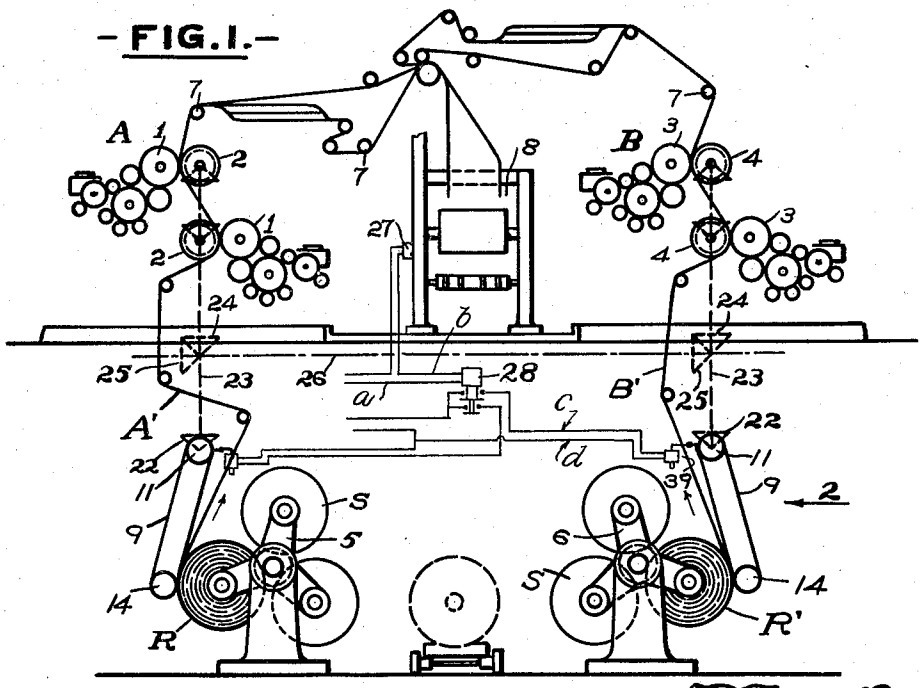
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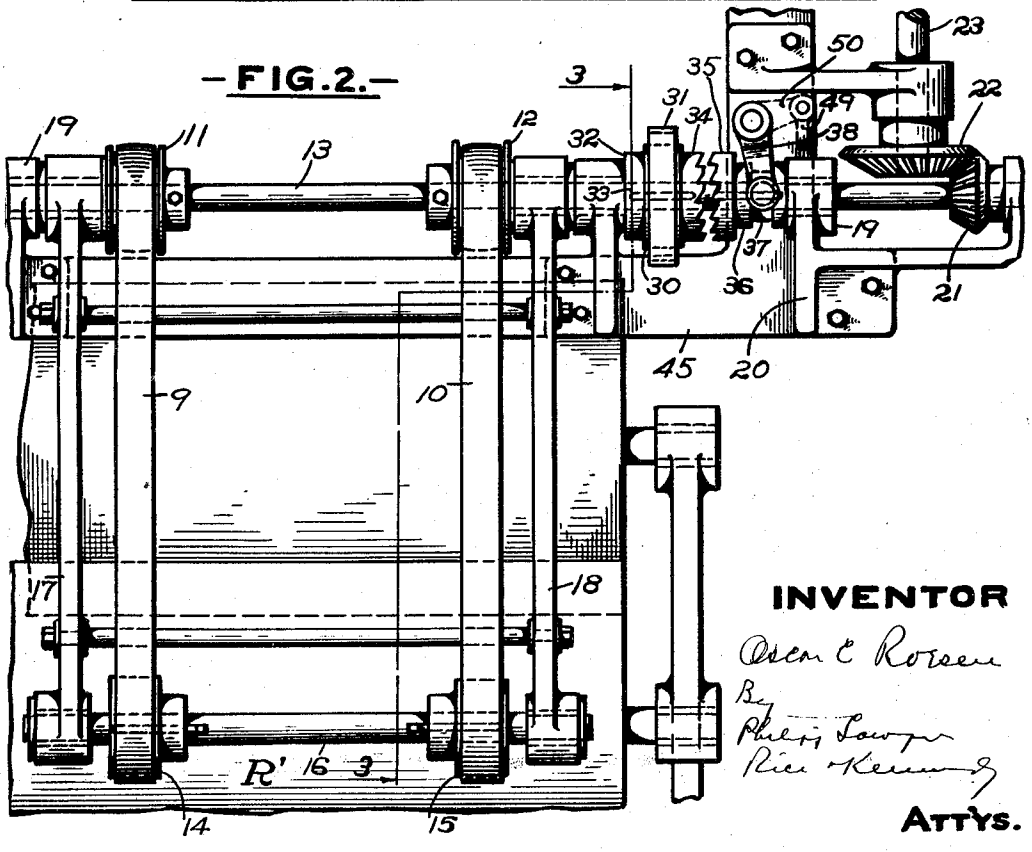
WEB ROLL CONTROLLING MECHANISM

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-FIG. 1.-



-FIG. 2.-



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WEB ROLL CONTROLLING MECHANISM

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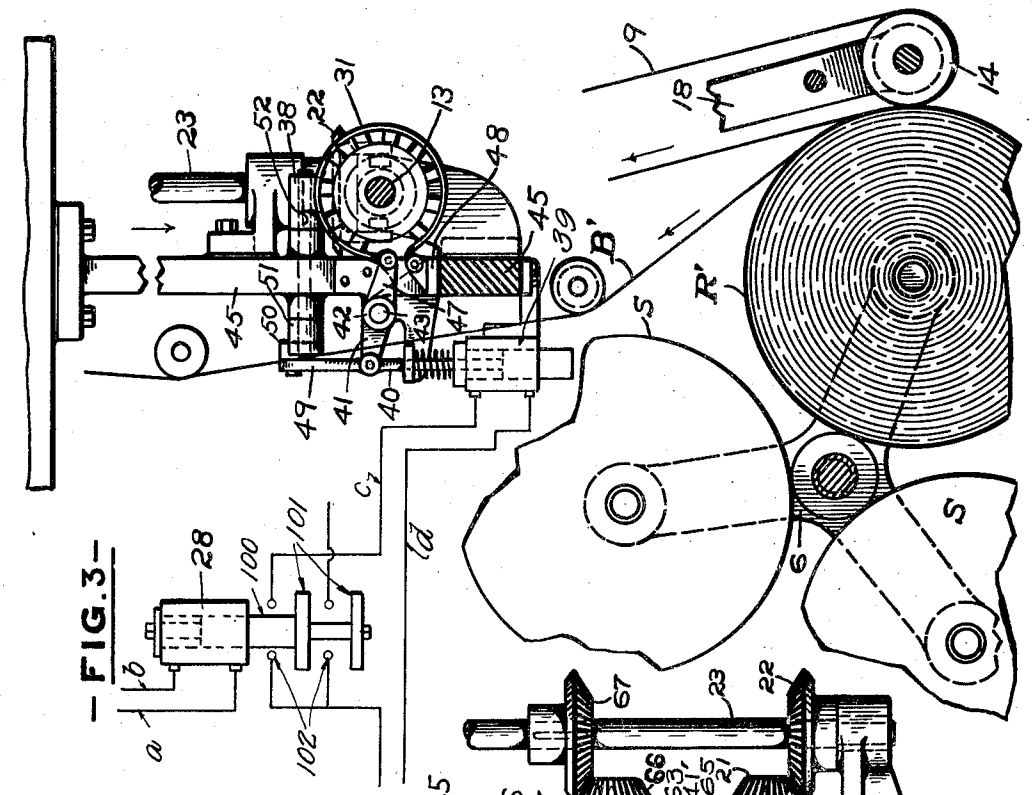


FIG. 3

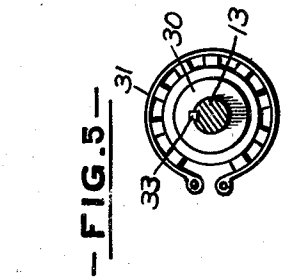


FIG. 5

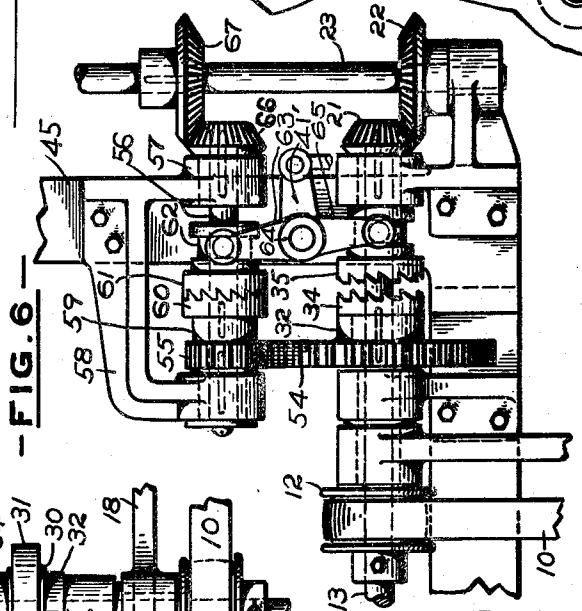


FIG. 6

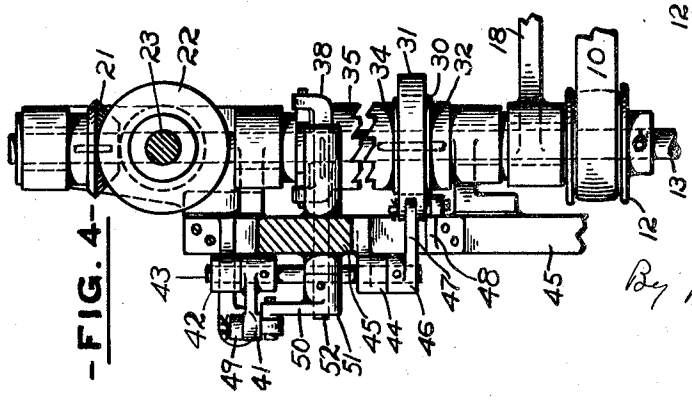


FIG. 4

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UNITED STATES PATENT OFFICE

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WEB-ROLL-CONTROLLING MECHANISM

Application filed August 24, 1926. Serial No. 131,217.

This invention relates to certain improvements in web roll controlling mechanism particularly adapted for rotary printing machines.

In rotary printing machines, the web is supplied from a web roll conveniently mounted adjacent the printing mechanism. These web rolls, to effect a proper running of the web, are controlled so as to run at press speed, that is, the web is supplied to the press at the speed at which the press cylinders are running, various devices, such as friction belts, being employed for controlling the speed of the unwinding web roll, these devices being driven from the press and at press speed. On the sudden stoppage of the press, due to breakage of the web or for other reasons, such stops being generally known as emergency stops, the web roll runs ahead of the friction devices, with the result that the web of paper is flooded through the machine causing wraps or breaks, or if these do not occur, sufficient roll unwinds so that it has to be rewound by hand until the web has the necessary tension.

It is the special object of the present invention to provide an electrically operated mechanism actuated on the stoppage of the press, by which the speed of the friction devices is slowed down so as to be less than that of the unwinding roll, the friction devices thus acting as a brake and stopping the rotation of the roll, thereby preventing this objectionable flooding or overrunning of the web.

It is a further object of the invention to provide a construction of simple form, the parts of which are readily installed and which can be added to machines in use as well as new machines.

With these and other objects not specifically referred to, the invention consists in certain novel parts, arrangements and combinations which will be described in connection with the accompanying drawings and the novel features pointed out in the claims hereto appended.

In these drawings,—

Figure 1 is a diagrammatic side elevation of a multi-unit printing machine showing the invention applied thereto;

Figure 2 is an enlarged end view of the controlling mechanism shown in Fig. 1, the view being taken in the direction of arrow 2 of that figure;

Figure 3 is a side view of part of the construction shown in Fig. 2, the view being taken in the direction of arrow 3 of that figure, and partly in section;

Figure 4 is a plan view, partly in section, of part of the construction shown in Fig. 3;

Figure 5 is a detail end view of a brake mechanism which may be employed, and

Figure 6 is a detail side view, partly broken away, of a modified form of construction in which suitable gearing is employed in lieu of the brake shown in the other figures.

Referring now to these drawings, the machine which has been selected to illustrate the invention includes a multi-unit printing machine in which the web roll supply is located below the printing units, although it will be understood that the invention is applicable to any printing mechanism in which the paper is fed to the press from an unwinding web roll. In this machine there is shown a printing unit A including printing and perfecting couples, the form cylinders of which are indicated by the numeral 1 and the impression cylinders by the numeral 2, and a printing unit B including printing and perfecting couples, the form cylinders of which are indicated by the numeral 3 and the impression cylinders by the numeral 4. These printing presses are supplied by webs A′ and B′ running from web rolls R and R′ suitably supported in standards 5, 6 located in the present instance below the printing mechanism, these standards in the present construction being capacitated to support one or more spare rolls, indicated by the letter S. From the press the webs may go over suitable guide rolls 7 to a folder 8.

Frictional devices engaging the surface of the running web roll are employed to control the speed of the roll as it unwinds, these devices being driven from the press and at press speed. While these friction devices may be of various characters, they are preferably in the form of narrow belts 9 and 10, a set of these belts being provided for each

running roll throughout the press. These belts are preferably endless belts and are driven at the press speed. While various mechanisms may be employed for effecting this, in the particular construction illustrated, the belts at one end pass over driving pulleys 11, 12, see Fig. 2, on a driven shaft 13. At the other end, these belts pass over pulleys 14, 15 on a shaft 16 which is hung in bearings in the lower end of arms 17, 18 pivotally supported at their upper ends on the shaft 13, before referred to. This shaft 13 is supported in suitable bearings 19 in framing 20 and at its outer end is provided with a miter 21 which meshes with a miter 22 on a vertical shaft 23 which is driven by a miter 24 from a miter 25 on a power shaft 26, see Fig. 1. With this construction, the friction belts are driven at the press speed and thus operate to control the roll at the speed of the press.

In accordance with the invention, means are provided for causing a slowing down or stoppage of these belts in the event of stoppage of the press, so that these belts will act to effect a braking pressure on the roll and thus prevent any overrunning of the roll and, in the preferred construction, these means will be electrically operated so as to act very quickly. While the specific construction of the mechanism for effecting this may be somewhat varied, the construction will preferably be the same for all the rolls, and a description of a preferred form and a modification of a convenient mechanism will now be given, as applied to one of the rolls.

Referring first to Figs. 1 to 5 inclusive, stoppage of the press is electrically controlled, a stop switch, indicated at 27 in Fig. 1, being provided at the folder, although, of course, such switch or switches may be provided at any suitable or desirable point in the press. The circuit for this switch is indicated by the letters *a*, *b*, and this circuit includes what may be termed a master solenoid 28, this solenoid being common to all the roll driving mechanisms of the press and in turn operating devices whereby all the rolls are simultaneously braked.

In the particular construction illustrated, the roll shaft 13, by which the roll is driven, is provided with a brake drum 30 which is provided with a brake band 31. The hub 32 of this drum is keyed to shaft 13 by a key 33, and the outer face of this drum forms one element 34 of a jaw clutch. The other element 35 of this jaw clutch is formed on a hub 36 slidably mounted on the shaft 13, the hub being provided with a groove 37 in which operates a yoke 38, so that by the operation of this yoke the jaw clutch may be unclutched to disconnect the shaft 13 and thus stop the driving of the friction belts. At the same time the brake band 31 is tightened on the drum 30 so as to stop the belts and thus, the friction belts being stationary, act to stop the rotation of the web roll. In the best constructions, means for effecting these two functions are electrical, being controlled from the master solenoid 28, and, as shown, there is provided an operating solenoid 39 for each set of friction belts, that is, one of these controlling solenoids is provided for the belts of each running web roll, all these solenoids 39 being in circuit with the master solenoid so that all are actuated from the master solenoid simultaneously.

The connections from the master solenoid 28 are shown in Figures 1 and 3, and, as there illustrated, the plunger 100 of the solenoid 28 is provided with bridging contacts 101, one of these contacts being provided for each of the roll supplies, two such contacts being illustrated for the two sources of web supply illustrated in the drawings. These bridging contacts, on the energizing of the solenoid 28 through the line *a*, *b* and switch 27, engage fixed contacts 102, closing a circuit, indicated at *c*, *d*, which effects the energizing of the operating solenoid 39. It will be observed that on the energizing of these operating solenoids the cores of these solenoids move upwardly and operate certain mechanism which will hereinafter be described for producing the desired stopping action on the belts.

In the construction shown in Figs. 2 to 5, this solenoid 39 acts to slip the clutch jaw 35 and to apply the brake band 31 through suitable mechanical connections. These connections may be of various forms, but a convenient arrangement is that shown, in which intermediate the ends of the operating rod 40 of the solenoid 39 is pinned thereto one end of arm 41 carried on a hub 42 on a rock shaft 43 suitably mounted in bearings 44 secured to suitable framing 45. This rock shaft 43 also has secured thereto a hub 56 having an arm 47 which is secured to one end of the brake band 31, as shown in Fig. 3, the other end of this brake band being fastened to a bracket 48 secured to the frame 45, before referred to. With this construction, as the solenoid 39 is energized, the arm 47 is operated to compress the brake band around the drum, and this brake band stopping the shaft 13. Simultaneously the clutch 35 is slipped to stop the drive of the shaft 13. In the construction shown for effecting this, the operating rod of the solenoid is extended, as shown at 49 in Fig. 3, and the end of this rod carries an arm 50 on an arm hub 51 on a shaft 52 on which is carried the yoke arm 38, before referred to, so that as the solenoid is actuated the arm 50 is moved, thus causing the yoke arm 38 to slip the clutch, thus stopping the rotation of the driving shaft 13.

In Fig. 6 a somewhat modified construction

is shown which may be employed for effecting a braking action on the belts instead of the brake construction heretofore described. In the construction shown in this figure, means are provided for changing the ratio of the gears which drive the belt shaft 13, so that in the event of a quick stop of the press the shaft is slowed down so as to cause the belts to exert sufficient pressure against the running roll to stop the roll and prevent overrun of the web. While the gear constructions employed for this purpose may vary, in the particular construction illustrated, the shaft 13 is driven from the miters 21, 22 as before described. In this construction, however, the hub 32 of the jaw clutch 34 is provided with a large gear 54. This gear is in mesh with a small gear 55 fast on a counter-shaft 56 suitably supported in bearings 57 mounted in brackets 58 suitably secured to the framing 45. The hub 59 of the gear 55 carries one member 60 of a jaw clutch. The other member 61 of this jaw clutch is slidable on the shaft, and the hub thereof is provided with a groove 62 to receive a yoke arm 63, this yoke arm being carried on a rock shaft 64 which is operated by the rod 40 of the solenoid 39 before described through arm 41'. This rock shaft 64 also carries a yoke arm 65 for operating the movable member 35 of the jaw clutch on the shaft 13. The shaft 56 is provided with a miter 66 which is in mesh with a miter 67 on the shaft 23, which, as before stated, is driven at press speed. With this construction, when the solenoid 39 is actuated, the parts are in the position shown in Fig. 6, the clutches 34, 35 being unclutched and the clutches 60, 61 clutched. The drive then is through clutches 60, 61, gear 55 and large gear 54, and the ratio of these gears is such as to effect a braking action on the shaft 13. With this construction, there has been provided a simple and convenient mechanism for effecting the braking of the running web roll so that the web roll is stopped and overrun prevented.

While the invention has been shown in its preferred form, it will be understood, of course, that various modifications in the character and arrangement of the braking device are within the invention as defined by the annexed claims and the invention is not to be restricted to the constructions and arrangements shown and described.

What I claim is:

1. In a web roll controlling mechanism for printing machines, the combination of means for supporting a web roll while unwinding, a friction device engaging the surface of the roll for controlling the roll as it unwinds, means for driving the device at substantially press speed, and an electrically operated device normally inactive but actuated on the stoppage of the press to cause the driving device to operate the friction devices with an increased resistance to the rotary movement of the roll and thus act as a brake for the roll to stop its rotation.

2. In a web roll controlling mechanism for printing machines, the combination of means for supporting a plurality of web rolls while unwinding, friction devices engaging the surfaces of the rolls for controlling the rolls as they unwind, means for driving the devices at substantially press speed, and electrically operated devices normally inactive but simultaneously actuated on the stoppage of the press to cause the driving means to operate the friction devices with an increased resistance to the rotary movement of the rolls and thus act as a brake for the rolls to stop their rotation.

3. In a web roll controlling mechanism for printing machines, the combination of means for supporting a web roll while unwinding, a friction device engaging the surface of the roll for controlling the roll as it unwinds, means for driving the device at substantially press speed, a breaking mechanism arranged to be brought into braking relation with the driving means and providing an increased resistance to the rotary movement of the roll, and an electrically operated device for actuating the driving means to operate the braking mechanism.

4. In a web roll controlling mechanism for printing machines, the combination of means for supporting a plurality of web rolls while unwinding, a friction device engaging the surface of the rolls as they unwind, means for driving the device at substantially press speed, a braking mechanism arranged to be brought into braking relation with the driving means and providing an increased resistance to the rotary movement of the roll, and an electrically operated device actuated on the stoppage of the press for simultaneously causing the friction device to operate at a speed less than the speed of the rolls and thus act as a brake for the rolls to stop their rotation.

5. In a web roll controlling mechanism for printing machines, the combination of means for supporting a web roll while unwinding, a friction device engaging the roll for controlling the speed of the roll as it unwinds, means for driving the device at substantially press speed, a solenoid connected with the emergency switch of the press, an operating solenoid actuated therefrom, and connections through which the operating solenoid acts to cause the friction device to operate at a speed less than the speed of the roll and thus act to stop the rotation of the roll.

6. In a web roll controlling mechanism for printing machines, the combination of means for supporting a plurality of web rolls while unwinding, friction devices engaging the rolls for controlling the speed of the rolls as

they unwind, means for driving the devices at substantially press speed, a master solenoid connected with the emergency switch of the press, an operating solenoid for each running roll simultaneously actuated by the master solenoid, and connections through which the operating solenoids act to cause the friction devices to operate at a speed less than the speed of the rolls and thus act to stop the rotation of the rolls.

7. In a web roll controlling mechanism for printing machines, the combination of means for supporting a web roll while unwinding, a friction device engaging the roll for controlling the speed of the roll as it unwinds, a power shaft for driving the device at substantially press speed, a driven shaft by which the device is driven, a clutch connecting the shafts, a solenoid, means for energizing the solenoid and connections operated by the solenoid for slipping the clutch to slow down the speed of the driven shaft.

8. In a web roll controlling mechanism for printing machines, the combination of means for supporting a web roll while unwinding, a friction device engaging the roll for controlling the speed of the roll as it unwinds, a power shaft for driving the device at substantially press speed, a driven shaft by which the device is driven, a clutch connecting the shafts, a brake on the driven shaft, a solenoid, means for energizing the solenoid and connections operated from the solenoid for slipping the clutch and applying the brake to the driven shaft.

9. In a web roll controlling mechanism for printing machines, the combination of means for supporting a web roll while unwinding, a friction device engaging the roll for controlling the speed of the roll as it unwinds, a power shaft for driving the device at substantially press speed, a driven shaft by which the device is driven, a clutch connecting the shafts, a brake on the driven shaft, a solenoid, means for energizing the solenoid, an operating rod therefor, an arm on the rod connected to the clutch and an arm on the rod connected to the brake.

10. In a web roll controlling mechanism for printing machines, the combination of means for supporting a web roll while unwinding, friction belts engaging the roll surface for controlling the speed of the roll as it unwinds, a power shaft, a driven shaft, driving pulleys on the driven shaft engaging the friction belts, a jaw clutch on the driven shaft, a brake on the driven shaft, a solenoid, an operating rod therefor, an arm on the rod having a yoke engaging the clutch, and an arm on the rod engaging the brake.

11. In a web roll controlling mechanism for printing machines, the combination of a plurality of roll stands for supporting a plurality of running rolls while unwinding, a friction device for each running roll for controlling the speed of the roll as it unwinds, a main power shaft, a power shaft for driving the friction device of each roll driven from the main shaft, a driven shaft for each roll, a clutch connecting each driven shaft with its driver, a master solenoid connected with the emergency switch of the press, and an operating solenoid for the shaft of each running roll, the operating solenoids being simultaneously actuated from the master solenoid for slipping the clutches and simultaneously disconnecting the driven shafts from their drivers.

In testimony whereof, I have hereunto set my hand.

OSCAR C. ROESEN.