April 30, 1957 A. J. KILGARIFF 2,790,639

SHEET HOLDING AND FEED CONTROL DEVICE

Filed April 22, 1952

Fig. 1

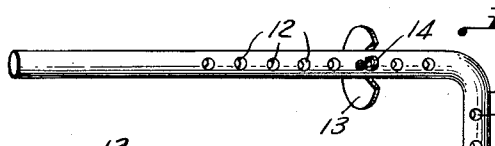



Fig. 2

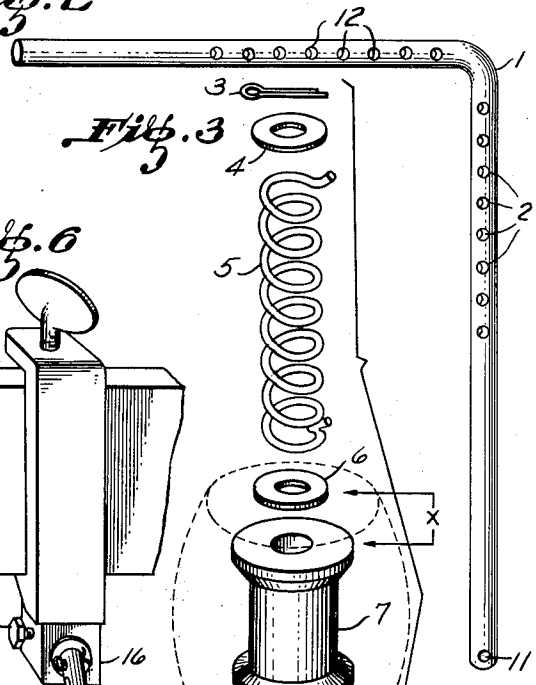
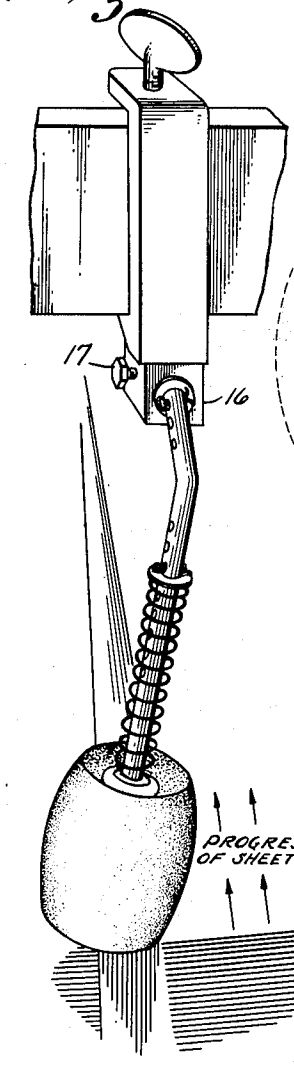



Fig. 3




Fig. 6



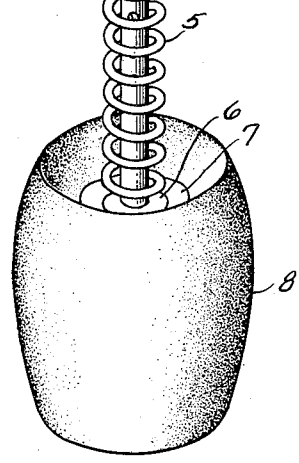




Fig. 5

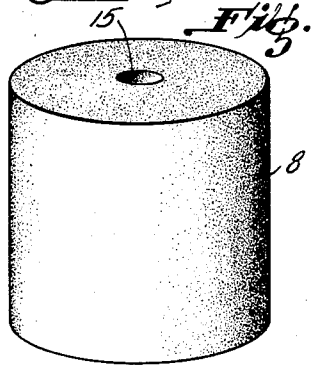
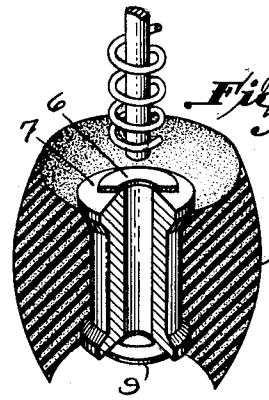



Fig. 4




INVENTOR

ANDREW J. KILGARIFF

BY William D. Carothers

ATTORNEY

United States Patent Office

2,790,639

Patented Apr. 30, 1957



2,790,639

# SHEET HOLDING AND FEED CONTROL DEVICE

Andrew J. Kilgariff, Pittsburgh, Pa.

Application April 22, 1952, Serial No. 283,589

6 Claims. (Cl. 271—18)

This invention relates generally to sheet feeding mechanism and more particularly to a device for holding and controlling the feeding of an initial sheet from a stack or pile of sheets to a machine, such as a printing press.

This invention contemplates the use of a resilient roller that engages the first few sheets in a stack for preventing more than one sheet from sliding into the feed conveyor of a printing press, or other processing machine.

An object of this invention is the provision of an aid for keeping the top sheets of a stack straight and in feeding position and for steering awry sheets into their proper position on the stack before being fed.

Another object of this invention is the provision of means to offset the sliding, suction, vibration, and shock impulses to the first few sheets of a stack on a feeder. This is accomplished by applying fluctuating, self-adjusting but governable pressure on the first few sheets, thereby providing a gentle but secure braking action which will in no way interfere with the smoothness of the ordinary suction cup feeding operation, or other type of feeding mechanism.

Another object is the provision of means to check any feeding disturbance caused by sheets dragging each other due to static.

Another object of this invention is the provision of a device to crowd certain types of sheets in from the edge or edges of the stack, making it easier for suction cups or other feeding mechanisms to remove the leading sheet from the stack.

Another object is the provision of a simple multipurpose antislide device easily and quickly applied for rendering unnecessary a variety of other appliances and thereby effecting economy in costs for such equipment, as well as safeguarding against waste, or spoilage, thus minimizing machine shutdowns, resulting in increased production.

Other objects and advantages appear hereinafter in the following description and claims.

A practical embodiment illustrating the principles of this invention is shown in the accompanying drawing, wherein:

Fig. 1 is a perspective view of the device comprising this invention.

Fig. 2 is a side view of the shaft shown in Fig. 1.

Fig. 3 is an exploded view of the several parts or mountings arranged for the shaft of Fig. 2.

Fig. 4 is a sectional view showing the concavo-convex contour of the cylindrical roll shown in Fig. 1.

Fig. 5 is a perspective view showing the sponge rubber roll in cylindrical shape.

Fig. 6 is a perspective view of the sheet retarding device illustrating the principle of this invention.

Referring to the drawings, the retarding device making up this invention is mounted upon the rod 1, which is preferably bent at right angles intermediate its ends to simplify the mounting of the same on a machine. The depending leg of the rod 1 has a series of holes 2 therethrough, to receive the cotter pin 3 that backs up the



washer 4 against the pressure of the coil spring 5. The other end of the spring 5 engages the washer 6 that bears against the top of the spool-like core 7 that has mounted thereon the rubber roll 8. This roll is preferably made of a resilient material. The best material found for this purpose is a sponge rubber which, when trimmed, provides a myriad of projecting points that aid in separating the sheets as they are being fed. The other end of the spool 7 is engaged by the washer 9, held by the cotter pin 10 passing through the hole 11 at the bottom of the depending leg of the rod 1.

In its free state, the sponge rubber roll 8 is cylindrical, as indicated at 15 in Fig. 5. When mounted on the spool, it is deformed as indicated in Figs. 1 and 4. The spool core 7 is free to rotate under the pressure of the spring 5 and when the side of the roll 8 engages the side edge of the first few sheets of a stack of paper being fed to a machine, the roll 8 will rotate and the small points or tongues on the side of the roll will force their way between the first few sheets.

In order to mount the roll 8 on the machine, the other leg of the rod 1 is provided with the series of holes 12 to receive the cotter pin 14 with the washer 13 for adjustably setting the rod 1 on the machine, as shown in Fig. 6. The horizontal leg of the rod is inserted into a socket to the depth of the setting of the washer 13. The socket holding the rod is on the bottom of the bracket 16 that is adjustably mounted to slide along the frame of the printing press or other machine into which the sheets are fed one at a time. A set screw 17 is employed to hold the rod at the proper angular position, and the washer 13 limits the horizontal position of the spool relative to the frame. This frame usually carries the suction feeding cups.

One of the holes 2 is selected through which the cotter pin 3 is inserted to hold the washer 4, bringing about sufficient compression in spring 5 to prevent the movement of the pile of sheets from pushing the spool core 7 upward out of its proper location adjacent the bottom of the rod 1. The washers 6 and 9 serve as bearings for the spool core 7 at the top and bottom respectively. The cotter pin 10 is inserted under the washer 9 and through the hole 11 to hold the assembly under predetermined pressure on the rod 1.

When the bore of the cylindrical rubber roll 8 is stretched over and squeezed between the flanges of the spool-like core 7, securing itself in place by its own elasticity and deforming to produce bulging of the sides, its flat ends become concave and the sides become barrel-shaped or convex. The intermediate portion of the mounted spool then provides a desirable spongy resilience that increases in softness and flexibility towards the perimeters of the spool ends. The initial deformation caused by mounting the roll on the spool core 7 provides these characteristics. This range of flexibility affords adequate means of controlling a variety of sheet stock, pulpy or stiff, throughout a high pile down to the last sheet, which obviously requires the least amount of pressure or gripping. The bottom perimeter of roll 8 extending considerably below the bottom of rod 1 eliminates danger of the rod binding or otherwise engaging the surface over which the sheets pass.

The rotation of the roller, caused by the movement of the passing sheets, is so slow that lubrication is relatively unimportant. However, a small amount of graphite on the rod and between the ends of spool core 7 and washers 6 and 9 may be advisable.

The horizontal leg of rod 1 is set at the desired distance in the supporting frame and is checked by the washer 13 and pin 14 from being pushed farther into the socket by the forward motion of the sheets, which incidentally

also aids in preventing the rod from slipping backward out of the fixture if the set screw is loose.

If it is desired to apply material pressure on the sheets, the roll **8** may be forced against the side of the pile of sheets with the horizontal section of rod **1** held rigidly in place and prevented from turning in the supporting frame by the use of a set screw **17** in the bracket **16** such as shown in Fig. 6. Again, the position of the bracket **16** along the frame may be employed to apply additional force against the pile of sheets. Additional, downward pressure may be applied on the sheets by moving pin **3** and washer **4** to one of the lower holes **2**, thereby increasing the initial compression in spring **5**.

Generally, it will be found that the gravitational pressure due to the weight of the device itself will be found sufficient if used without being locked in place by a set screw **17**, but left free to swing in contact with the pile of sheets, thus maintaining a uniform pressure and gripping ability at all times. However, if it is desired to have the device swing freely and still add pressure, a number of weights in the form of additional large washers can be placed on shaft **1**, between the washer **6** and the core **7** at the point indicated at X in Fig. 3.

The roller, composed of spool core **7** and roll **8** is made to revolve around rod **1** by the movement of the sheets. This action turns the roller gradually and releases its grip on the leading sheet as it is taken from the pile by the suction cups of the feeder. At the same time, the roller is applying new grip pressure to oncoming sheets by means of a multiplicity of projections gently pressing against and between the first few sheets and overlapping the edges of the same.

This device may be quickly and easily installed and adjusted without the aid of special mechanical skill and may be left on a machine over long periods of time, controlling all different types of sheets that are fed consecutively without the inconvenience or requirement of frequently changing or adjusting the device to any one or more combinations of a variety of other antislide or holding devices such as has been the practice hereto.

I claim:

1. A sheet holding and separating device comprising a rod secured at one end relative to the sheets to be separated and having an abutment on its free end, a resilient sheet engaging roller rotatably mounted on said rod with one end in contact with said abutment and with its periphery in position to engage the side edges of the top few sheets to apply a buckling force thereto, and a spring adjustably mounted on said rod and engaging the opposite end of said roller to retard both rotary and axial movement of said roller on said rod when the top sheet is withdrawn from engagement therewith.

2. A sheet holding and separating device comprising a rod secured at one end relative to the top of the sheets to be separated, a resilient sheet engaging roller rotatably mounted on said rod adjacent the free end thereof and having its periphery positioned to engage the side edges of the top few sheets to apply a buckling force thereto, and a spring mounted on said rod and having one end adjustably secured relative to said rod and engaging said roller to retard both rotary and axial movement of the roller when the top sheet is withdrawn from engagement therewith.



3. A sheet holding and separating device comprising a rod, a resilient sheet engaging roller rotatably mounted on said rod adjacent the free end thereof, a spring mounted on said rod and having one end adjustably secured to said rod and having its other end engaging said roller to retard the roller's movement on said rod, a bracket for receiving and supporting the other end of said rod, and means for adjusting the position of said bracket, the rod supported thereby and the roller mounted on the free end of the rod to position the periphery of the roller to engage and exert pressure on and buckle the side edges of the top few sheets.

4. A sheet holding and separating device comprising a rod bent to form two legs, a resilient sheet engaging roller rotatably mounted on one leg of said rod adjacent to the free end thereof with its periphery positioned to engage the side edges of the top few sheets to apply a buckling force thereto, a spring adjustably mounted on said rod and engaging said roller to retard its movement on the leg of said rod, a bracket adjustably secured relative to the top few sheets to be separated, and adjustable fastening means on said bracket for securing said other leg in a position whereby the periphery of said roller adjacent the free end of said rod is positioned to apply a predetermined pressure and buckling force to the side edges of the top few sheets.

5. A sheet holding and separating device comprising a rod secured at one end relative to the sheets to be separated, a resilient sheet engaging roller having a bulged exterior paper engaging surface and rotatably mounted on said rod with its periphery positioned to engage the side edges of the top few sheets to apply a buckling force thereto, spaced abutments on said rod smaller in diameter than said roller and engaging the opposite ends thereof, one abutment fixed relative to said rod, and a spring adjustably mounted on said rod and engaging said other abutment to move it toward the fixed abutment and squeeze the roller axially therebetween to retard its rotative and axial movement on said rod when the top sheet is withdrawn from engagement therewith.

6. The structure of claim 5 characterized in that said roller is of soft sponge-like rubbery material.


**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 1,037,792 | Morawiecki | Sept. 3, 1912 |
| 1,867,038 | Upham | July 12, 1932 |
| 1,944,176 | Higbee | Jan. 23, 1934 |
| 2,022,989 | Tilman | Dec. 3, 1935 |
| 2,112,341 | Klemm | Mar. 29, 1938 |
| 2,284,429 | Jirousek | May 26, 1942 |
| 2,285,224 | Nigra | June 2, 1942 |
| 2,626,149 | Holmberg | Jan. 20, 1953 |
| 2,685,380 | Moeller | Aug. 3, 1954 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 842,580 | Germany | June 30, 1952 |