Nov. 8, 1932. C. B. COTTRELL, 3D 1,886,528

ELECTRIC MOTOR DRIVE FOR WEB PRINTING MECHANISM

Filed July 3, 1929 2 Sheets-Sheet 1

Fig. 1.

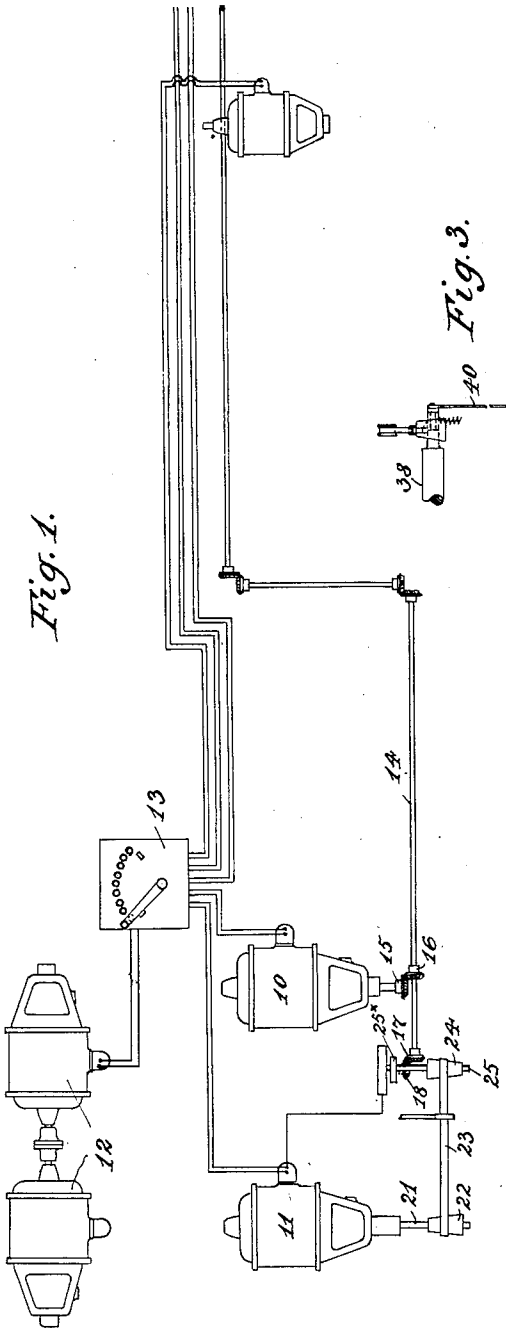


Fig. 3.

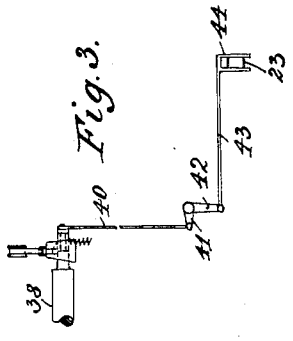
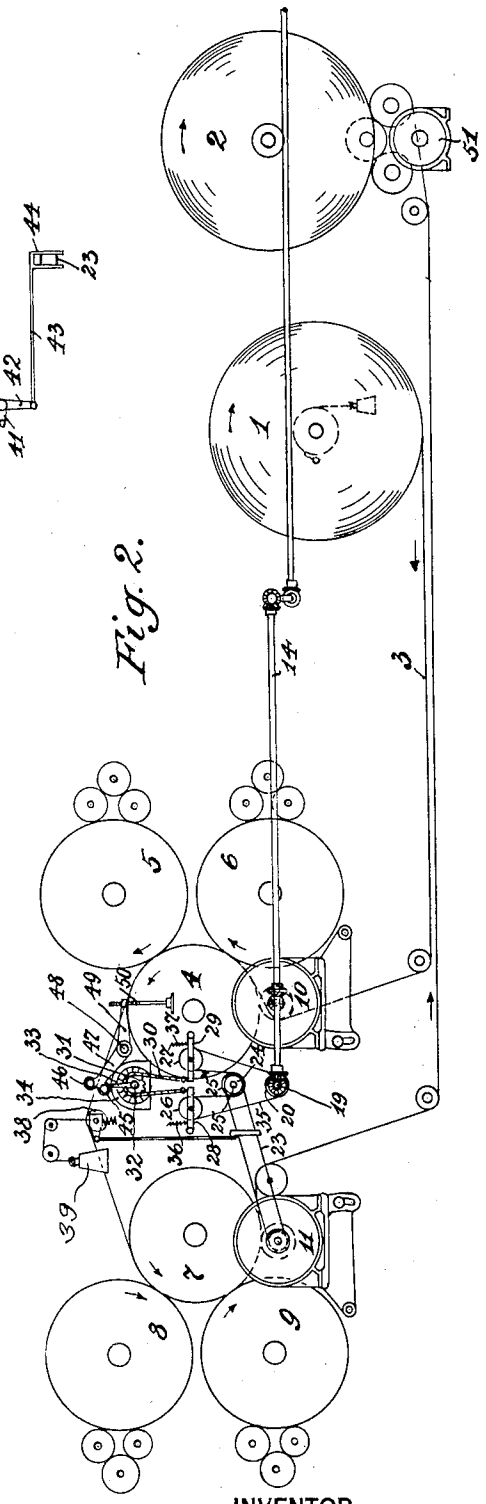


Fig. 2.



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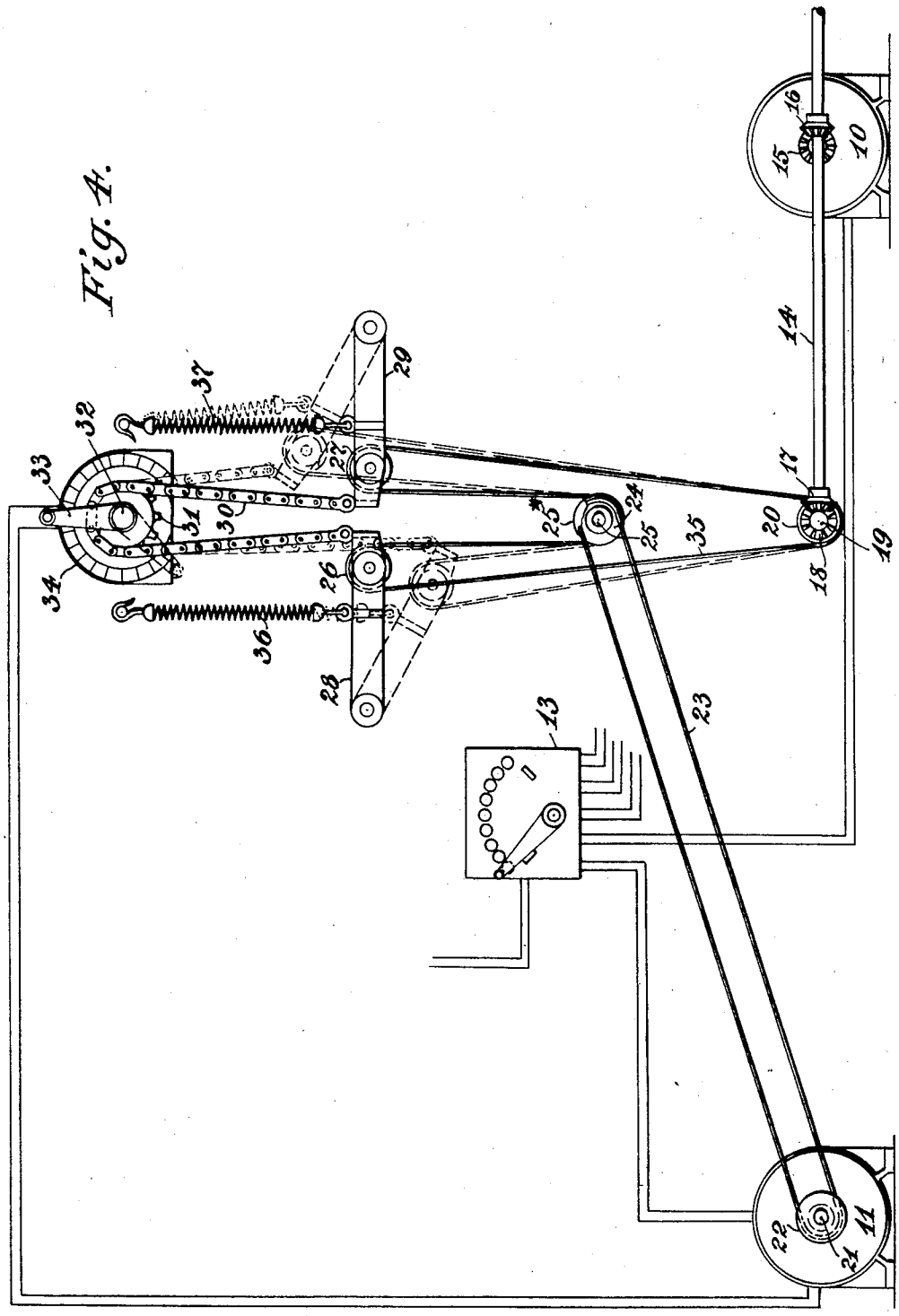
ATTORNEYS

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Fig. 4.



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Patented Nov. 8, 1932 1,886,528

UNITED STATES PATENT OFFICE

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ELECTRIC MOTOR DRIVE FOR WEB PRINTING MECHANISM

Application filed July 3, 1929. Serial No. 375,831.

The object of my invention broadly is to provide in a plural motor drive for printing presses, novel control means whereby variations in the speed of an auxiliary motor will be automatically corrected to maintain the auxiliary motor at a predetermined relative speed with respect to the speed of a master motor.

The object of my invention, more particularly, is to provide separate electric motor drives for two printing units of a rotary web printing press together with control means associated therewith, whereby the variations in the speed of the auxiliary motor which drives one of the printing units will be automatically corrected to maintain the auxiliary motor at a predetermined relative speed with respect to the speed of the master motor which drives the other printing unit.

A further object is to provide means whereby the tension of the web between the printing units may be varied for bringing the units into printing register on the web.

A practical embodiment of my invention is represented in the accompanying drawing, in which

Fig. 1 represents a diagrammatic plan view showing the electric equipment for a four color two printing unit rotary web printing press, with my novel control means associated therewith;

Fig. 2 represents a diagrammatic side view of such a press;

Fig. 3 represents a detail view of the mechanism for shifting the belt which connects the motor pulleys with the rheostat control device; and

Fig. 4 represents an enlarged view of the control mechanism represented in Fig. 2.

It will be understood that the several parts of the electric equipment shown may be of any well known or approved construction.

The web supply roll is denoted by 1 and the web rewinding roll is denoted by 2. The web 3 is led from the supply roll 1 to and through the first printing unit which is shown, in the present instance, as comprising an impression cylinder 4 and its two coacting form cylinders 5 and 6. From thence the web 3 is led to and through the second printing unit which is herein shown as comprising an impression cylinder 7 and its two coacting form cylinders 8 and 9. From thence the web 3, printed in four colors, is led to the rewinding roll 2. These printing units may be of any well known or approved construction and arrangement.

The first printing unit is shown as driven by a master electric motor 10 and the second printing unit is shown as driven by an auxiliary electric motor 11. These motors derive their power from a motor-generator 12 through its manually operated voltage control 13 which controls the speed of the master motor 10 and the normal relative speed of the auxiliary motor 11 by voltage control of the generator. In the present instance the speeds of the two motors are intended to be the same. The master motor 10 drives a shaft 14 through the bevel gear connection 15, 16. This shaft 14 is provided with a bevel gear driving connection 17, 18 with a pulley shaft 19 on which is mounted a pulley 20. The shaft 21 of the auxiliary motor 11 is provided with a cone pulley 22 which has a driving connection by a belt 23 with a reverse cone pulley 24 carried by a shaft 25 having a pulley 25* located, in the present instance, over the pulley 20 driven by the master motor 10. Pulleys 26, 27 are carried by two rock levers 28, 29 the free ends of which levers are connected by a flexible connection, in the present instance a sprocket chain 30 with a sprocket wheel 31 carried by the shaft 32 on which the arm 33 of a rheostat 34 is carried. A driving belt 35 passes around the pulleys 20, 25*, 26 and 27. Springs 36, 37 serve the double purpose of holding the levers 28 and 29 and the rheostat arm 33 in their neutral positions and also of holding the driving belt 35 under slight tension.

The means for varying the tension of the web as it passes from one printing unit to the other printing unit to bring the printing units into register on the web is as follows:

The web 3 passes over a roller 38 held under upward stress by a weighted flexible connection 39 tending to take up the slack

in the web between the two printing units. This roller 38 is connected by a rod 40 with one arm 41 of a bell crank lever, the other arm 42 of which is connected by a rod 43 with a belt shifter fork 44 which embraces the belt 23 connecting the reverse cone pulleys 22, 24. The web 3 on its way from the first printing unit to the roller 38 passes between rollers 45 and 46 carried by a two armed lever 47, pivoted at 48, the other arm 49 of which is provided with a hand micrometer adjustment 50.

The above mechanisms per se form the subject matter of my copending application filed of even date herewith, its serial number being 375,827.

The web rewinding roll 2 is driven by a suitable torque or stall motor 51 which receives its energy through the manually controlled rheostat 13 from the motor-generator 12.

The operation of the device is as follows:

When the auxiliary motor 11 is running at a predetermined speed with respect to the speed of the master motor 10, in the present instance at the same speed, the rock levers 28 and 29 and the rheostat arm 33 flexibly connected thereto are held in their neutral positions. Should the auxiliary motor 11 start to run "ahead" or "behind" the additional pull on the belt 35 in the one or the other direction will cause the rock levers to move in opposite directions, thereby causing the rheostat arm 33 to move along its contacts in one or the other direction from its neutral position, thereby causing the auxiliary motor 11 to "slow down" or "speed up" to its predetermined relative speed with respect to the master motor 10.

Should the web 3 run ahead or behind from the first printing unit to the second printing unit the additional compensating device will come into action to shift the belt 23 on the reverse cone pulleys 22, 24 to vary the speed of the auxiliary motor 11 with respect to the master motor 10. This is accomplished through the action hereinabove described. viz., the weighted tension device 39 for the roller 38, the connecting rod 40, the bell crank lever 41, 42, the connecting rod 43 and the belt shifter yoke 44. The micrometer adjustment hereinabove referred to is used when the printing plates on the second printing unit do not register with those on the first printing unit. This lack of register may be compensated for by varying the distance which the web 3 travels from the first printing unit to the second printing unit. For instance, if the lever arm 47 is lowered the pressure of the web 3 will force the roller 38 down, thereby causing the belt shifter to shift the belt 33 along the reverse cone pulleys 22, 24, to cause the auxiliary motor 11 to slow down until sufficient slack has been created in the web 3, to allow the roller 38 to come back to its normal position. It will thus be seen that the relation of the first and second printing units may be changed with respect to each other, to bring them into printing register with each other at will and while the press is in operation.

From the above description it will be seen that any variation in the speed of the auxiliary motor will be automatically corrected to bring it into its relative speed with respect to the master motor and also that any variation in the register in the first and second printing units can be compensated for while the press is in operation.

While I have illustrated my invention in connection with a two printing unit four color printing press it is evident that I do not wish to limit myself to such a press but contemplate the use of my invention in connection with various types of presses where the equipment is applicable.

What I claim is:—

1. A web printing press comprising two printing units and an electric motor drive therefor, including a source of current supply, master and auxiliary driving motors for the two printing units, and means for maintaining the auxiliary motor at a predetermined speed relative to its master motor.

2. A web printing press comprising two printing units and an electric motor drive therefor, including a source of current supply, master and auxiliary driving motors for the two printing units, and means including an automatically controlled rheostat for maintaining the auxiliary motor at a predetermined speed relative to its master motor.

3. A web printing press comprising two printing units and an electric motor drive therefor, including a source of current supply, master and auxiliary driving motors for the two printing units, means for maintaining the auxiliary motor at a predetermined speed relative to its master motor, and supplemental means controlled by the tension of the web between the printing units for automatically varying the speed of the auxiliary motor to bring the two printing units into register.

4. A web printing press comprising two printing units and an electric motor drive therefor, including a source of current supply, master and auxiliary driving motors for the two printing units, means including an automatically controlled rheostat for maintaining the auxiliary motor at a predetermined speed relative to its master motor, and supplemental means controlled by the tension of the web between the printing units for automatically varying the speed of the auxiliary motor to bring the two printing units into register.

5. A web printing press comprising two printing units and an electric drive therefor, including a source of current supply, master

and auxiliary driving motors for the two printing units, a rheostat, means operated by variations in the speed of the auxiliary motor for controlling the rheostat to bring the auxiliary motor back to its predetermined relative speed with respect to the master motor, said means comprising a pair of rock levers, a flexible connection between them and the rheostat contact arm and a flexible connection between the rock levers and said motors, and spring means for yieldingly maintaining the rock levers and rheostat arm in their neutral positions.

6. A web printing press comprising two printing units and an electric drive therefor, including a source of current supply, master and auxiliary driving motors for the two printing units, a rheostat, means operated by variations in the speed of the auxiliary motor for controlling the rheostat to bring the auxiliary motor back to its predetermined relative speed with respect to the master motor, said means comprising a sprocket on the rheostat arm, a pair of rock levers, a chain connecting said levers with said sprocket, rock lever and motor driven pulleys, and a belt engaging said pulleys whereby the variations in the speed of the auxiliary motor will exert a pull on the belt sufficient to move said levers and rheostat contact arm away from their neutral positions.

7. A web printing press comprising two printing units and an electric drive therefor, including a source of current supply, master and auxiliary driving motors for the two printing units, a rheostat, means operated by variations in the speed of the auxiliary motor for controlling the rheostat to bring the auxiliary motor back to its predetermined relative speed with respect to the master motor, said means comprising a sprocket on the rheostat arm, a pair of rock levers, a chain connecting said levers with said sprocket, rock lever and motor driven pulleys, a belt engaging said pulleys whereby the variations in the speed of the auxiliary motor will exert a pull on the belt sufficient to move said levers and rheostat contact arm away from their neutral positions, and spring means for yieldingly maintaining the rock levers and rheostat contact arm in their neutral positions.

In testimony, that I claim the foregoing as my invention, I have signed my name this 26th day of June, 1929.

CALVERT B. COTTRELL, 3D.