement with the successive sheets and arranged to engage each advancing sheet under pressure sufficiently to apply a sliding frictional drag thereon while permitting continued movement thereof by said conveyor, means mounting said friction member for movement into and out of engagement with each sheet, said friction member being normally spaced from the path of movement of the sheets a distance slightly in excess of the thickness of said sheets, means operative when each advancing sheet is disposed in operative relation with said friction member for moving said friction member into engagement with the sheet and for applying pressure thereon, means for moving said friction member out of engagement with the slowed down and still advancing sheet before its leading edge contacts said front stops to release said sheet for free further movement by said conveyor into contact with said front stops, and means for controlling said operations of said friction member.

6. In a sheet feeder, front stops, a continuously driven endless conveyor for advancing sheets successively toward and into engagement with said front stops, and means for slowing down each sheet in turn as it approaches said front stops comprising, a friction member fixed against movement with the successive sheets and arranged to engage each advancing sheet under pressure sufficiently to apply a sliding frictional drag thereon, means mounting said friction member for movement into and out of engagement with each sheet, means including a cam operated arm and a spring-pressed plunger carried by said arm and yieldingly engaged with said friction member for moving said friction member into engagement with each sheet and for applying a yieldable pressure thereon, means for moving said friction member out of engagement with the slowed down sheet to release said sheet, and means for controlling said operations of said friction member.

7. In a sheet feeder, front stops, means for advancing sheets successively toward and into engagement with said front stops, and means for slowing down each sheet in turn as it approaches said front stops comprising, two opposed friction members normally spaced apart a distance slightly in excess of the thickness of the sheets and arranged adjacent said front stops and between which the sheets are advanced, means fixedly mounting said members against movement with the successive sheets, means mounting one of said members for movement toward the other of said members to engage and press each sheet advanced between the same against said other member such that a sliding frictional drag is imposed on said sheet by both members while permitting continued movement of the sheet by said advancing means, and means operative when each advancing sheet is disposed in operative relation with the opposed friction members for operating said movable friction member to engage the same with the sheet and to release the slowed down and still advancing sheet before its leading edge contacts said front stops.

8. In a sheet feeder having a feedboard and conveyor means for moving sheets successively over said feedboard, a fixed transverse shaft mounted above said feedboard, a transverse rock shaft mounted above said feed board, a bracket secured to said fixed shaft, a sheet slow down member pivotally mounted on said bracket below said shafts and extending lengthwise of said feedboard in spaced relation therewith, the space between said member and said feedboard being in excess of the thickness of the sheets moving over the feedboard and passing under said member, a bell-crank pivotally mounted on said bracket above said slow down member and having one arm thereof disposed in operative relation with said member, resilient means for urging said member toward said bell-crank-arm, a lever secured to said rock shaft and depending therefrom into operative relation with the other arm of said bell-crank, and means for oscillating said rock shaft and said lever to actuate said bell-crank and thereby move the slow down member toward said feedboard and into engagement with the sheet passing under said member.

9. A sheet feeder as defined in claim 8, wherein the slow down member is in the form of a flat elongated shoe having a front portion disposed substantially parallel with the upper surface of the feedboard, an intermediate portion slightly inclined upwardly with respect to said feedboard-surface, and a rear portion further inclined upwardly with respect to said intermediate portion and said feedboard-surface.

10. A sheet feeder as defined in claim 8, including a spring-pressed plunger carried by the said one arm of the bell-crank and engaged with said slow down member, the spring for said plunger being of greater tension than said resilient means for urging said slow down member toward said bell-crank-arm and into engagement with said plunger.

11. A sheet feeder as defined in claim 8, wherein the bell-crank is pivotally mounted on an eccentric adjustably carried by said bracket, said eccentric providing for adjustment of said bell-crank in a vertical plane relative to said bracket, said lever and said slow down member.

12. A sheet feeder as defined in claim 8, wherein said slow down member is pivotally mounted on a block slidably fitted in said bracket for adjustment relative to said bracket toward and away from said feedboard.

13. A sheet feeder as defined in claim 8, including means for regulating the extent of movement of said slow down member toward said feedboard.

14. A sheet feeder as defined in claim 13, wherein said regulating means comprises an abutment member adjustably carried by the said other bell-crank-arm and engageable by said lever.

LEO C. WILLIAMS.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
934,608	Gustafson	Sept. 21, 1909
1,071,448	Martin	Aug. 26, 1913
1,112,791	Hardie	Oct. 6, 1914
1,126,584	Spies	Jan. 26, 1915
1,128,877	Hughes et al.	Feb. 16, 1915
1,212,242	Novick	Jan. 16, 1917
1,231,559	Breen et al.	July 3, 1917
1,289,697	Dexter et al.	Dec. 31, 1918
1,787,532	Kelly	Jan. 6, 1931
1,872,916	Eckhard	Aug. 23, 1932