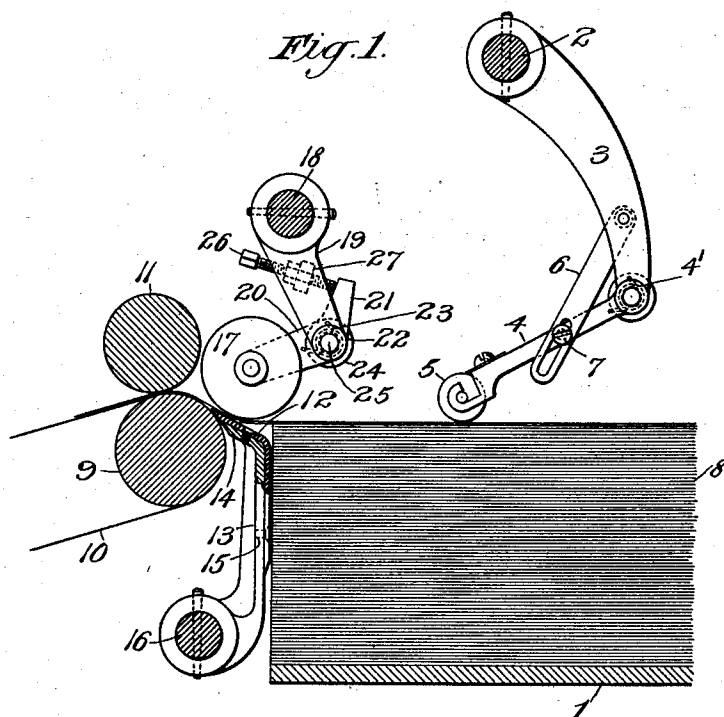
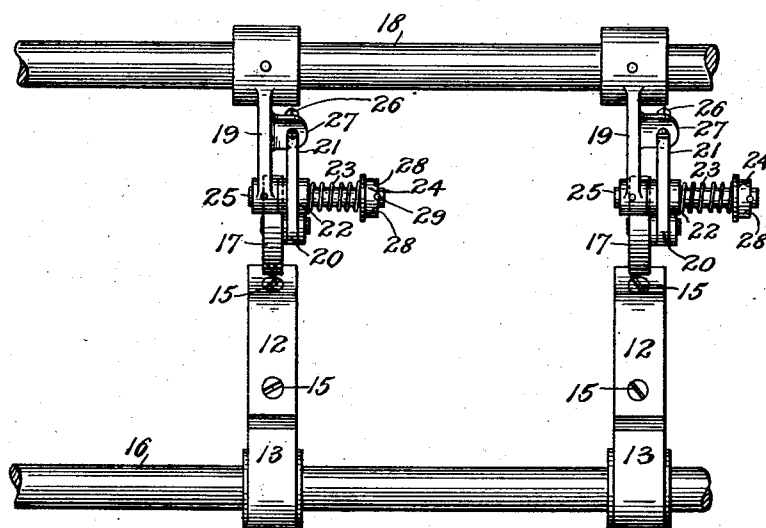


**1,009,289.**

*Fig. 1.*



*Fig. 2.*



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# UNITED STATES PATENT OFFICE.

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## SHEET-SEPARATING DEVICE.

1,009,289.

Specification of Letters Patent.

Patented Nov. 21, 1911.

Application filed February 3, 1909. Serial No. 475,763.

*To all whom it may concern:*

Be it known that I, JAMES W. DUFFY, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Sheet-Separating Devices, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to improvements in sheet separating devices.

In automatically feeding sheets from a pile to mechanism which is to subsequently act thereon, as, for instance, a printing machine, it is, of course, necessary that the sheets be fed from the pile singly, and various devices have been proposed and to some extent practically employed to insure the delivery of single sheets. Thus, for instance, in feeding certain kinds of material, such, for instance, as thin sheets of paper, buckling devices are employed to separate the top sheet from those beneath it and thus lessen the liability of simultaneously delivering more than one sheet from the pile, but where comparatively thick material, such, for instance, as sheets of cardboard, are to be fed, the sheets are not sufficiently flexible to permit the efficient use of such devices.

The present invention has for its object to produce an improved sheet feeding mechanism provided with a simple and effective means for insuring the delivery of the sheets singly from a pile.

With this and other objects not specifically referred to in view, the invention consists in certain constructions, and in certain parts, improvements and combinations as will be hereinafter fully described and then specifically pointed out.

In the accompanying drawings—Figure 1 is a sectional side elevation of so much of a sheet feeding mechanism embodying the invention as is necessary to an understanding of the same. Fig. 2 is a detail view.

Constructions embodying the invention will employ suitable means for supporting a pile of sheets. While this means may be varied, in the construction shown, the pile support comprises a table 1. This table may be gradually fed upward to keep the pile in range of the sheet feeding devices by mechanism which is well known in the art but which is not illustrated as it has no special reference to the present invention. Con-

structions embodying the invention will further include suitable sheet delivery devices which may be varied widely in construction. In the particular machine shown, there is provided a shaft, as 2, rocked by any suitable means, not shown. This shaft is provided with an arm 3 to which is pivoted an arm 4 having a delivery roll 5. The pivot of the arm 4, in the construction illustrated, is surrounded by a torsion spring 4' which tends to throw the arm downward toward the pile. The movement of the arm 4 is controlled by a slotted link 6 supported on the arm 3, the arm 4 being provided with a set screw 7 which coöperates with a slot in the link 6. As the shaft rocks, it will be understood that the roll 5 will act to deliver the sheets from the pile, indicated at 8. It will be understood that a plurality of such delivering rolls 5 may be employed, but only one is shown, as it is deemed sufficient for the purpose of the present invention to indicate simply a form of delivery device which may be employed. The mechanism just described is a common one in the art and any other suitable form of sheet delivery mechanism may be substituted therefor. Constructions embodying the invention will also include means for forwarding the sheet after it is delivered from the pile, which means may be of any suitable character. As shown, they comprise a roll, as 9, serving to support a plurality of tapes 10, a nipping roll, as 11, being shown as co-operating with the tapes and roll. Constructions embodying the invention will also include a sheet detaining surface which is interposed in the path of the advancing edge of the sheet after the same has been delivered from the pile. This sheet detaining surface may be composed of various materials and may be mounted in various ways. In the best constructions, however, the surface will be so arranged as to lie across the path of the advancing edge of the sheet after the same has been delivered from the pile and so as to form an obtuse angle with the line of movement of the advancing sheet, a part of said surface extending above the level of the pile on the sheet supporting device. In the particular machine illustrated, this sheet detaining surface consists of a plurality of leather strips, as 12, leather having been found in practice to be well-adapted for the purpose. These

leather strips 12 are mounted on arms 13 having angular supporting faces 14 on their upper ends, the leather strips being secured to the arms in any suitable manner, as, for instance, by screws 15, the heads of which are countersunk in the leather. The arms 13 may be supported in any suitable manner, as, for instance, by a cross-rod 16 mounted in the frame of the machine. It will be understood that a single detaining surface may be employed, the width of which will vary according to requirements, but good results will be obtained by providing a plurality of such surfaces, as in the construction shown.

Constructions embodying the invention in its best form will include sheet directing means arranged to cooperate with the sheet detaining surface and these means will bear on the surface back of the forward edge. With this construction, and with the detaining surface arranged as described, the sheets will be given an upward bend at or near their forward edges which will assist in separating the sheets should two sheets be simultaneously forwarded to the detaining surface. While the construction of this sheet directing means may be varied, in the particular construction shown, it comprises a roll which consists of a plurality of roll sections 17, although of course a single roll section, the length of which is varied according to particular requirements, may be employed. Good results, however, are obtained by the use of a roll comprising a plurality of sections. In the best constructions, when such sections are employed, they will be mounted so as to be independently adjustable, so as to vary their position with respect to the detaining surface. In the particular machine illustrated, there is provided a cross-rod 18 supporting a plurality of arms 19. Each of these arms has pivoted thereto a bell-crank lever 20—21, the arm 20 of which carries a section 17. The hub 22 of each lever has secured to it one end of a torsion spring 23, the other end being secured to an adjustable collar 24 mounted on the pivot 25 which supports the bell-crank lever, this pivot being elongated, as shown. A stop screw, as 26, may be employed, the end of which contacts with the arm 21 of the bell-crank lever, this screw being supported in an ear 27 on the arm 19. This torsion spring tends to throw the arm 20 and the roll section 17 which it carries down toward the sheet detaining surface, the movement of the arm and roll section being controlled by the stop screw 26. The collar 24 may be provided with locking notches 28 which are engaged by a pin 29 on the end of the pivot 25.

With the construction illustrated, as the sheets are pushed off the pile, they strike the sheet detaining surface and move across

it, the friction exerted by the surface on the sheet being insufficient to prevent the passage of a single sheet which is moving forward under the force imparted by the feeding roll 5. Should, however, more than one sheet be fed from the pile, the directing roll, which is located over the detaining surface, forces the sheets toward the surface. The friction between the detaining device and the under sheet as the two sheets are held against the detaining device by the directing roll, is much greater than the friction between the two sheets, with the result that the upper sheet slides over the under one and is fed out, the under sheet being held back by the detaining surface, this action being assisted by the arrangement of the directing roll with respect to the detaining surface which has been before adverted to and by which the sheets are bent.

Changes and variations may be made in the construction by which the invention is carried into effect. The invention is not, therefore, to be confined to the particular construction herein shown and described.

What is claimed is:—

1. In a sheet separating device, the combination with pile supporting means, of sheet delivery devices mounted over the pile supporting means, sheet forwarding means, a frictional sheet detaining surface lying across the path of the sheet and arranged at an obtuse angle with the line of movement of the sheet, a part of said surface extending above the level of the pile on the sheet supporting means, and a sheet directing device located over and operating to hold the sheets against the detaining surface and back of its forward edge.

2. In a sheet separating device, the combination with pile supporting means, of sheet delivery devices mounted over the pile supporting means, sheet forwarding means, a frictional sheet detaining surface lying across the path of the sheet and arranged at an obtuse angle with the line of movement of the sheet, a part of said surface extending above the level of the pile on the sheet supporting means, a sheet directing device located over and operating to hold the sheets against the detaining surface and back of its forward edge, and means for adjusting the position of the sheet directing surface.

3. In a sheet separating device, the combination with pile supporting means, of sheet delivery devices mounted over the pile supporting means, sheet forwarding means, a frictional sheet detaining surface lying across the path of the sheet and arranged at an obtuse angle with the line of movement of the sheet, a part of said surface extending above the level of the pile on the sheet supporting means, a yieldingly mounted sheet directing device located over and op-

erating to hold the sheets against the detaining surface and back of its forward edge, and means for adjusting the position of the directing device with respect to the detaining surface.

4. In a sheet separating device, the combination with pile supporting means, of sheet delivery devices mounted over the pile supporting means, sheet forwarding means, a frictional sheet detaining surface lying across the path of the sheet and arranged at an obtuse angle with the line of movement of the sheet, a part of said surface extending above the level of the pile on the sheet supporting means, a yieldingly mounted sheet directing roll located over and operating to hold the sheets against the detaining surface and back of its forward edge, and means for adjusting the position of the directing roll with respect to the detaining surface.

5. In a sheet separating device, the combination with pile supporting means, of sheet delivery devices mounted over the pile supporting means, sheet forwarding means, a leather sheet detaining surface lying across the path of movement of the sheet and arranged at an obtuse angle with the line of movement of the sheet, a part of said surface extending above the level of the pile on the sheet supporting means, and a sheet directing device located over the detaining surface and operating to hold the sheets against said surface and back of its forward edge.

6. In a sheet separating device, the combination with pile supporting means, of sheet delivery devices mounted over the pile supporting means, sheet forwarding means, a leather sheet detaining surface lying across the path of movement of the sheet and arranged at an obtuse angle with the line

of movement of the sheet, a part of said surface extending above the level of the pile on the sheet supporting means, a sheet directing device located over the detaining surface and operating to hold the sheets against said surface and back of its forward edge, and means for adjusting the position of the sheet directing device with respect to the detaining surface.

7. In a sheet separating device, the combination with pile supporting means, of sheet delivery devices mounted over the pile supporting means, sheet forwarding means, a leather sheet detaining surface lying across the path of movement of the sheet and arranged at an obtuse angle with the line of movement of the sheet, a part of said surface extending above the level of the pile on the sheet supporting means, a sheet directing roll located over the detaining surface and operating to hold the sheets against said surface and back of its forward edge, and means for adjusting the position of the sheet directing roll with respect to the detaining surface.

8. In a sheet separating device, the combination with pile supporting means, of sheet delivery devices, sheet forwarding means, a plurality of leather sheet-detaining surfaces lying across the path of the advancing edge of the sheet between the delivery devices and the forwarding means, and a plurality of yieldingly mounted independently adjustable roll-sections cooperating with said surfaces.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses.

JAMES W. DUFFY.

Witnesses:

WALTER TESS,

MILDRED DEUSCH.