June 4, 1968 J. F. GREEN ET AL 3,386,637

ROTARY PRESS PREPRINTED WEB REGISTERING DEVICE

Filed Dec. 12, 1966 3 Sheets-Sheet 1

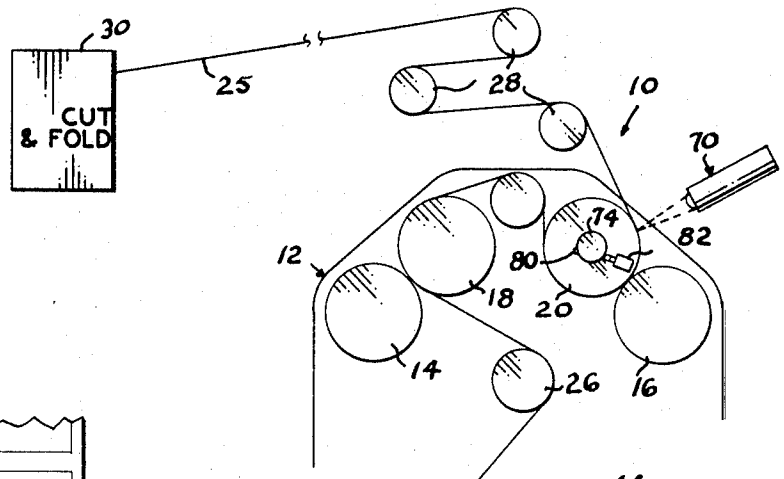
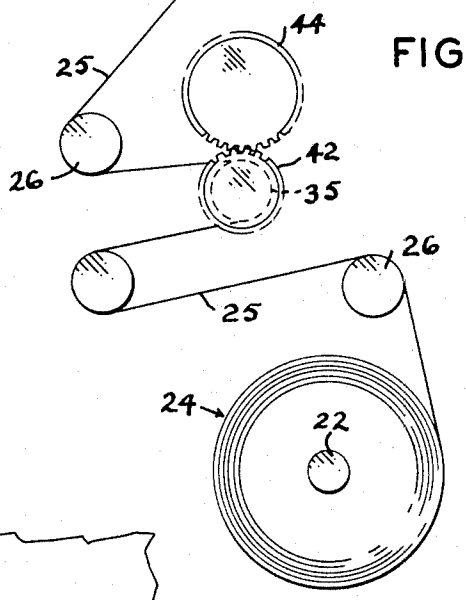


FIG. 1



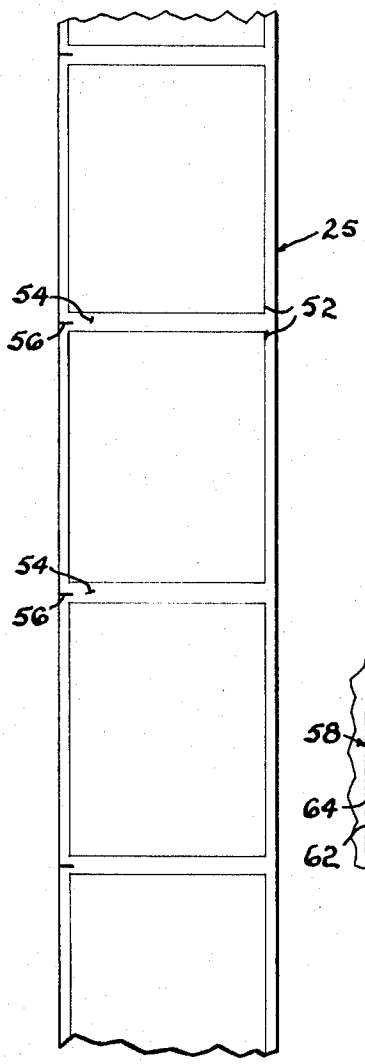


FIG. 2

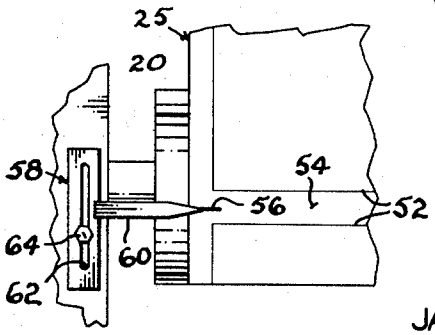


FIG. 6

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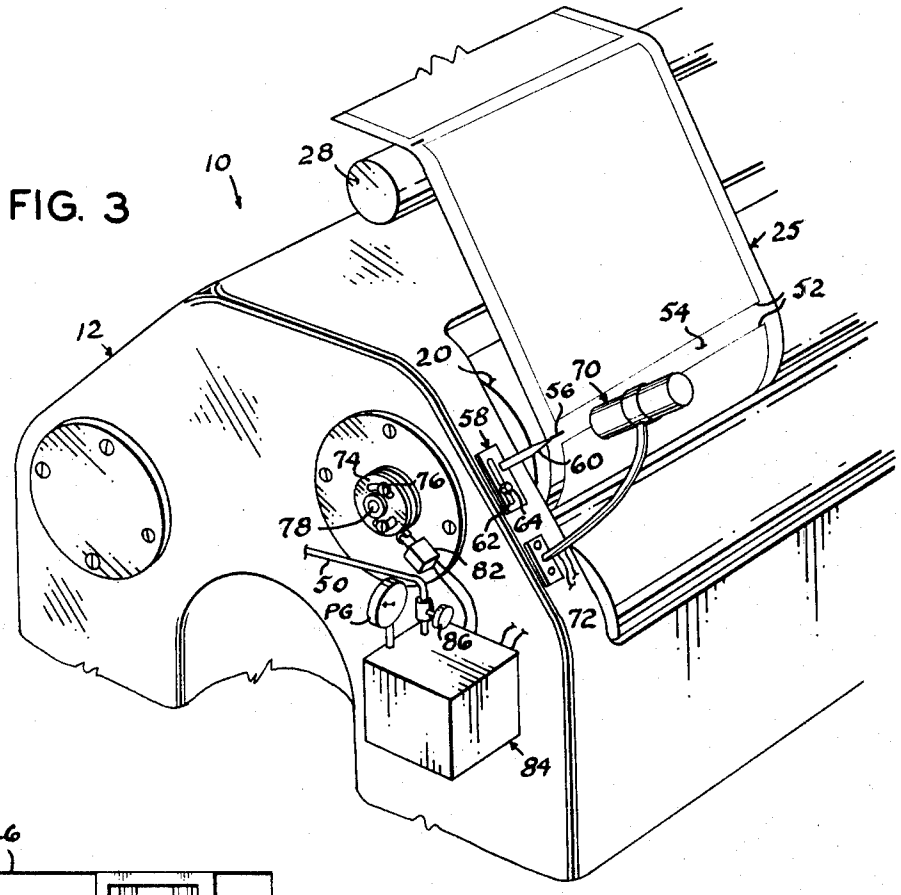
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ROTARY PRESS PREPRINTED WEB REGISTERING DEVICE

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FIG. 3



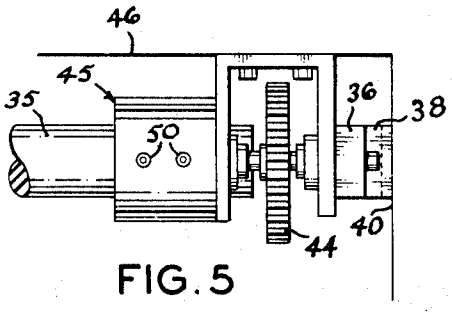


FIG. 5

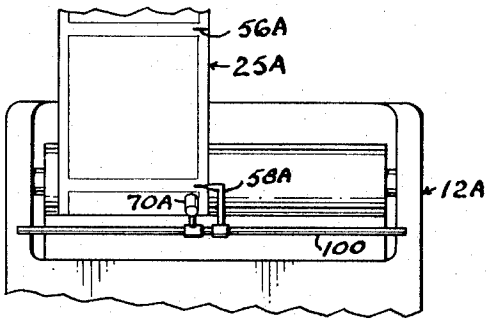


FIG. 8

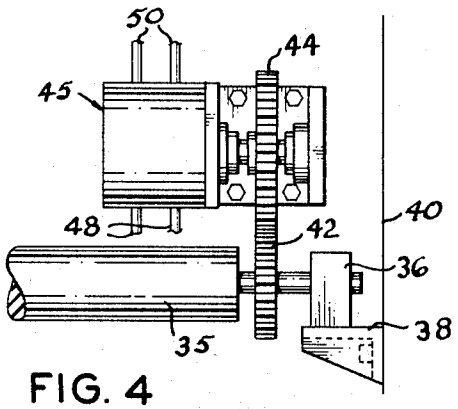


FIG. 4

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ROTARY PRESS PREPRINTED WEB REGISTERING DEVICE

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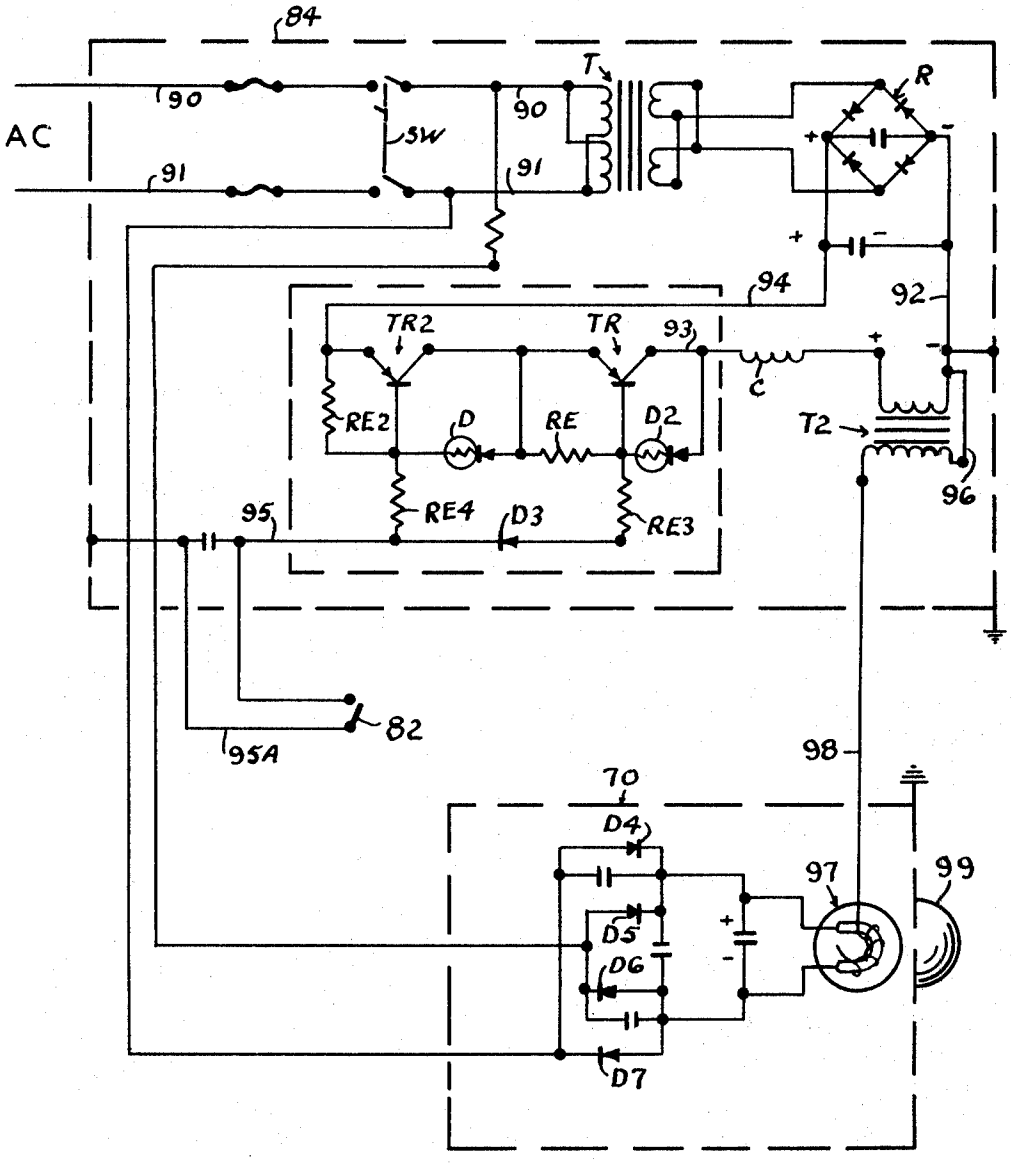


FIG. 7

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ROTARY PRESS PREPRINTED WEB REGISTERING DEVICE

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Filed Dec. 12, 1966, Ser. No. 601,075
7 Claims. (Cl. 226—100)

ABSTRACT OF THE DISCLOSURE

A preprinted web is entrained around an idling roller mounted in a rotary press and connected at one end by gears to a brake. A register mark locating pointer mounted on the press frame at one end of a press cylinder visually indicates "in" or "out" of registry of the preprinted web, by an electrical circuit, closed by a cam mounted on one end of the press cylinder, illuminating the position of register marks on the web with respect to the pointer. A manually operated control valve actuates the brake to longitudinally advance or retard the web movement and maintain registration.

Background of the invention

The present invention relates to a rotary press control and more particularly to the registration of a repetitive preprinted web with other data being printed on its opposite side and on other webs.

In the printing of newspapers on rotary presses nationally distributed ads are frequently preprinted on one side of a newsprint web in newspaper sheet sizes and a roll of such a preprinted web is furnished as newsprint to various newspaper publishers. The preprinted web is mounted on the rotary press for printing the opposite or unprinted side of the web with local news or advertising. It is essential that this preprinted web be synchronized in the press with the remainder of the newspaper being printed so that each page or segment of the preprinted web is severed between the preprinted portions to register with the locally printed data on its opposite side. The preprinted web is placed in register at the beginning of a run but various factors, such as discrepancy in pitch or distance between the repetitive preprinted matter of the web may not exactly match cylinders of the printing press, which results in an out-of-register condition as the newspaper run progresses. Therefore, some means must be provided for effecting a continuous check or correction of out-of-register conditions of the preprinted web. The preprinted web is conventionally provided with register marks in one or both of its marginal edges medially the upper and lower limits of the respective preprinted areas.

Various web registering means are disclosed by the prior art, such as the patent to Baumgartner No. 2,963,-965 which relates to a means for maintaining the automatic registry between a printing and a cutting position. Similarly the patents to Degnan No. 2,105,185, Poole No. 2,497,909, Horton No. 2,140,402, Kott No. 2,278,933 and Huck No. 3,097,844, employ an electrical eye and an electrical circuit for automatically applying or releasing tension on a moving web to effect its registration. Each of the devices of the above patents are relatively expensive and require considerable modification of an existing rotary newspaper printing press.

Summary of the invention

This device is used in combination with a rotary newspaper printing press having impression rollers or printing cylinders around which the web is entrained from an unwinding reel synchronized with the cylinders and wherein the web is further entrained around rollers in a tortuous path and collated with other webs terminating in a cut and fold mechanism. A control roller is mounted in the press in parallel spaced relation with the preprinted supply roll. The preprinted web is entrained around the control roller in the path of the other rollers of the press. The control roller is connected by gears to a water cooled air brake manually controlled by an operator. A pointer is mounted on the press adjacent one end of one press cylinder and overlaps the marginal edge of the preprinted web. An electrical circuit, closed by a cam operated switch mounted at one end of the press cylinder, excites a lamp for illuminating the position of the pointer with respect to preprinted register marks on the preprinted web. This invention, therefore, requires only the addition, to an existing rotary newspaper press, of the control roller, the water cooled air brake, a cam on the end of one press cylinder, a pointer on the press frame and an electrical circuit including a lamp or "flash gun" to achieve the desired results.

It is, therefore, the principal object of this invention to provide a means for effecting accurate longitudinal registration of repetitive preprinted webs drawn from a supply roll under the influence of an automatic variable speed unwinding drive in synchronism with the operation of the remainder of the press so that the preprinted web may be collated with the other webs of the newspaper being printed.

Brief description of the drawings

FIGURE 1 is a diagrammatic view illustrating the path of the preprinted web through a newspaper rotary press;

FIGURE 2 is a plan view of a fragmentary portion of the preprinted web;

FIGURE 3 is a fragmentary perspective view of one unit of a rotary newspaper press having the preprinted web entrained therethrough and illustrating a portion of the control means;

FIGURE 4 is a fragmentary elevational view of the control roller and the water cooled air brake;

FIGURE 5 is a top view of FIG. 4;

FIGURE 6 is a fragmentary elevational view of the press unit illustrating the position of the pointer;

FIGURE 7 is a wiring diagram; and,

FIGURE 8 is a fragmentary elevational view of a press unit illustrating an alternative manner of mounting the registration pointer.

Description of the preferred embodiments

The reference numeral **10** indicates, generally, one section or unit of a rotary newspaper press having a frame **12** which journals impression cylinders **14** and **16** and "backup" cylinders **18** and **20**. A reel or rolled web holding means **22**, usually positioned in a reel room, not shown, downwardly of the press unit **10**, supports the supply roll **24** comprising the preprinted web. A single thickness of the web, indicated at **25**, from the supply roll, is entrained around conventional rollers **26**, around the back-up rollers **18** and **20** and over a tortuous path above the unit **10** around other rollers **28** terminating with other webs, not shown, through the same or other similar units of the press, not shown, at a conventional cut and fold apparatus **30**. The cylinder **14** has a stereotype plate mounted thereon, not shown, which prints the blank side of the web **25**.

A control roller **35** is mounted within the press, above and in spaced parallel relation with respect to the supply roll **24**, by bearings **36** and supports **38** attached to the press reel room frame, indicated at **40**, only one end of the roll mounting being shown (FIG. 4). One end of the roller **35** is coaxially connected with a spur gear **42**

which meshes with a cooperating spur gear 44 coaxially connected with a variable speed control means comprising a water cooled tension air brake assembly 45 in turn connected with a cross-brace frame member of the press, indicated at 46. The water cooled air brake 45 is conventional and presently available under the trade name Wichita Water Cooled Brake. The brake 45 is provided with a pair of tubes 48 which continuously supply water to the interior of the brake from a source of supply, not shown. The air brake is connected with air conducting tubes 50 from a source of air under pressure, not shown, which actuates the air brake and controls the speed or rotational velocity of the gear 44.

As shown in FIG. 2, the preprinted web 25 has a series of longitudinally spaced-apart rectangular newspaper page size sections 52 printed thereon between its respective side edges leaving a transverse marginal blank area 54 between successive areas 52 of the web. These transverse marginal areas 54 are provided, adjacent one marginal side edge of the web, with a relatively heavy preprinted register mark 56 for the purposes presently apparent.

Referring now more particularly to FIGS. 3 and 6, register mark position reference means comprising a pointer 58, having an arm 60 terminating in a pointed end, is mounted on the press unit frame 12 so that the arm 60 projects toward and overlaps the cylinder 20 and the marginal edge of the web 25. The pointer is provided with a slot 62 for receiving a bolt 64 for adjustably positioning the pointer. A "flash gun" or lamp housing 70 is adjustably mounted on the press frame 12 by any suitable bracket means 72 for illuminating the tip portion of the pointer arm 60 and the adjacent marginal edge portion of the web 25 at selected intervals as hereinafter described more fully.

A cam 74 is coaxially adjustably mounted by screws 76 on one end of a shaft 78 coaxially connected with the cylinder 20 and projecting outwardly of the frame 12. The cam 74 is provided, on its periphery, with a detent 80 (FIG. 1) for closing a microswitch 82 mounted on the frame 12 for the reasons presently explained.

An electrical signal generating circuit shown by FIG. 7; is shielded by a control box 84 mounted on one end of the press frame 12 adjacent the pointer 58. One of the air lines 50 is connected with or extends through the control box 84 and is provided with a manually operated valve 86 for the reasons presently explained.

Referring now more particularly to FIG. 7, a source of electrical energy AC is connected by leads 90 and 91 to the primary side of a transformer T through an "off-on" switch SW. The secondary side of the transformer T is connected to a full wave rectifier R. The negative output of the rectifier R is connected to one end of the primary winding of a second transformer T2 by a lead 92. This lead is also grounded to the control box 84. The other end of the primary winding of the transformer T2 is connected to a choke coil C which is in turn connected to the collector of a PNP type transistor TR by a lead 93. The emitter of the transistor TR is connected to the collector of a second similar transistor TR2. The emitter of the transistor TR2 is connected to the positive output of the rectifier R by a lead 94. The bases of the transistors TR and TR2 are connected together through a resistor RE and a rectifier D connected in series. A second rectifier D2 is interposed between the lead 93 and the junction connecting the base of the transistor TR with the resistor RE. The emitter of the transistor TR2 is also connected to the juncture connecting its base with the rectifier D through a resistor RE2. A third rectifier D3 is connected to the juncture connecting the rectifier D2 and resistor RE through a resistor RE3 and in turn, connected to one terminal of the microswitch 82 by a lead 95. A fourth resistor RE4 is connected between the lead 95 and the junction connecting the resistor RE2 with the rectifier D. The other terminal of the microswitch 82 is grounded by a lead 95A to the control box 84. Thus a direct current potential is impressed across the primary winding of the transformer T2 which is discharged to ground by the closing of the microswitch 82, as hereinafter described, from the secondary side of the transformer T2 connected at one end with the negative terminal of the primary winding of the transformer T2 by a wire 96.

The lamp housing 70 contains a gas filled lamp 97 connected to the current source wires 90 and 91 through four diodes D4, D5, D6 and D7 which impresses a positive charge direct current on the lamp 70. A high voltage discharge lead 98 is connected to the other end of the secondary winding of the transformer T2 and to the gas filled lamp 97. The lamp housing 70 is connected to ground and is provided with a lens 99 for focusing the light emitted by the lamp 97 on the web 25 and pointer arm 60, as shown by dotted lines (FIG. 1), which illuminates the position of the pointer with respect to the register mark 56.

Operation

In operation the device is installed as described hereinabove and a register mark 56 on the web 25 is initially placed in registration with the pointer arm 60. This positions the preprinted web sections 52 in register with data printed on other webs, not shown, and in register with the function of the cut and fold apparatus 30. As the press is operated moving the web 25 therethrough the detent 80 on the cam closes the microswitch 82 on each revolution of the cylinder 20 which releases electrical potential and excites the lamp 97 and illuminating the position of the respective register mark 56 with respect to the tip end of the pointer arm 60. Air under pressure, indicated by a pressure gauge PG, is normally applied to the air brake 45 through the valve 86. Any misregistration, either, advanced or retarded, of the register mark position with respect to the pointer is observed by an operator at the instant of the lamp illumination. Any deviation of the register mark from registry with the pointer 60 is adjusted for correction by the air valve 86 wherein the operator, to retard the movement of the web, opens the valve 86 to apply more air pressure to the brake 45 which in turn reduces the rate of the rotation of the control roller 35. The web 25 then frictionally slides, longitudinally, across a peripheral portion of the roller 35, during its uninterrupted travel through the press, until such time as the succeeding register marks 56 are again aligned with the pointer arm. In the event that the registration of the marks 56 is too slow, or the web 25 needs advancing, air pressure against the brake 45 is partially released by closure of the valve 86 so that the roller 35 may run more freely which permits the web to advance in its longitudinal movement into registration of the marks 56 with the pointer arm.

Preprinted webs are sometimes printed with the register mark on only one or the inward side of the web with respect to the press unit 10 as indicated by the web 25A and register mark 56A.

An alternative arrangement for this type of web is provided by mounting a rod-like support 100 on the press frame 12A in parallel spaced relation with the cylinders so that a pointer 58A and lamp housing 70A may be adjustably positioned longitudinally of the support 100.

Obviously the invention is susceptible to some change or alteration without defeating its practicability, and we therefore do not wish to be confined to the preferred embodiment shown in the drawings and described herein, further than we are limited by the scope of the appended claims.

We claim:

1. In a machine for feeding at least one continuous web provided with register marks at spaced-apart locations therealong from a source in predetermined timed relationship and in a register with respect to a function performed at a station of the machine to which the web is to be fed continuously, the combination of: a control roller

engageable with the web and defining a portion of the feeding path for the web extending from the source of the web to said station; variable speed control means connected with and controlling the rate of rotation of said control roller; detecting means for observing the position of said register marks as they pass across a predetermined positional relationship of said marks corresponding to correct register between the web and said station; means for generating a signal at a uniform frequency synchronized with the rate of performance of said function; and means for controlling said variable speed drive control means.

2. Structure as specified in claim 1 in which the control roller is journaled by the machine and provided at one end with a coaxially connected spur gear.

3. Structure as specified in claim 2 in which the variable speed control means includes a brake mounted on said machine and having a spur gear in mesh with the spur gear on said control roller.

4. Structure as specified in claim 3 in which the detecting means includes a pointer adjustably mounted on said machine, said pointer having an arm projecting toward a marginal edge of said web.

5. Structure as specified in claim 4 in which the signal generating means comprises a cam connected with and driven by said machine, a microswitch mounted adjacent and closed by said cam, a lamp mounted on said machine,

and an electrical circuit connected with a source of electrical energy and interconnecting said microswitch with said lamp.

6. Structure as specified in claim 5 in which the last mentioned means comprises an air line connected with said variable speed control means and having a valve for releasing and retarding the action of said variable speed control means.

7. An apparatus for maintaining a predetermined position of a preprinted web entrained through a printing press unit, said printing press unit having a frame journalling a plurality of rollers over which the web is entrained, comprising: a variable speed control means connected with one of said rollers; a cam driven by one of said rollers; a pointer mounted on the frame; a microswitch closed by said cam; a lamp; and an electrical circuit interconnecting said lamp and said microswitch with a source of electrical energy.

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2,797,610 7/1957 Coakley ---------- 226—100

ALLEN N. KNOWLES, *Primary Examiner.*