I. F. NILES.

SHEET DETECTOR.

APPLICATION FILED MAR. 21, 1912.

1,114,020.

Patented Oct. 20, 1914.

2 SHEETS—SHEET 1.

Fig. 3.

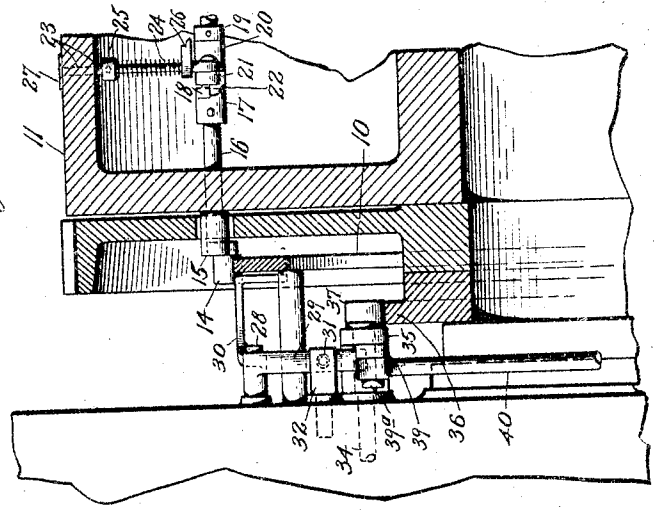
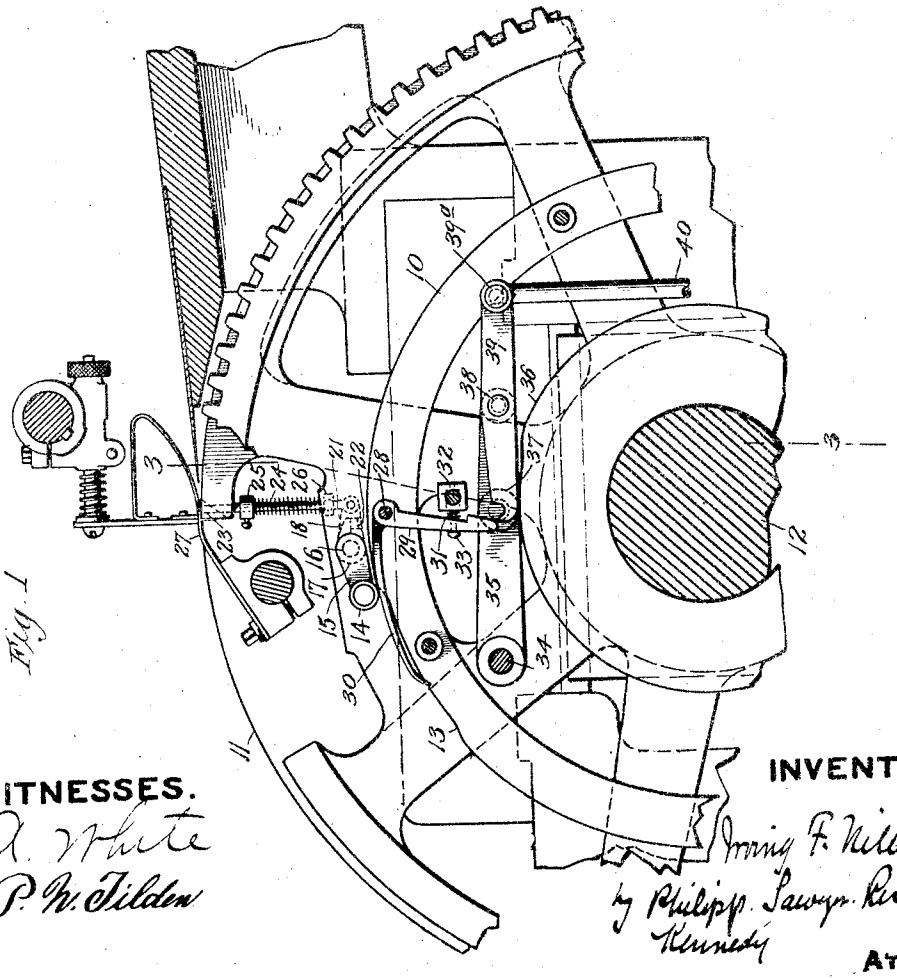


Fig. 1.



WITNESSES.

A. White

P. W. Tilden

INVENTOR.

Irving F. Niles

by Philipp, Sawyer, Rice & Kennedy

ATT'YS.

I. F. NILES.

SHEET DETECTOR.

APPLICATION FILED MAR. 21, 1912.

1,114,020.

Patented Oct. 20, 1914.

2 SHEETS-SHEET 2.

Fig. 4.

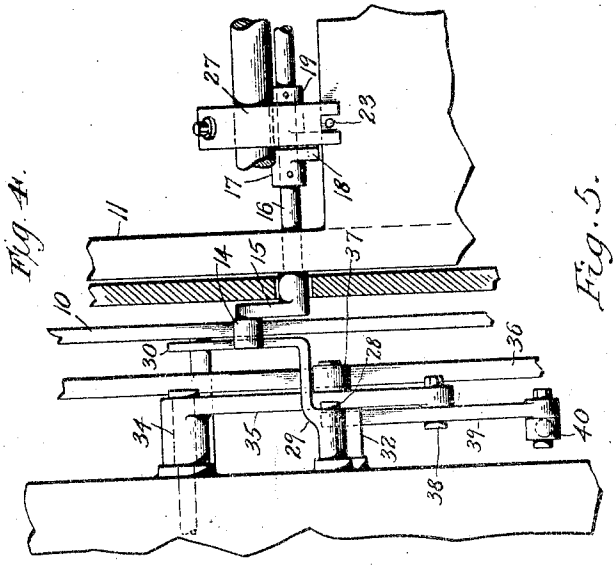


Fig. 5.

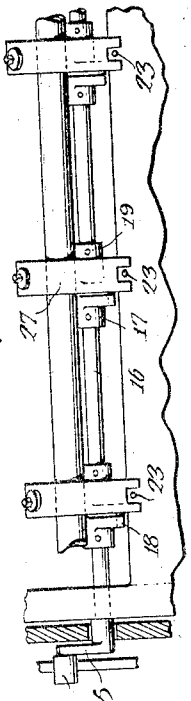
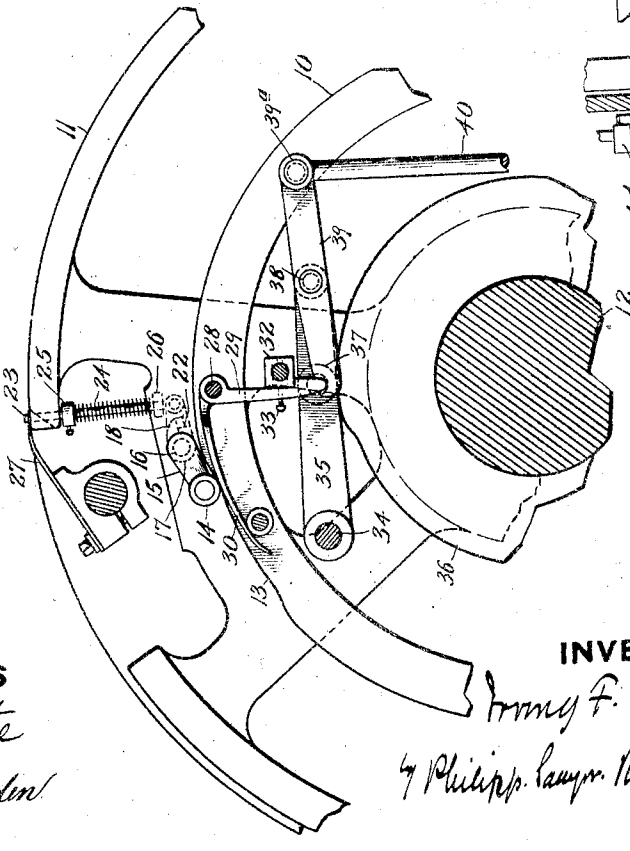


Fig. 2.



WITNESSES

A. White

P. H. Tilden

INVENTOR.

Irving F. Niles

by Philipp, Lawyer, Rice & Kennedy

ATT'YS.

UNITED STATES PATENT OFFICE.

IRVING F. NILES, OF PLAINFIELD, NEW JERSEY, ASSIGNOR TO R. HOE AND CO., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SHEET-DETECTOR.

1,114,020.

Specification of Letters Patent. Patented Oct. 20, 1914.

Application filed March 21, 1912. Serial No. 685,246.

To all whom it may concern:

Be it known that I, IRVING F. NILES, a citizen of the United States, residing at Plainfield, county of Union, and State of New Jersey, have invented certain new and useful Improvements in Sheet-Detectors, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to automatic sheet detectors for sheet fed printing machines.

One of its principal objects is to provide an improved mechanism that will detect the absence of a sheet from the impression cylinder.

Another object is to provide an improved mechanism that will also detect the lack of registration of a sheet if improperly taken up by the grippers.

Still another object is to provide an improved mechanism that will detect a mutilated sheet if such be fed to the grippers.

Other objects of the invention not here set forth will appear in the following description and in the appended claims.

Referring to the drawings, Figure 1 is a partial end elevation of an impression cylinder showing the improvement as applied thereto; Fig. 2 is a similar view showing the mechanism in a different position; Fig. 3 is a sectional elevation taken on the line 3—3 of Fig. 1; Fig. 4 is a partial plan view of the mechanism shown in Fig. 2; and Fig. 5 is a plan view partly in section and partly broken away showing a plurality of grippers and detector fingers.

When devices of the character to which the invention relates are to be employed to detect lack of registration, the operation of such devices should be timed to follow the closing of the grippers upon the sheet for the registration of the sheet is not determined until that time. Mechanism constructed in accordance with the invention will, therefore, include means whereby it becomes operative after the grippers have closed. While the particular means to accomplish this may be widely varied, in the embodiment shown, it comprises a stationary cam ring 10 located at one end of the impression cylinder 11 and concentric with the shaft 12 of the impression cylinder. The cam 10 is circular in form except for a slight depression 13 shown in Figs. 1 and 2. Bearing upon the cam is a roller 14 attached to an arm 15 fastened to a rock-shaft 16 which is journaled longitudinally within the impression cylinder 11. Pinned to the shaft 16 is a series of collars, one of which is shown at 17 in Figs. 3 and 4, and each collar is provided with a projection 18. Loosely mounted upon the shaft 16 between the collar 17 and a second collar 19 is a sleeve 20 carrying an arm 21 having an off-set lug 22 positioned to contact with the projection 18, as viewed in Fig. 3. Pivoted to the arm 21 is shown a plunger or feeler 23, constituting one of a series, which passes radially through the wall of the impression cylinder. A compression spring 24 located between a collar 25 fastened to the plunger and a fixed abutment 26 attached to the impression cylinder tends to hold the plunger outward, and projecting slightly above the surface of the impression cylinder.

As will be apparent from Fig. 1, the plunger is normally held inward, below the surface of the cylinder, by means of the cam 10 and mechanism described, at all times except when the roller 14 is opposite the cam depression 13, which occurs just after the grippers indicated at 27 have closed upon the sheet. At this particular time the plunger 23, unless it be restrained by the sheet clamped under the grippers, is free to move outwardly under the tension of its spring 24. In order to insure the detection of either a sheet that is out of register or a sheet that is mutilated, the detecting mechanism includes a plurality of detecting feelers, these feelers being capacitated to move outwardly independently of one another, each feeler being also adapted independently to cause the actuation of the throw-out mechanism associated with the detector. While the particular construction for operating the feelers so that they may be independently movable as described and so that they may independently cause the actuation of the throw-out mechanism may be widely varied, in the embodiment of the invention here disclosed, the particular arrangement of the rock-shaft 16, collars 17 and 19, sleeve 20 and feelers 23 described above has been made to effect the purpose. It will be noted, as viewed in Fig. 1, that when the shaft 16 is rocked in a clockwise direction, the projection 18 on collar 17 will contact with the off-set lug 22

and depress the plunger 23, and that this movement of the shaft 16 will depress all of the plungers distributed along the shaft, regardless of their number or position. On the other hand, at the time the roller 14 moves opposite the cam depression 13, if any of the plungers 23 be driven ontward under tension of its spring (owing to the absence of the sheet at that point) the off-set lug 22 will move upward, raising the related projection 18 and rocking the shaft 16 in an anti-clockwise direction, thereby causing the actuation of the mechanism now to be described. Upon the frame at 28 is fulcrumed a pawl 29 provided with a tail 30 located adjacent the cam depression 13 and adapted to be actuated by the roller 14. The tail is normally forced upward by a spring 31 located between a thrust block 32 fastened to the frame and the pawl, and held in position by a pin 33. Upon the frame at 34 is fulcrumed a power arm 35 which is continuously oscillated by a cam 36 carried by the shaft 12, the cam bearing against a roller 37 mounted upon the arm 35. At the extremity 38 of the power arm is fulcrumed a lever 39 which is attached at its outer end to the throw-out mechanism indicated at 40. The inner end of the lever 39 is U-shaped and forms a socket into which the nose of the pawl 29 moves when its tail 30 is depressed, as described above.

In operation, the lever 39 normally vibrates idly about the point 39^a as a fulcrum as the power-arm oscillates. Should the pawl 29 be moved to engaging position, however, the nose of the pawl will form a block between the inner end of the lever 39 and the thrust block 32, and the lever 39 will now fulcrum upon the nose of the pawl, as the lever is raised by the power arm, as shown in Fig. 2, and the consequent upward movement of its outer end will elevate the rod 40 of the throw-out mechanism, thus causing the cylinders to be thrown out of printing relation in the usual manner. As any movement of the shaft 16 in an anti-clockwise direction, as viewed in Fig. 1, will cause the actuation of the throw-out mechanism, and also as any one of the feelers or plungers 23 is adapted by its connections to rock the shaft 16 in this direction independently of the position of the remaining feelers, the throwout mechanism may be operated by any one of the series of feelers, which arrangement is necessary in order to effect the results described.

It will be understood that changes and variations may be made in the construction by which the invention claimed is carried into effect. The claimed invention, therefore, is not to be confined to the particular construction herein described and illustrated in the accompanying drawings.

What is claimed is:—

1. An impression cylinder, a plurality of feelers located beneath the sheet path carried by the cylinder and independently movable to detect the absence of a sheet from the impression cylinder, a throw-out mechanism, and connections between the said feelers and the throw-out mechanism whereby the detector movement of any one of the feelers will cause the actuation of the throw-out mechanism.

2. An impression cylinder, grippers and feelers located beneath the sheet path carried by the cylinder, the feelers being movable to operative position after actuation of the grippers, said feelers having respectively a further and independent movement to detect the absence of a sheet from beneath the grippers, a throw-out mechanism, and connections between said feelers and the throw-out mechanism, whereby the detector movement of any one of the feelers will cause the actuation of the throw-out mechanism.

3. In combination, an impression cylinder, grippers, a shaft longitudinally mounted in the cylinder, a plurality of feelers carried by the cylinder and adapted to move into operative position after the actuation of the grippers, the said feelers being further movable independently to detect the absence of a sheet from beneath the grippers, a throw-out mechanism controlled by the movement of said shaft, and connections between the respective feelers and the said shaft whereby the detector movement of any one of the feelers will cause a movement of the said shaft to actuate the throw-out mechanism.

4. In combination, an impression cylinder, grippers, a rock-shaft longitudinally mounted in the cylinder, a plurality of feelers carried by the cylinder and adapted to move into operative position after the actuation of the grippers, the said feelers being further movable independently to detect the absence of a sheet from beneath the grippers, a throw-out mechanism controlled by the movement of the said rock-shaft, and connections between the respective feelers and the said rock-shaft whereby the detector movement of any one of the feelers will cause a movement of the said rock-shaft to actuate the throw-out mechanism.

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

IRVING F. NILES.

Witnesses:
RICHARD KELLY,
JOHN M. W. JORDAN.