ABSTRACT OF THE DISCLOSURE

A sheet feeding mechanism for a copying machine or the like. The feeder is of the type which consists of rotatable rollers which rest upon the top sheet of a stack of sheets and upon rotation of the rollers which frictionally engage the top sheet, the top sheet is moved off the stack of sheets and into the copying machine or printing machine. The rollers are mounted on a rotatable shaft which is transverse to the path of movement of the top sheet of the stack which shaft is supported on pivot pins. At least one of these arms has an arm projecting from it adjacent to the pivot point of the supporting arm, and the short arm is adapted to be contacted by a spring biased L-shaped sliding member which serves to bias the transverse shaft with its rollers in a direction to relieve the stack of sheets of some of the weight of rollers and supporting members.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a sheet feeding mechanism illustrating one embodiment of the invention; FIG. 2 is a cross sectional view taken along the dotted line 2-2 of FIG. 1; FIG. 3 is an end view looking from the plane marked 3-3 of FIG. 1; and FIG. 4 is a cross sectional view along dotted line 4-4 of FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

This invention relates to an improvement of a sheet feeding mechanism, particularly of a type in which rotatable rollers activated by suitably transmitted power are adapted to be pressed on the top of a pack of sheets mounted on a feed table so as to feed the topmost sheet in the pack forward in timed relation with the rotation of said rollers.

The present invention will now be described in further detail hereinbelow in reference to an example embodiment shown in the accompanying drawings.

Referring now to FIG. 1, a planar sheet feed table 1 has upstanding side ends or walls 1a and 1b, one of which is pierced through by a transmission shaft 2. The shaft 2 is horizontally supported by a pair of side plates 3 for a U-shaped bearing fixed on a suitable position on the feed table. On the other side wall 1b across the feed table, shaft 2 is fixedly mounted an axil 2a which serves as a pivot for one end of one of the pair of oscillating arms 4, the remaining oscillating arm being pivoted likewise on the aforesaid shaft 2. Said oscillating arms are respectively connected integrally with a rod 4a and are further provided, at their free ends, with a shaft 6 carrying a plurality of freely rotatable rollers 5. The circumference of the rollers 5 are adapted to be pressed on the top surface of the topmost sheet in the stack of sheets loaded on the feed table with their forward ends aligned.

On one end of the roller shaft 6 is provided a chain carrying gear 9a (refer FIG. 1) which is equipped, in the interior thereof, coaxially with an irreversible rotary mechanism 8 such as illustrated in FIG. 4. The gear 9a is coupled, through a transmission chain 11, with the motion of the like gear 10 mounted on the shaft 2.

It follows that the rotation of the shaft 6 in a suitable direction activates the like motion of the rollers 5, causing the topmost sheet in the stack 7 pressed by the latter to be moved in the direction of an arrow shown in FIG. 1. The rollers take a position shown in dot and dash lines in FIG. 4 when the stack is high and another position shown in actual lines when the roller supporting arm 4 takes a horizontal position as the stack is depleted.

Supposing now that the rollers 5 are pressed on the top of the stack under their own weight and the weight of their supporting arms 4, and that the height of the stack is diminished, then the roller supporting arms are near a horizontal position from their original slanting position, the rotary coefficient of the roller supporting arm around the shaft 2 will increase, causing the pressure of the rollers against the stack to increase correspondingly. Let the rotary force and amount for rollers around their axis be same, changes in the pressure of the rollers against the stack cause variations in the distance moved by the sheets in a forward direction by virtue of their frictional engagement with the rotating rollers. Needless to mention, it is desirable to keep such distance variable from the topmost sheet to the last sheet in the stack.

In a preferred embodiment of a copying machine employing a sheet feeding mechanism such as contemplated herein, the machine will be designed such that an original form fed thereinto will be activated to adapt a microswitch provided in a passage channel of the original form for rotating a transmission which will cause the feed rollers to rotate for feeding a copy sheet forwardly, whereupon the copy sheet will be adapted to be overlaid with the aforesaid original form with their respective leading edges aligned to each other and then fed to a rotating printing cylinder for revolving around thereof to complete a printing cycle automatically.

With a copying machine such as described above, variations in the feeding distance of each copy sheet delivered by aforesaid frictional feed rollers may cause misalignment of the copy sheet from the overlaid original form, resulting in considerable difficulty. In a duplicator similarly having an automatic sheet feeding mechanism of the type described heretofore, it may be readily understood that the same variations will cause various inconveniences and disadvantages.

In an example embodiment of this invention illustrated in the accompanying drawings, the roller supporting arm 4 is provided, at one side edge proximate to its base portion, with an extension 12 formed integral therewith.

The extension 12 is engaged with an abutment of a metal mounting 13 mounted freely slideable on the feed table. Provided between said metal mounting and a stationary member such as a stud 14 on the feed table is a contractable spring 15 which tends to keep the rotary coefficient of the roller supporting arm 4 around shaft 2 uniform. In other words, the contracting force of the spring 15 tends not only to abate the dead load of the roller supporting arm 4, but also to balance in an increasing contracting force as the roller supporting arm approaches its horizontal position, with an increasing rotary coefficient of said roller supporting arm, with a result that the pressure exerted by the rollers on the stack will always be made uniform.

The contracting force of the spring 15 may be variable by permitting, as shown in FIG. 4, the stud 14 which holds one end of the spring onto the feed table 1, to be adjustably mounted on the feed table for free sliding movement.
The manner in which the spring is extended is, of course, not limited to the illustrated example, but other mode of effecting the same result will be readily conjecturable for those skilled in the art without departing from the true spirit and the scope of the utility model. For example, a spring can be wound around a rotary axis 2a for the roller supporting arm 4 with one end attached to said axis, the other end leaned pressingly against a pin planted approximate to the base portion of said roller supporting arm 4.

What is claimed is:

1. In a sheet feeding mechanism for a stack of sheets, comprising pivoted mounted arms a transverse rotatable shaft mounted on pivoted arms, rollers on said shaft adapted to rotate with said shaft and to contact the top surface of the top sheet on a stack of sheets to be fed into a copying machine, an arm projecting from at least one of the pivoted arms near its pivot point, a sliding, spring actuated, L-shaped member positioned to contact said point upon movement of the said member by said spring and to bias said pivoted arm in a direction to raise said rollers from the stack of sheets and thus relieve said sheets of some of the weight of said rollers and their supporting means.

References Cited

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