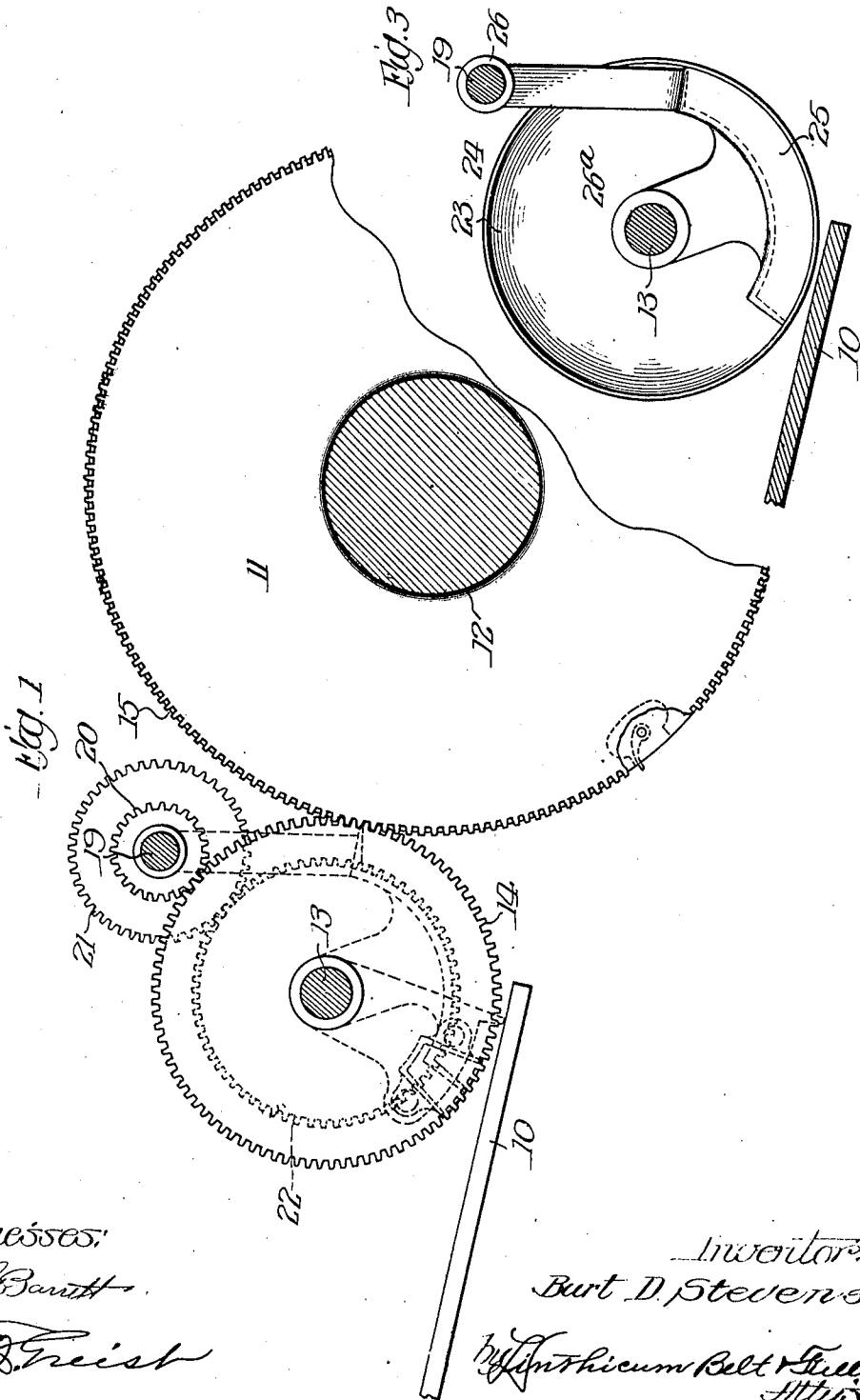


B. D. STEVENS.
SHEET REGISTERING MECHANISM.
APPLICATION FILED MAY 13, 1912.

1,292,968.

Patented Jan. 28, 1919.
2 SHEETS—SHEET 1.



Witnesses:

A. B. Barrett

V. S. Greist

Inventor:

Burt D. Stevens

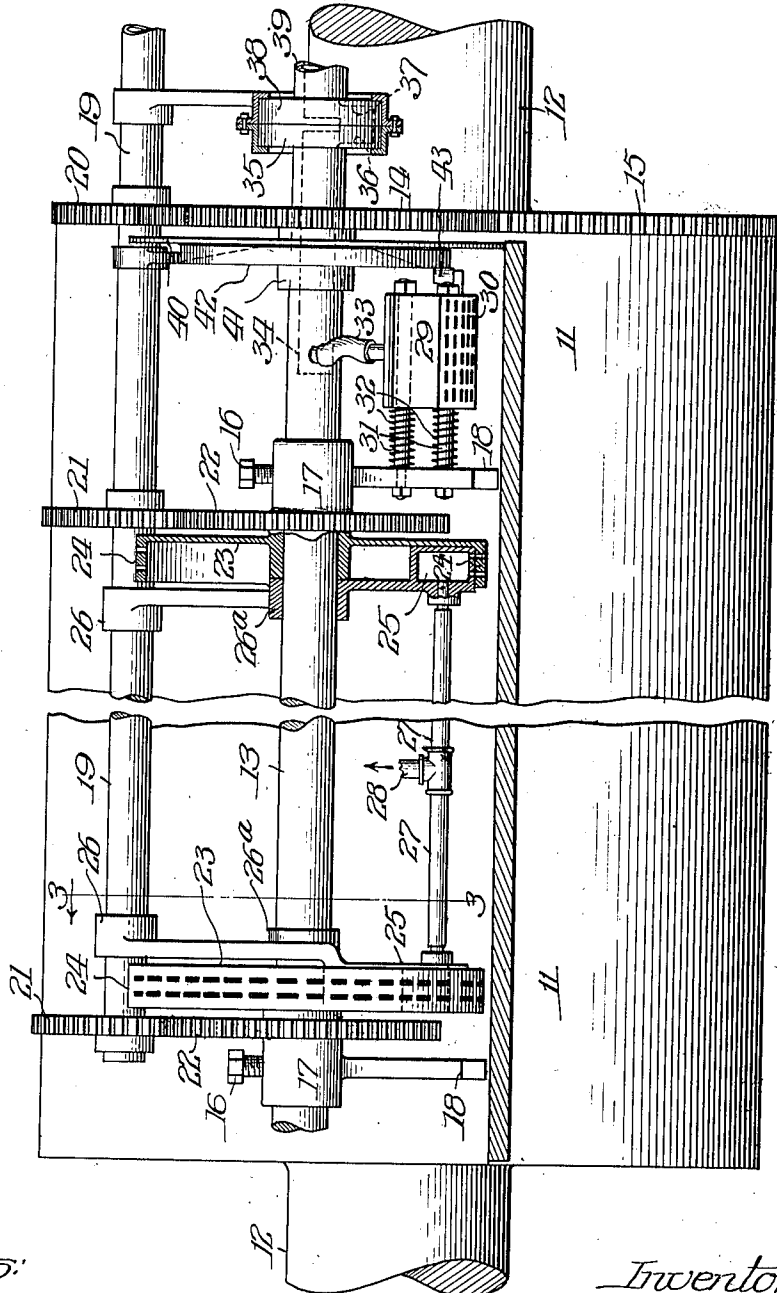
Wm. H. Cummins & Co. Attys

B. D. STEVENS.
SHEET REGISTERING MECHANISM.
APPLICATION FILED MAY 13, 1912.

1,292,968.

Patented Jan. 28, 1919.
2 SHEETS—SHEET 2.

Fig. 2



Witnesses:

S. C. Barrett

V. D. Geist

Inventor
Burt D. Stevens

by Linthicum Belt & Fuller
Attorneys

UNITED STATES PATENT OFFICE.

BURT D. STEVENS, OF RIVERSIDE, ILLINOIS, ASSIGNOR TO THE MIEHLE PRINTING PRESS & MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SHEET-REGISTERING MECHANISM.

1,292,968.

Specification of Letters Patent.

Patented Jan. 28, 1919.

Application filed May 13, 1912. Serial No. 696,840.

To all whom it may concern:

Be it known that I, BURT D. STEVENS, a citizen of the United States, residing at Riverside, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sheet-Registering Mechanism, of which the following is a specification.

One of the leading objects of the present invention is to secure a more accurate registration or gaging of the sheets of paper as they are fed to the cylinder of a printing press, and also to accomplish such registration in a manner that the speed of such feed may be increased, whereby the output of the press may be materially enlarged.

It has been customary heretofore to feed the sheets individually against substantially stationary gages or guides, so that during the travel of the paper it is necessarily stopped in its movement, at least momentarily, to secure the desired registration. In such presses the inertia of the paper must be instantly overcome when the grippers of the impression cylinder, which are constantly traveling at full speed, grasp the sheet and secure it on the cylinder. As will be appreciated, in a structure of that character the gages and grippers must operate with great precision to secure registration of the sheet and its transfer or clamping to the rapidly traveling impression cylinder. In other words, when a sheet of paper is gaged and gripped in a press of this kind the stationary sheet is instantaneously changed to the full speed of travel, which renders accurate registration difficult, if not impossible.

In accordance with my invention, the gages are made to travel at the same speed as the gripper-equipped impression cylinder, and the registration is accomplished during the movement of such gages, so that an appreciable and valuable interval of time is taken advantage of to secure more accurate registration and to increase the rate of feeding to the impression cylinder. In my improved construction there is no substantial change in the speed of travel of the sheet during its registration and gripping to the impression cylinder, because the registration is obtained during the travel of the paper, as distinguished from the old method of stopping the sheet to effect the registration.

In order that a complete understanding of the invention and more or less of the details of construction of a preferred embodiment of the invention may be fully understood, I have illustrated, in a more or less fragmentary and diagrammatic manner, one desirable embodiment of the invention in the accompanying drawings, which form a part of this specification, and to which reference should be made.

In these drawings:

Figure 1 illustrates in side elevation one of my improved sheet-registering devices, many of the parts being omitted for the sake of clearness of illustration;

Fig. 2 illustrates, partly in elevation and partly in section, the registering mechanism shown in Fig. 1; and,

Fig. 3 is a cross-section on line 3—3 of Fig. 2.

In these drawings the feed-table may be of any ordinary and usual construction for hand feeding, or in its place, any automatic mechanism may be used for power feeding. Near the end of the table, adjacent to the impression cylinder 11, mounted on shaft 12, I employ a shaft 13, revolving in suitable bearings by means of the gear 14, the teeth of which mesh with those of the large gear 15 mounted on the impression cylinder shaft 12. Fixed to the shaft 13 by means of set screws 16, 16 are a pair of hubs 17, 17, outstanding from which are the front gage arms 18, 18, against which the forward edge of the sheet of paper is adapted to be brought to secure its proper registering position. Obviously, in order to bring the sheets against these revolving stops or gages 18, 18 it is necessary to cause the sheets of paper to travel faster than the gages do, and to accomplish this result the following parts and instrumentalities are employed:

A second shaft 19 is mounted in suitable bearings adjacent and in parallel relation to the shaft 13, shaft 19 being driven by a gear 20 intermeshing with the gear 14. Gears 21, 21 are fixed upon the shaft 19, in mesh with gears 22, 22, loosely mounted on shaft 13. Carried by the hubs of the gears 22, 22, and preferably formed integral therewith, are cupped disks 23, 23, having their lateral flanges 24, 24 apertured as shown. Segmental hollow suction shoes 25, 25 are suspended

from bearings 26 and 26^a, and occupy positions within the lower portions of the respective disks 23. Each of these shoes has its outer arcuate face 26 provided with apertures corresponding or in register with the apertures in the flange 24, and it rides within the disk 23 with its face 26 in close relation to the inner surface of the flange 24. The pair of shoes 25, 25 are connected by means of air pipes 27, 27 and 28 to a suitable exhausting device, not shown.

By reason of the difference in size of the gear members, 14, 20, 21 and 22, the disks 23, 23 are caused to rotate upon the shaft 13 at a speed greater than that of the shaft 13 itself, and, consequently, the peripheral speed of the disks 23, 23 is greater than that of the gages 18, 18 carried by said shaft.

The sheets of paper resting upon the feed table 10 are, by means of the suction shoes 25, 25, acting through the apertured flanges 24 of the disks 23, engaged by suction and carried forward at a speed greater than that of the gages, so that without any stoppage of the gages the sheet of paper is fed forward into contact therewith during its progress toward the impression cylinder 11, so that longitudinal registration is secured.

In order to effect a lateral registration of the paper after the same has been brought into contact longitudinally with the gages 18, 18, further cooperating mechanism is provided comprising a suction shoe 29 provided with an apertured wall 30 concentric with the shaft 13, and slidably mounted upon pins 31, 31 projecting laterally from one of the gages 18, and yieldingly pressed from said gage by coil expansion springs 32, 32. The interior of the shoe 29 is in communication, by means of a flexible pipe 33, with an air passage 34 within the end of shaft 13 which to this extent is tubular.

The outer end of shaft 13 is provided with a hollow head 35 having an eccentrically disposed opening 36 arranged to cooperate intermittently or at properly timed intervals with a similar opening 37 in the hollow head 38 carried by a stationary exhaust pipe 39, whereby the air is periodically exhausted from the interior of the shoe 29 at a time corresponding to the coming of the shoe 29 into contact with the sheet of paper after its longitudinal registration has been effected by means of contact with the gages 18, 18.

A stationary disk 40 fastened to the shaft 13 constitutes the side gage or stop against which the suction shoe 29 is adapted to shift the paper laterally to effect proper side registration. A stationary cam 42 co-acts with the roller 43 carried by the shoe 29, whereby the latter is pressed to the left, as shown in the drawing, against the action of the springs 32.

When the sheets have been brought into

longitudinal registration and rest against the front gages 18, 18, the shoe 29 engages the sheet, and under the influence of the springs 32 and the suction applied through the shoe, the effective suction area of which is relatively larger than that of the shoe 24, moves the sheet to the right against the traveling disk 40 to register the sheet laterally, and after the sheet is released by the shoe the latter is returned to its former position by means of the stationary cam 42 acting upon the roller 43.

It will be apparent that the lateral movement of the sheet by means of suction applied by the shoe 29 at one side of the sheet while such lateral movement is retarded or restrained by suction applied by the shoe 24 at the opposite side and at a point intermediate the two sides, causes the sheet to be placed under lateral strain thereby smoothing out any wrinkles and preventing any bulging of the sheet.

Thus it will be seen that registration of the sheets fed to the press is quickly, accurately, and automatically secured, the registration being both longitudinal and lateral with reference to the direction of the feed or travel of the sheet. Such registration is obtained without stopping the travel of the sheets or gages, whereby I am enabled to obtain better registration than has heretofore been effected, and the speed capacity of the press is also materially increased.

It will be understood that, while I have shown and described with a considerable degree of particularity mechanism of specific construction and arrangement adapted to the purposes of the invention, yet the structural features are subject to modification within a wide range without departure from the invention or sacrifice of its characteristic advantages. It will also be understood that while the terms used in the specification and claims are appropriate to that type of press chosen for purposes of illustration, they are to be construed in a generic sense to include the corresponding or equivalent elements of other types of press.

I claim

1. In a sheet registering device for printing presses, the combination with a printing cylinder, and its sheet gripping mechanism, of a front gage having a forward movement corresponding in speed to that of the grippers, and means acting by suction to feed the sheet forwardly against said gage during the travel of the latter, substantially as described.

2. In a sheet registering device for printing presses, the combination with a rotary printing cylinder, and its sheet gripping mechanism, of a rotary front gage having a forward movement corresponding in speed to that of the grippers, and rotary means acting by suction to feed the sheet forwardly

against said gage during the travel of the latter, substantially as described.

3. In a sheet registering device for printing presses, the combination with a rotary printing cylinder, and its sheet gripping mechanism, of a rotary front gage having a forward movement corresponding in speed to that of the grippers, means to feed the sheet forwardly against said gage during the travel of the latter, a side gage, and rotary means acting to move the sheet laterally against the side gage during its forward movement, substantially as described.

4. In a sheet registering device for printing presses, the combination with a printing cylinder, and its sheet gripping mechanism, of a front gage having a forward movement corresponding in speed to that of the grippers, means acting by suction to feed the sheet forwardly against said gage during the travel of the latter, a side gage, and means acting by suction to move the sheet laterally against the side gage during its forward movement, substantially as described.

5. In a sheet registering device for printing presses, the combination with a rotary printing cylinder, and its sheet gripping mechanism, of a rotary front gage having a forward movement corresponding in speed to that of the grippers, and rotary means acting by suction to feed the sheet forwardly against said gage during the travel of the latter, a side gage, and rotary means acting by suction to move the sheet laterally against the side gage during its forward movement, substantially as described.

6. In a sheet registering device for printing presses, the combination with a printing cylinder, and its sheet gripping mechanism, of front and side gages, the former having a forward movement corresponding in speed to that of the grippers, and rotary means to feed the sheet in a forward and lateral direction against both of said gages during the forward travel of the front gage, substantially as described.

7. In a sheet registering device for printing presses, the combination with a printing cylinder, and its sheet gripping mechanism, of front and side gages, the former having a forward movement corresponding in speed to that of the grippers, and rotary means to feed the sheet in a forward and lateral direction against both of said gages during the forward travel of the front gage, substantially as described.

8. In a sheet registering device for printing presses, the combination with a printing cylinder, and its sheet gripping mechanism, of front and side gages, the former having a forward movement corresponding in speed to that of the grippers, and rotary means acting by suction to feed the sheet in a forward

and lateral direction against both of said gages during the forward travel of the front gage, substantially as described.

9. In a sheet registering device for printing presses, the combination with a printing cylinder, and its sheet gripping mechanism, of a front gage having a forward movement corresponding in speed to that of the grippers, and means to feed the sheet forwardly against said gage during the travel of the latter, and means acting on the sheet whereby to straighten the same and maintain it smooth, substantially as described.

10. In a sheet registering device for printing presses, the combination with a printing cylinder, and its sheet gripping mechanism, of a front gage having a forward movement corresponding in speed to that of the grippers, means acting by suction to feed the sheet forwardly against said gage during the travel of the latter, and restraining suction means acting on the sheet in opposition to the suction feeding means whereby to straighten the same and maintain it smooth, substantially as described.

11. In a paper registering device, the combination of a rotary front gage, means to rotate said gage to cause the same to move in the general direction of the travel of the sheet of paper, a rotary suction device acting upon the sheet of paper to feed the same against the front gage during the travel of the latter, a side gage and a second rotary suction device acting upon the sheet of paper during its forward travel to feed said sheet against the side gage, substantially as described.

12. In a paper registering device, the combination of a rotary gage, means to move said gage in the general direction of the travel of the paper, a rotary suction device acting upon the sheet of paper to feed the same against the gage during the travel of the latter, said suction device comprising a rotary cupped disk having a laterally extending apertured flange, a stationary suction shoe having an apertured face fitted within the disk in close contact with the apertured flange, and means to rotate the apertured disk at a speed greater than that of the gage, substantially as described.

13. In a paper registering device, the combination of a rotary gage, means to rotate said gage to cause the same to move in the general direction of the travel of the paper, a rotary suction device acting upon the sheet of paper to feed same against the gage during the travel of the latter, said suction device comprising a pair of rotary cupped disks each having a laterally extending apertured flange, a stationary suction shoe having an apertured face fitted within each of the disks in close contact with the apertured flange, and means to rotate the aper-

tured disks at a speed greater than that of the gages, substantially as described.

14. In a paper registering device, the combination of a rotary front gage, means to rotate said gage to cause the same to move in the general direction of travel of the sheet of paper, a rotary suction device acting upon the sheet of paper to feed the same against the front gage during the travel of the latter, said suction device comprising a rotary cupped disk having a laterally extending apertured flange, a stationary suction shoe having an apertured face fitted within the disk in close contact with the apertured flange, means to drive the apertured disk at a speed greater than that of the front gage, a side gage, and a second suction shoe rotating with the front gage and mounted for lateral movement toward and from the side gage, a spring device tending to move the second shoe toward the side gage and means to return the shoe, substantially as described.

15. In a paper registering device, the combination of a rotary front gage, means to rotate said gage to cause the same to move in the general direction of travel of the sheet of paper, a rotary suction device acting upon the sheet of paper to feed the same against the front gage during the travel of the latter, said suction device comprising a pair of rotary cupped disks each having a laterally extending apertured flange, a stationary suction shoe having an apertured face fitting within each of the disks in close contact with the apertured flange, means to rotate the apertured disks at a speed greater than that of the front gage, a side gage, a second suction shoe carried by the rotary front gage and mounted thereon for lateral movement toward and from the side gage, springs interposed between the front gage and the shoe to yieldingly press the same toward the side gage, and a cam acting upon the shoe to return the same against the action of the springs, substantially as described.

16. In a device of the character described, the combination of a gage, a movable suction member adapted to move a sheet of paper into register with said gage, and restraining suction means adapted to smooth

out the sheet of paper and maintain it substantially free from wrinkles and bulging, substantially as described.

17. In a device of the character described, the combination of a front gage, a suction member adapted to register a sheet of paper with such gage, a side gage, a movable suction member adapted to register said sheet with said side gage, means to move said last named suction member to shift the sheet against the restraining action of the first suction member whereby to smooth out the sheet of paper and maintain it substantially free from wrinkles and bulging, substantially as described.

18. In a printing press, the combination with the impression cylinder, and its grippers, of means for imparting front register to a sheet fed to the cylinder without interrupting the forward movement of the sheet, and means for imparting side register to said sheet comprising a side gage mounted to revolve at the speed of the grippers in a curved path to which the plane of the sheet path is tangent, a revoluble sheet clamping device traveling with the gage, means to actuate the clamping device to seize the side of the sheet, and means to move the clamping device laterally to bring the side of the sheet to the gage.

19. In a printing press, the combination with the impression cylinder, and its grippers, of means for imparting front register to a sheet fed to the cylinder without interrupting the forward movement of the sheet, and means for imparting side register to said sheet comprising a side gage mounted to revolve at the speed of the grippers in a curved path to which the plane of the sheet path is tangent, a revoluble sheet clamping device traveling with the gage, means to actuate the clamping device to seize the side of the sheet, and means to move the clamping device laterally to bring the side of the sheet to the gage, the sheet clamping device comprising a shoe and suction means to frictionally press the sheet against the shoe by air pressure.

BURT D. STEVENS.

Witnesses:

CARL HENDERSON,
CHAS. HICKMAN.