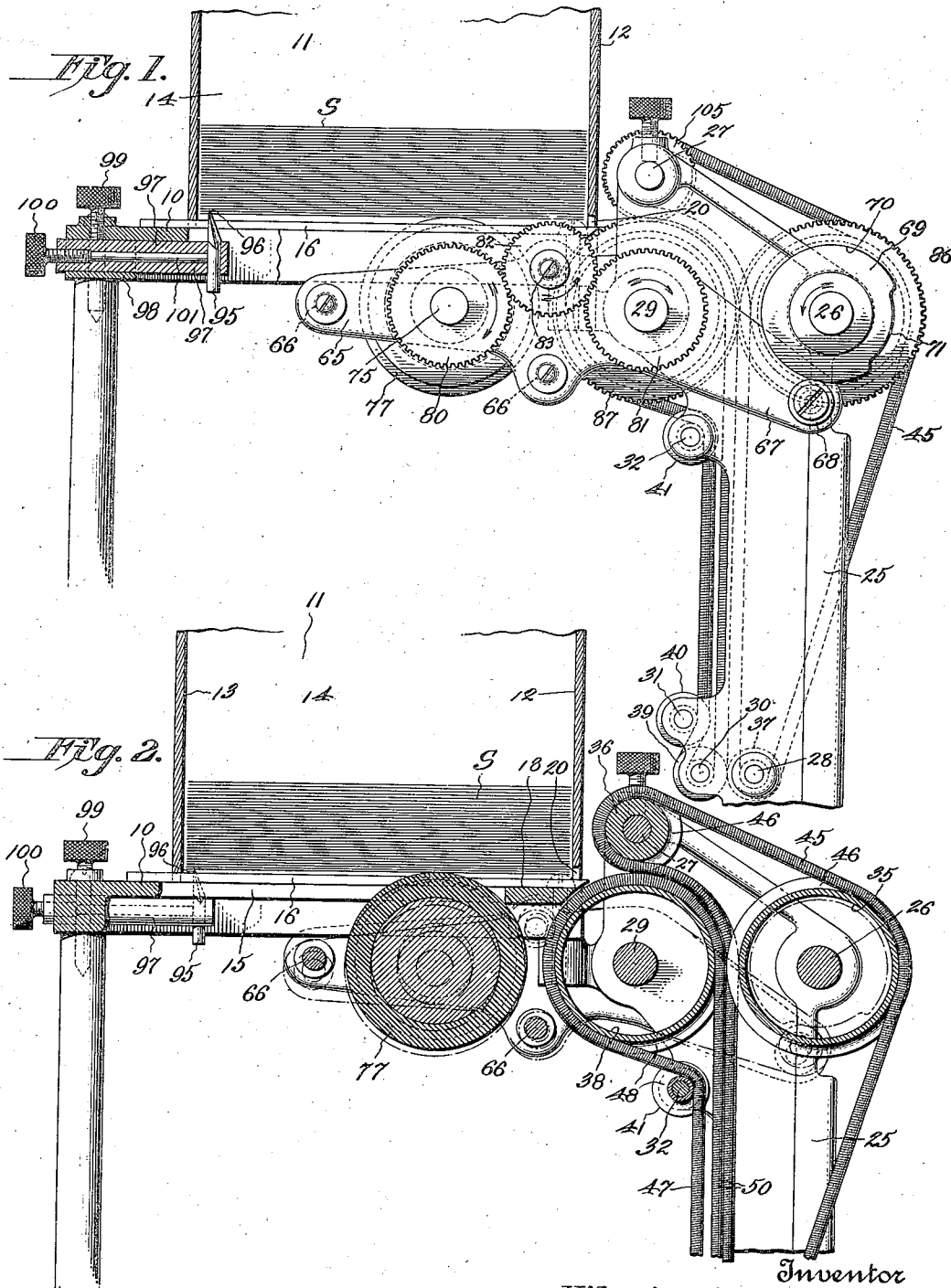


Jan. 9, 1923.

H. DE ESCOBALES.
SHEET FEEDING MECHANISM:
FILED DEC. 10, 1920.

1,441,271.

2 SHEETS—SHEET 1.



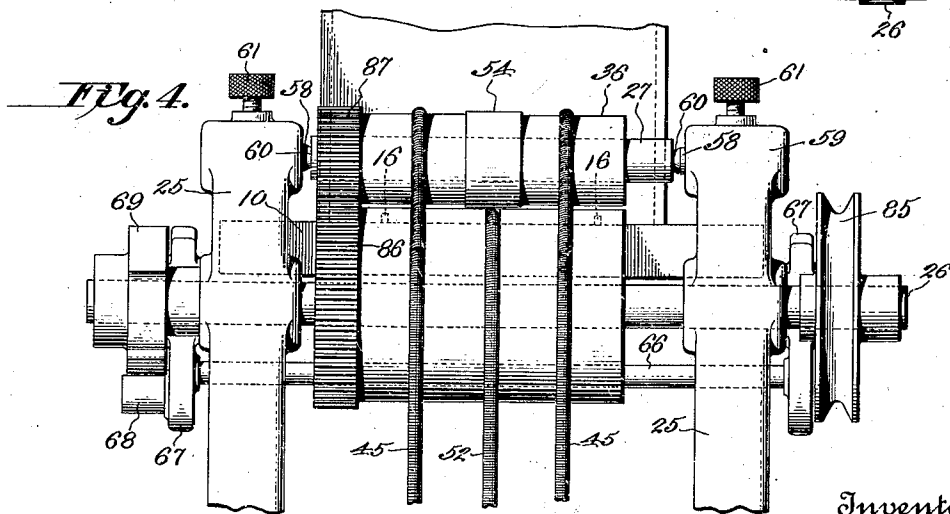
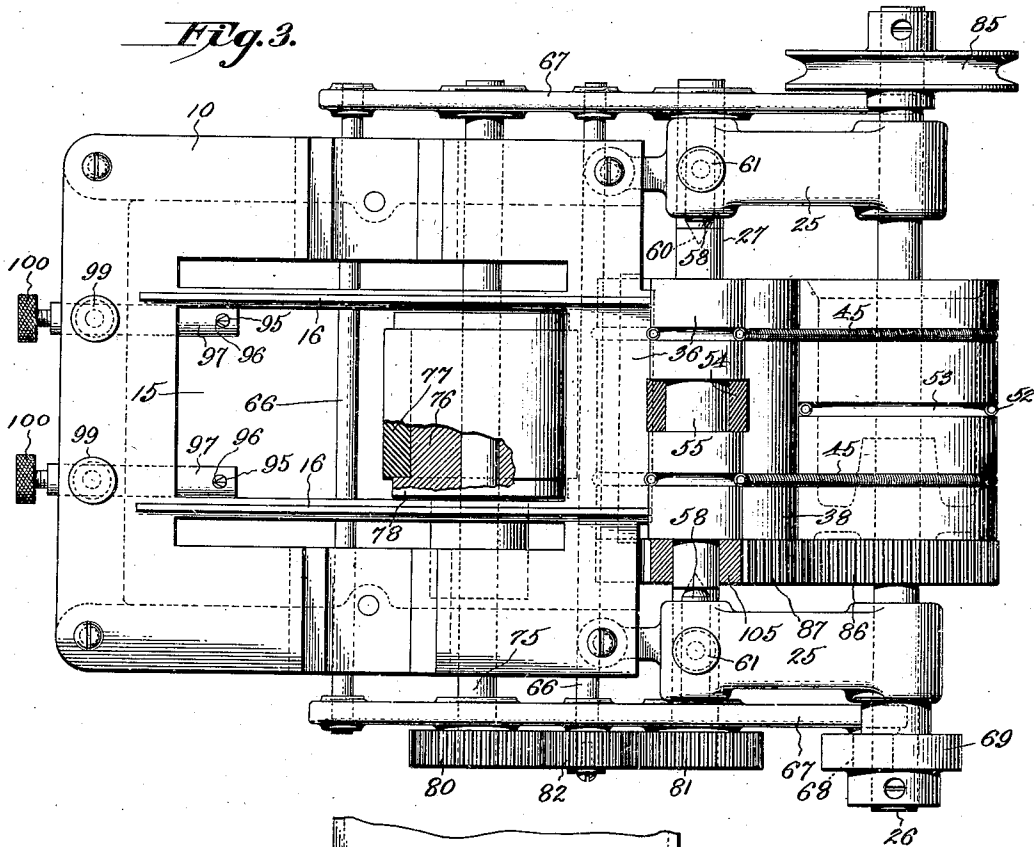
Inventor
Hilarion de Escobales,
By his Attorneys
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UNITED STATES PATENT OFFICE.

HILARION DE ESCOBALLES, OF BROOKLYN, NEW YORK, ASSIGNOR TO H. ESCOBALLES CO. INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SHEET-FEEDING MECHANISM.

Application filed December 10, 1920. Serial No. 429,696.

To all whom it may concern:

Be it known that I, HILARION DE ESCOBALLES, a citizen of the United States, and resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Sheet-Feeding Mechanism, of which the following is a specification.

My invention relates to mechanism for feeding sheets, usually paper, singly from a stack.

The general object of the invention is to provide for this purpose, very simple and durable mechanism which can be constructed at moderate cost, and which operates with satisfactory certainty and precision.

Another object is to provide sheet feeding mechanism well adapted to sheet conveying or advancing mechanism of a certain type, although the adaptation of the invention is not limited to sheet conveying mechanism of any particular kind.

Another object is to provide a very simple and effective sheet-engaging and feeding device, and simplified and improved operating means therefor.

To accomplish these and other objects, my invention consists in certain instrumentalities and combinations of elements, the nature of which is sufficiently explained in the following detail description of the accompanying drawings, which show one exemplifying embodiment of the invention. After considering this, it will be evident to persons skilled in the art that many variations may be made in accordance with the principles of the invention, and I contemplate the employment of any structures which are within the scope of the claims.

In the drawings:

Fig. 1 is a side elevation of a mechanism embodying the invention, with some parts in section;

Fig. 2 is a vertical, longitudinal section;

Fig. 3 is a top plan, with a few parts in section; and

Fig. 4 is a front-end elevation.

A table 10 is provided with a holder or magazine 11 for a stack of sheets S, usually of paper. The form of this holder may vary greatly, but conveniently it comprises vertical front and rear walls 12 and 13 and side walls 14. Below the stack holder the

table has an opening 15. The front end of the sheet stack may be supported normally by a forward portion 18 of the table, and other supports extending into or across the opening, at the normal level of the bottom of the stack, may be provided, as may be necessary or desirable for the size of sheets to be handled by the machine. In the present case, the machine is intended to feed sheets of moderate width and length. Narrow ledges 16 extending slightly into space 15 are provided to support the side edges of the sheet stack. This provides sufficient support, in addition to the support afforded by sheet retaining devices 96 (later described), and table portion 18, for sheets of reasonable length and width, and at the same time reduces the frictional engagement of the supporting devices with the bottom sheet to a very small amount, so that while the sheet stack is adequately supported, the bottom sheet is easily withdrawn in the feeding action. This arrangement also leaves the table opening 15 substantially unobstructed for free access to the bottom sheet by the friction feed roller and the sheet retaining devices, as later described. Other supporting devices may be provided for larger or wider sheets, when necessary or desirable. Front wall 12 of the stack holder is cut away at 20, providing an opening substantially at the level of the table, for the passage of the sheets.

The present sheet feeding mechanism is well adapted to co-operate with sheet conveying or advancing mechanism of the kind disclosed in my pending application, Serial No. 154,447, filed March 13, 1917, for paper feeding mechanism; and since certain parts of the present structure are advantageously combined with parts of the sheet conveying mechanism, when the two instrumentalities are to be used in conjunction, sheet conveying mechanism of the general type referred to will be briefly described, reference being made to the above-mentioned application for a more detailed description of such mechanism. In addition to features of the conveying mechanism disclosed in said application, the conveying mechanism here shown and described includes certain improvements, as will appear.

Uprights 25 support in suitable bearings

roll shafts 26, 27, 28, 29, 30, 31 and 32, which support respectively rolls 35, 36, 37, 38, 39, 40 and 41. Rolls 35, 36 and 37 support continuous bands 45, spaced apart and located relatively near the ends of the rolls. These bands are desirably of the close wound spring-coil type. The bands are located in grooves 46 which are desirably of such a depth that the exposed surfaces of the bands are approximately flush with the main surfaces of the rolls, or extend only slightly above such surfaces. Rolls 38, 39, 40 and 41 support co-operating bands 47 located in roll grooves 48 and bands 47 are in the present instance arranged in the same planes with bands 45, so that the active flights 50 of the two pairs of bands are in engagement and constitute a conveyor for a sheet delivered by the feed mechanism. Roll 36 is located so that a portion of each of bands 45 partially encircles the upper portion of the corresponding band 47 so that while the main portion of the active flight 50 proceeds in one direction, conveniently downward in the present instance, the entrance of this conveyor flight, consisting of the converging inner surfaces of the two bands opposite delivery opening 20, is directed in another direction substantially at a right angle, and in this case horizontally, for the convenient reception of sheets delivered through the opening.

Rolls 35, 36 and 37 may also be provided with another centrally arranged band 52 located in grooves 53, this band serving, for example, to support a central portion of the conveyed sheet while it is acted upon by an adhesive applying device, as more fully explained in the above-mentioned application. To assist in grasping sheets delivered by the feed mechanism and starting them on their course between the conveyor bands roll 36 may be provided with a central enlarged gripping segment 54, which may be of suitable rubber composition, located in an annular recess 55 provided in the roll. This gripping surface is of proper diameter to yieldingly engage a smooth central portion of the periphery of roll 38. Gripping member 54, therefore, grasps the ends of the sheets at the same time that they are grasped between bands 45 and 47.

To insure the true running of roll 36 and its proper adjustment in relation to roll 38, an improved bearing support for the roll is desirably provided consisting in the present instance of bearing pins 58 mounted in sleeves formed in members 59 of uprights 25 and provided with conical inner ends 60. The ends of shaft 27 are provided with conical sockets co-operating with the ends of the bearing pins. The bearing pins may be screw-threaded for engagement with their sleeves, or may be cylindrical and adjusted by simply pushing them in until the

bearing adjustment is sufficiently tight and in either case the pins may then be secured in position by set screws 61.

The sheet feeding mechanism constituting a principal part of the present invention, and arranged in the present embodiment to co-operate with such sheet conveying mechanism as has been described, although it is capable of many other adaptations, as previously explained, comprises the following: Side members 65 are arranged, one at each side of the machine, and have bearings to permit oscillation in a vertical direction, these bearings in the present instance, being located on roll shaft 29. The side members are connected by suitable means to move together, cross rods 66 being provided for this purpose in the present instance. The side members 65 and rods 66, therefore, constitute a substantially rigid oscillating frame.

One of the side members has a forward extension 67 provided with a cam roller 68 arranged to co-operate with a suitably mounted cam 69 for oscillating the frame. In the present embodiment, this cam 69 is mounted on one end of roll shaft 26 and comprises a concentric surface 70 and a shorter concentric surface 71 of smaller radius. As shaft 26 rotates arm 67 is alternately depressed and held down and the opposite end of the feed frame is held up by cam surface 70, and arm 67 is permitted to rise by cam roller 68 falling into the depressed cam portion 71 and the other end of the feed frame is at the same time lowered. The weight of the frame and parts carried by it, to the left of shaft 29, as viewed in Figs. 1 and 2, is sufficient to hold the cam roller in engagement with the cam and to move the frame downward when permitted by the cam movement.

Frame members 65 carry a shaft 75 mounted in suitable bearings and this shaft has a central enlargement 76 providing a support for a cylindrical feed member 77 which may be of suitable rubber composition of such diameter that its face engages the lower sheet in the pile S when the roller is moved up by the action of the cam. Feed member 77 may be located between flanges 78 provided on shaft member 76 and owing to its flexible character may be easily removed and replaced when necessary. The feed roll is continuously driven by any suitable means. Conveniently in the present instance the drive mechanism comprises a gear 80 fixed on shaft 75, a gear 81 fixed on shaft 29, and an intermediate pinion 82 mounted on a bearing stud 83 screwed into frame side member 65. Gear 81 is continuously driven by the rotation of shaft 29, and so drives gear 80 and the feed roll 77, regardless of the oscillation of the feed frame. To prevent localized wear on any

one part of the surface of the feed roll or feed roll band 77, the driving mechanism is desirably arranged so that different portions of the roll surface will be successively engaged with the sheets in the feeding operation. For this purpose, to give one example, the number of teeth in gear 80 differs from the number in gear 81 in a suitable way, for instance, when the number of teeth in either gear differs from the number in the other by one, the angular relation to the feed roll by its driving means is evidently continually changed, insuring the even distribution of wear of the periphery of the feed roll.

It is desirable in some cases, as shown in the present embodiment, to connect the feed roll drive with the cam and conveyor band driving mechanism. For this purpose a suitable one of the conveyor shafts, such as shaft 26, is provided with a pulley 85 which is driven by a belt from any suitable source of power. Shaft 26 also carries a gear 86 meshing with a gear 87 on shaft 29. In this way cam 69 is driven to oscillate the feed roll frame, and by the proper proportioning of the different gears the periphery of feed band 77 is driven at the proper speed to compensate for slippage and to deliver sheets from the stack one at a time at each oscillation of the feed roll, the forward edge of each sheet being seized by the converging faces of bands 45 and 47 and also by the engaging members of roll surface 54 and roll 38.

Evidently the feed roll with its oscillating frame and other essential features may cooperate with widely differing forms of conveyor mechanism or may in fact deliver sheets singly upon a table for hand removal; and the sheet feed mechanism, regardless of the subsequent sheet handling or conveying mechanism, comprises parts exemplified in the present embodiment by the feed roll 77, its supporting frame, suitable driving means, and means for oscillating the frame at suitable intervals, such as the cam 69.

The bottom supports for the stack S are so arranged that a desirable part of the stack weight is borne by the feed roll when it is elevated to insure proper frictional engagement for the withdrawal of the bottom sheet. It is desirable in some cases to provide means for preventing the withdrawal of more than one sheet at a time by the feed mechanism. For this purpose in the present embodiment of the invention, one or more sheet holding devices 95 are provided consisting of vertical rods terminating in points 96, arranged to engage and perforate the lower sheet in the stack near the sides and rear end of the sheet and to engage the sheet ends above the lower one so that when the lower sheet is withdrawn the points tear through the rear portion of the sheet and retain the sheet

above in proper position. The stack supports are arranged as shown so that a suitable part of the stack weight rests upon the points. The action of the sheet holding or retarding devices may be regulated to a great extent by proper adjustment and this is fully provided for as follows: The rods 95 are located in holes bored through the ends of bars 97 mounted in suitable sockets 98 in the rear portion of the table. The bars may be moved in and out to regulate the position of the points in relation to the rear edge of the sheets and are then secured in adjusted position by set screws 99. The elevation of the points may be regulated by moving rods 95 up and down in their holes and this adjustment may be fixed by means of set screws 100 having threaded engagement with threaded holes in bars 97 and having long shanks 101 extending through the bars and engaging against the pointed rods.

The driving connections above described include means for positively driving conveyor band rolls 35 and 38. It is usually also desirable to positively drive roll 36 and for this purpose a roll shaft or the roll itself carries a pinion 105 engaging gear 87 of shaft 29.

The sheet feed mechanism described is especially adapted for feeding labels such as revenue stamps or other small sheets, in an efficient manner; but it is not at all limited to feeding sheets of such size or character, but may be readily adapted for a great variety of uses in the sheet feeding arts.

Obviously in the previous description it has been attempted to describe only one exemplifying embodiment of the invention, and many variations may be made in detail, as well as in combinations and sub-combinations of parts; and I do not limit myself to details, except as claimed.

What I claim is:

1. Mechanism for feeding sheets singly from the bottom of a stack, comprising a frame having a fixed axis of oscillation, a friction feed roll in the frame and arranged to act on the bottom sheet of the stack, means for continuously driving the roll, and continuously acting means for oscillating the frame intermittently to automatically feed single sheets from the stack in regular succession.

2. Mechanism for feeding sheets singly from the bottom of a stack, comprising a frame having a fixed axis of oscillation, a friction feed roll carried by the frame adjacent to the bottom sheet of the stack, means for driving the roll continuously, and continuously acting cam mechanism for oscillating the frame intermittently to automatically feed single sheets from the stack at regularly spaced intervals.

3. Mechanism for feeding sheets singly from a stack comprising a frame having an

- axis on which it is mounted to oscillate, a friction feed roll carried by the frame with its surface below and adjacent to the bottom sheet of the sheet stack, a driving element 5 rotatable about the oscillation axis of the frame, a connection from said element to the feed roll, cam mechanism for oscillating the frame, and a driving connection between said driving element and the cam mechanism. 10
4. Sheet feed mechanism comprising a holder for a sheet stack, a frame, a support on which the frame is oscillatably mounted, a friction feed roll carried by the 15 frame and adapted to frictionally engage the bottom sheet of the stack, means for driving the roll, an arm fixed to move with said frame, a cam follower on the arm, a cam for engaging the follower, and means for continuously driving the cam. 20
5. Sheet feed mechanism comprising a holder for a sheet stack, a frame, a support on which the frame is oscillatably mounted, a friction feed roll carried by the frame and 25 adapted to frictionally engage the bottom sheet of the stack, means for driving the roll, an arm fixed to move with said frame, a cam follower on the arm, a cam for engaging the follower, means for driving the cam, and a driving connection between the cam and feed roll driving means. 30
6. Sheet feed mechanism comprising a holder for a sheet stack, a frame, a support on which the frame is oscillatably mounted, 35 a friction feed roll carried by the frame and adapted to frictionally engage an end sheet of the stack, means for driving the roll, an arm fixed to move with said frame, a cam follower on the arm, a cam for engaging the 40 follower, means for driving the cam, and a driving connection between the cam and feed roll driving means, said connection including a gear rotatable on the oscillation axis of the frame. 45
7. Sheet feed mechanism comprising a holder for a sheet stack, a transverse shaft near one end of the holder, a frame including side members mounted to oscillate about the axis of said shaft, a roll shaft mounted 50 in bearings in said side members, a feed roll having a friction surface and carried by said shaft, a gear on the first named shaft connected to drive the feed roll shaft, a cam shaft adjacent to the first named shaft and a cam on the cam shaft, means for driving the cam shaft, an arm fixed to move with the frame and a cam follower on the arm engaging the cam. 55
8. Sheet feed mechanism comprising a holder for a sheet stack, an oscillating feed frame, a feed roll carried by the frame, a transverse shaft on which the frame is mounted to oscillate, cam mechanism for operating the frame and interconnected driving 60 mechanism for the cam and the feed roll, the driving mechanism being constructed and arranged to continually vary the surface portion of the feed roll which is engaged with a sheet at each feeding movement of the frame. 70
9. Sheet feed mechanism comprising a holder for a sheet stack, an oscillating frame, a shaft near one end of the holder on which the frame is mounted to oscillate, 75 a roll shaft carried by the frame, a friction feed roll on said shaft, a cam shaft, a cam thereon, an arm on the frame, a cam follower on the arm engaging the cam, a drive connection between the cam shaft and the first named shaft, a gear fixed on the first 80 named shaft, a gear on the feed roll shaft, the gears last named having different numbers of teeth, and an intermediate gear connecting said gears.
10. Feed mechanism comprising a holder 85 for a sheet stack having an aperture at one end for the discharge of sheets, an oscillating feed frame, a friction feed roller carried by the frame, means for driving the feed roll continuously, and means for oscillating the frame intermittently at regular 90 intervals to feed sheets in regularly spaced relation, and sheet retaining means comprising sharp elements which pierce the bottom sheet of the stack and having a restraining 95 engagement with the sheet above the bottom, and means admitting adjustment of said elements.
11. In combination with a table, a sheet stack holder and sheet feeding means of 100 sheet feeding mechanism, a sheet retaining device comprising a bar mounted for longitudinal adjustment in relation to the sheet stack in a socket carried by the table, and a pointed element adjustably mounted in a 105 transverse socket in said bar.
12. A sheet retaining device for sheet feeding mechanism, comprising a bar adjustably mounted in a sleeve supported by the table of such mechanism, a set screw for 110 securing the bar in adjusted position in the sleeve, a rod mounted in a transverse hole in said bar and having a pointed end adapted to engage a sheet stack, and a set screw engaging a threaded hole in said bar and 115 having a long shank passing through the bar and engaging said rod to hold it in adjusted position.
13. In sheet feeding and conveying mechanism, a plurality of conveyor shafts, conveyor rolls on said shafts and a plurality 120 of conveyor bands traveling in grooves in said rolls, the rolls and bands being arranged to provide active flights of adjacent bands arranged to convey a sheet and having a 125 converging entrance to the active flights, the sheet stack holder having an opening directed toward said converging entrance, a feed frame mounted to oscillate on one of the conveyor shafts and having an arm pro- 130

vided with a cam follower, a cam on another conveyor shaft to co-operate with the cam follower, and a friction feed roll carried by the frame and arranged to intermittently engage the bottom of the sheet stack.

14. In sheet feeding and conveying mechanism, a plurality of conveyor shafts, conveyor rolls on said shafts and a plurality of conveyor bands traveling in grooves in said rolls, the rolls and bands being arranged to provide active flights of adjacent bands arranged to convey a sheet and having a converging entrance to the active flights, the sheet stack holder having an opening directed toward said converging entrance, a feed frame having side members mounted to oscillate on one of said roll shafts, one of the side members having an extension, a cam follower mounted on the extension, a cam on another of said roll shafts co-operating with the cam follower, transverse members connecting said side frame members, a feed roll shaft mounted in bearings in the side members, a friction feed roll on said shaft adapted to engage the bottom of the sheet stack, gears on the feed roll shaft and the shaft on which the side members oscillate, a connection between said gears, and a gear connection between the last named shaft and the shaft carrying said cam.

15. In sheet feeding and conveying mechanism, a plurality of conveyor shafts, conveyor rolls on said shafts and a plurality of conveyor bands traveling in grooves in said rolls, the rolls and bands being arranged to provide active flights of adjacent bands arranged to convey a sheet and having a converging entrance to the active flights, the sheet stack holder having an opening directed toward said converging entrance, a feed frame having side members mounted to oscillate on one of said roll shafts, one of the side members having an extension, a cam follower mounted on the extension, a cam on another of said roll shafts co-operating with the cam follower, transverse members

connecting said side frame members, a feed roll shaft mounted in bearings in the side members, a friction feed roll on said shaft adapted to engage the bottom of the sheet stack, gears on the feed roll shaft and the shaft on which the side members oscillate, a connection between said gears, and a gear connection between the last named shaft and the shaft carrying said cam, the gears being designed so that the position of the end gear is varied in relation to the position of the conveyor shafts to evenly distribute wear of the roll surface.

16. Sheet feeding and conveying mechanism, comprising conveyor shafts and rolls, and a plurality of sheet conveyor bands carried by said rolls, certain rolls and band portions being arranged to provide a sheet entrance, a holder for a sheet stack having a discharge opening directed toward said entrance, a feed frame oscillatably mounted on one of said shafts, a friction feed roll in the frame, means for driving the roll, a cam on another of said shafts, a cam follower on said frame, and means for driving the last named shaft.

17. Sheet feeding and conveying mechanism, comprising conveyor shafts and rolls, and a plurality of sheet conveyor bands carried by said rolls, certain rolls and band portions being arranged to provide a sheet entrance, a holder for a sheet stack having a discharge opening directed toward said entrance, a feed frame oscillatably mounted on one of said shafts, a friction feed roll in the frame, means for driving the roll, a cam on another of said shafts, a cam follower on said frame, means for driving the last named shaft, and a driving connection between the last named shaft and other of the conveyor shafts.

Signed at New York, in the county of New York and State of New York, this 26th day of November, A. D. 1920.

HILARION DE ESCOBALLES.