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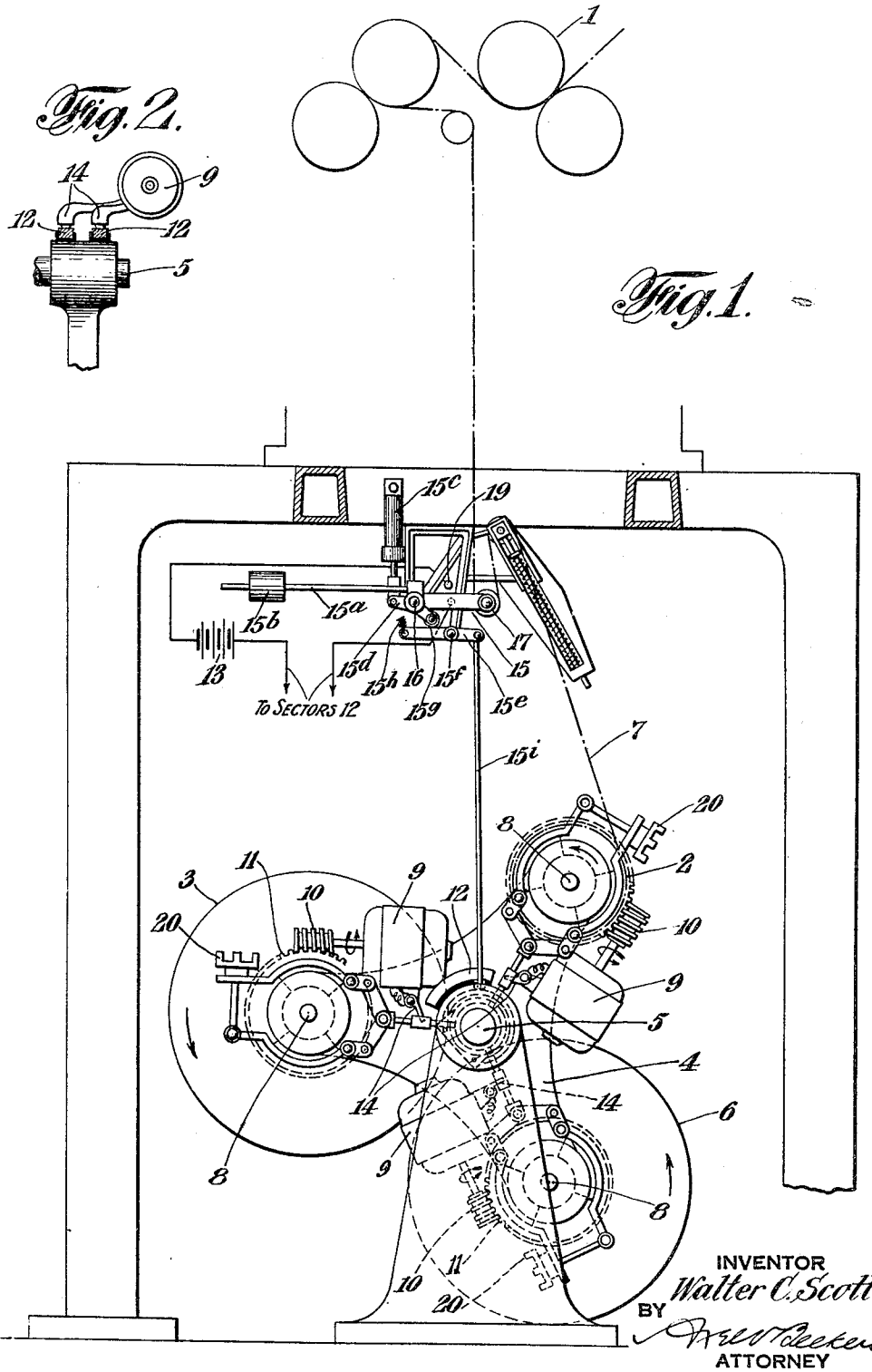
W. C. SCOTT

1,908,490

MEANS FOR SUPPLYING WEBS

Filed May 23, 1930

6 Sheets-Sheet 1



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May 9, 1933.

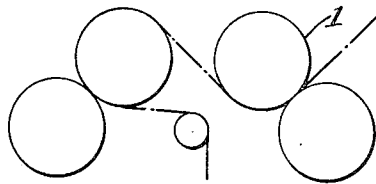
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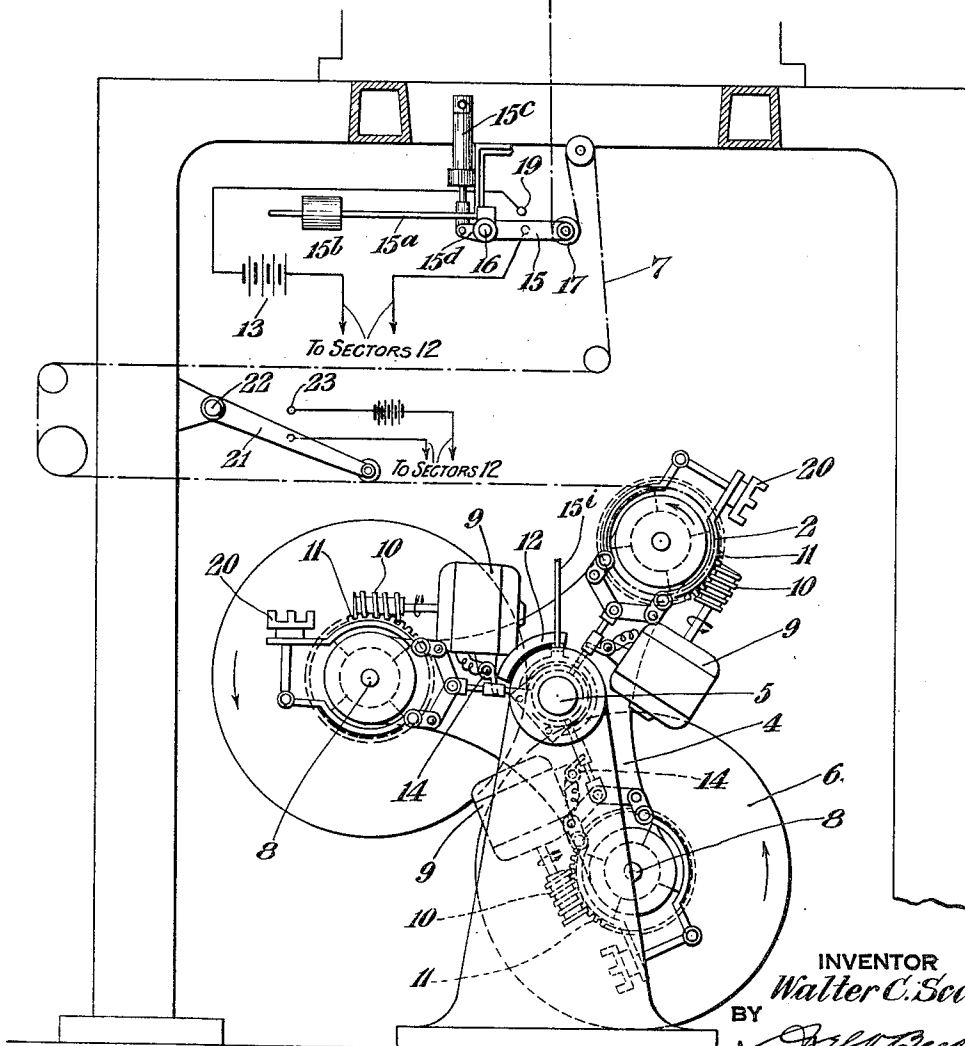
MEANS FOR SUPPLYING WEBS

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6 Sheets-Sheet 2



*Fig. 3.*



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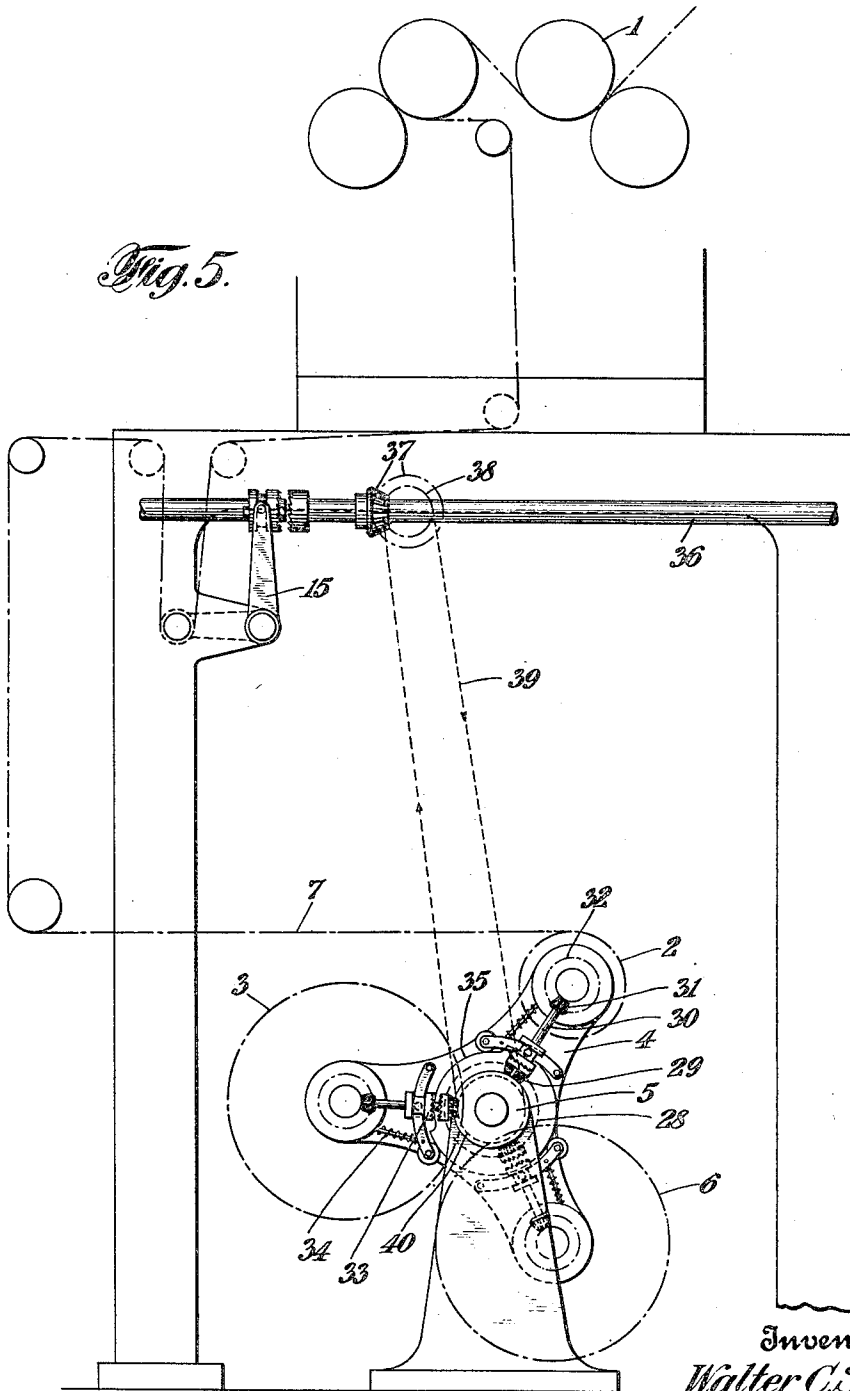
1,908,490

MEANS FOR SUPPLYING WEBS

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6 Sheets-Sheet 4

*Fig. 5.*



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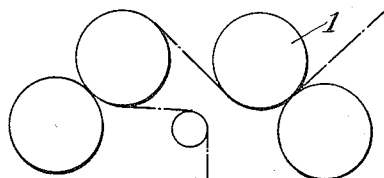
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1,908,490

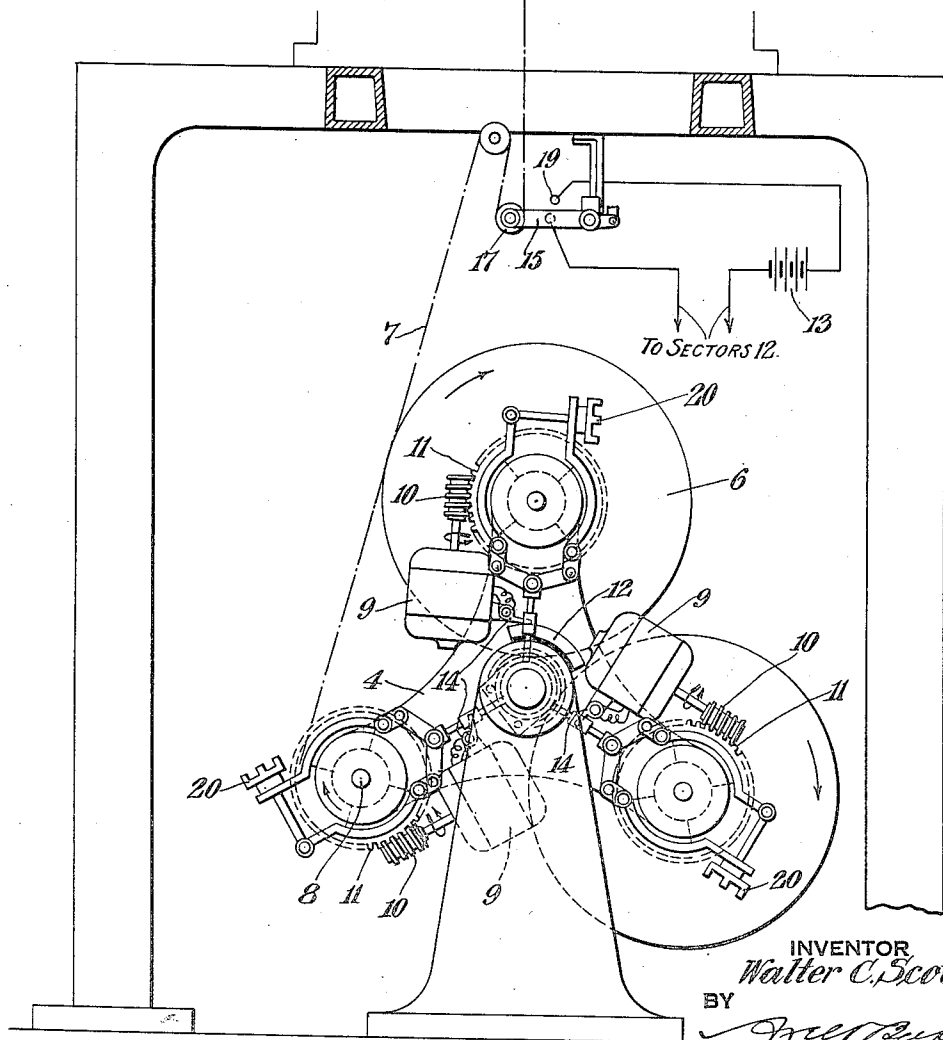
MEANS FOR SUPPLYING WEBS

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*Fig. 6.*



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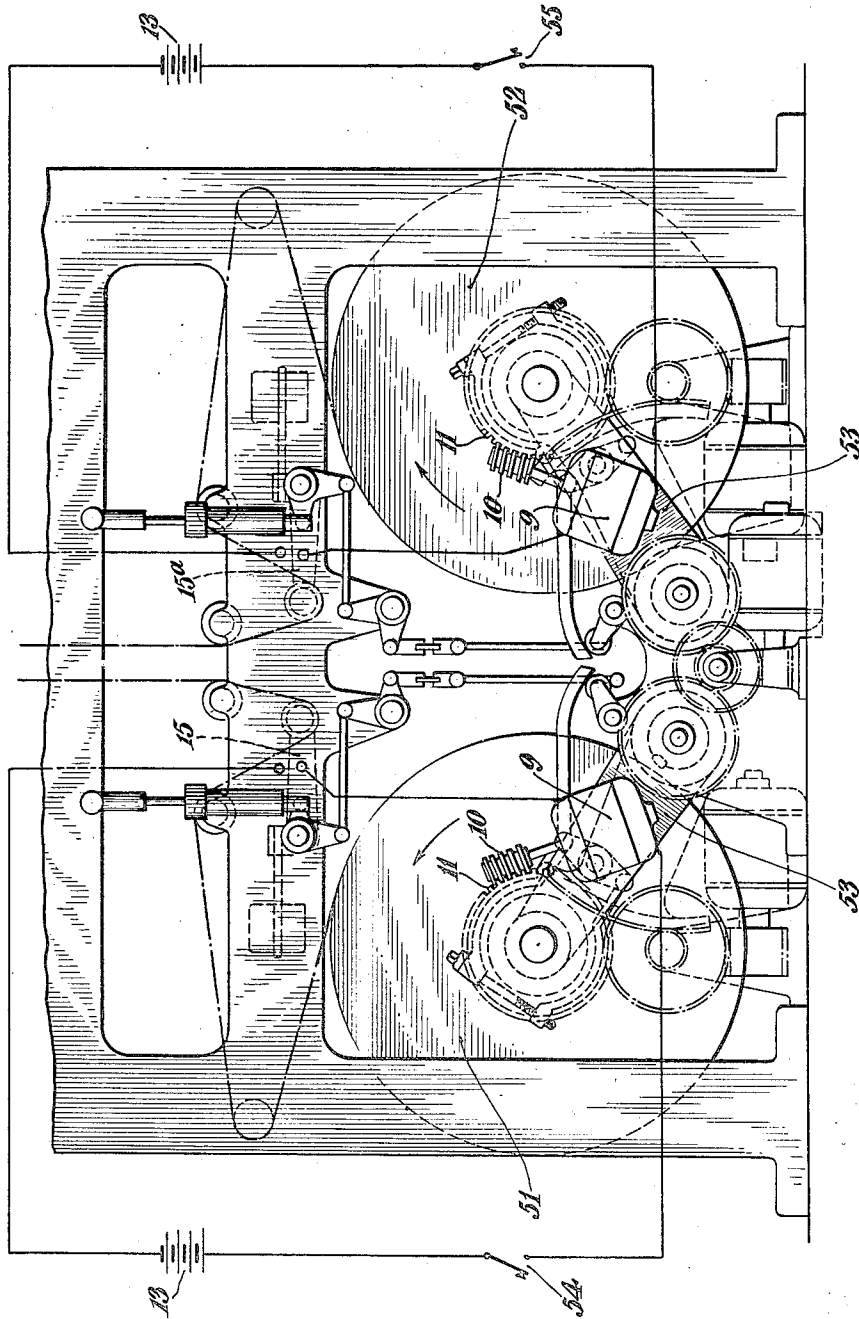
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MEANS FOR SUPPLYING WEBS

Filed May 23, 1930

6 Sheets-Sheet 6

*Fig. 7.*



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## UNITED STATES PATENT OFFICE

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## MEANS FOR SUPPLYING WEBS

Application filed May 23, 1930. Serial No. 454,907.

This invention relates to means for supplying webs of flexible material to a machine, such as a printing machine, for acting upon or manipulating the webs in some way.

5 In machines of this type, a web from a web roll is threaded into the machine, and presently, when such active web roll is nearing its exhaustion, it is necessary, if the machine is to continue to run, to substitute a  
10 replenishing roll for said active roll by uniting the webs of the two rolls.

It is the custom now, and has been for some time, to unite the webs while the machine continues to run, although at a speed  
15 very much reduced from running speed, one reason for this reduction in speed being the difficulty of making and retaining the paste-joint between the two webs,—for, it will be understood, the replenishing web roll constitutes a considerable mass, and, if the pull  
20 of the active web is relied upon to start the replenishing roll revolving, the strain or tension on the active web will be excessive owing to the inertia of the replenishing roll,  
25 with the result that the web breaks or the freshly pasted joint is pulled apart. It is, therefore, now the practice to give the replenishing web roll a "boost"; that is, to rotate said replenishing roll by power other  
30 than that derived from engaging or uniting said replenishing roll or its web with the active web.

In preparing to make the roll change, paste is applied to the standing-still replenishing roll, after which said roll is given a  
35 "boost" and then brought into contact with the active web, which latter is usually backed up by an apron or belt or is otherwise rendered taut. In carrying out this process it  
40 is, therefore, necessary to take into consideration a number of factors. First, if the making of the joint is to be successful, it is necessary that the position, circumferentially, of the pasted portion of the replenishing roll be such that, at the moment of  
45 contact between the active web and the replenishing roll, the leading edge of such pasted portion must not have passed the tangential point between said web and roll;  
50 otherwise, said leading edge is apt to be fold-

ed back and the rollers will be gummed up, with the result that a choke in the machine is likely to occur or the web will break either at the joint or at some other point. The operator must, therefore, gage the "boost" very  
55 accurately and must relate it to the speed at which the reel is being turned to bring the replenishing roll into feeding position. If the weight and diameter of the replenishing roll were constant, it would not be so difficult; but, as two web rolls are seldom of  
60 equal diameter and weight it is practically impossible to properly co-relate the different speed factors, unless the machine is running at very low speed, say, threading speed,  
65 and even then the joint is not always properly made.

The main object and feature of this invention is to provide means whereby the uniting  
70 of the webs may be accomplished with greater certainty and at higher speeds than has heretofore been customary. To this end, one feature of the invention consists in applying  
75 a driving force, other than the pull exerted by the active web, tending to rotate the replenishing roll substantially at the time of uniting the two webs, together with the means whereby the application of the force is controlled.

Other features of the invention will appear as the specification proceeds.

This driving force can be rendered active by a manual operation as by closing a switch or throwing in a clutch, but, preferably, the  
85 application of this driving force to the replenishing roll is controlled by the tension of the active web or web on the run, or by the act of uniting the two webs, or by the movement of the pasting device or by the bodily  
90 movement of the replenishing roll into feeding position, or by a combination of two or more of these. If an electric motor is used as the actuating means, a torque motor may be employed of such character that, when  
95 energized, it is insufficient to start the replenishing roll from a stand-still, but the moment a slight pull is exerted, by the active web, the replenishing roll is started up by reason of the additional power supplied by  
100 said web on the run.

Other features of the invention will appear as the specification proceeds.

In the accompanying drawings the invention is disclosed in several concrete and preferred forms in which:

Fig. 1 is a somewhat diagrammatic view in end elevation of a machine embodying one form of the invention.

Fig. 2 is a detail view of the contact sectors and brushes of one of the boosting motors.

Figs. 3, 4 and 5 are views similar to Fig. 1 showing modified forms of the invention.

Fig. 6 is a diagrammatic view of a modified form of the invention in which the rotatable reel moves in a direction opposite to that shown in the other figures, in other words, it shows the invention applied to a construction of the regulation type, such as the Stone reel, now in use.

Fig. 7 is a diagrammatic view of a further modified form of the invention in which two rolls are arranged side by side and are raised and lowered by means of arms.

In Fig. 1, 1 indicates a machine, here a printing machine, 2 is an active web roll and 3 is a replenishing web roll. The supporting means here used to bring the rolls successively into feeding position comprises a rotatable reel 4 supported on a stationary shaft 5. 6 is a third web roll which in due course will become a replenishing roll and then an active roll. Each of these rolls are rotatable about their own axes being mounted on core-engaging members such as spindles or chucks 8 and it will be understood that web 7 from the active web roll passes over suitable web guides into threaded engagement with printing machine 1. When roll 2 is about to become exhausted, paste is applied to roll 3, reel 4 is turned to bring said roll 3 against web 7 and the webs are thereby joined together. After this, the web from roll 2 may be severed. It will be understood that if roll 3 is standing still (so far as rotation about its own axis is concerned) when the webs are pasted together, then a considerable strain will be placed upon the joined webs due to the energy which must be expended in starting up rotation of roll 3, and such strain is apt either to disengage the webs or to cause a tear. Actuating means are therefore provided to drive roll 3 about its own axis. Such actuating or motor means may take many forms, but a simple expedient is shown in Fig. 1 in which an electric motor 9 is carried by the reel adjacent each roll 2, 3 and 6, and such motor carries a worm 10 on its armature shaft meshing with worm gear 11 on spindle 8 of its roll. 12 indicates two contact sectors mounted fast on, and properly insulated from, shaft 5, to which sectors energy is supplied by battery, or other source of power, 13 by means of suitable leads. Motor 9 is provided with two brush contacts

14 that engage the contact sectors when a roll as 3 is moved by reel 4 into feeding position. Reel 4 may therefore be considered as a means to move a roll into feeding position or it may be considered to be a pasting device in that it serves to bring the webs into contact, in this case by bringing the replenishing roll against the web on the run. It will be apparent that the length of the contact sectors may be such that a circuit will be established through the motor during a portion of the movement of the roll into feeding position, and that when it arrives at the final feeding position (indicated by position of roll 2) the circuit may be automatically ruptured. And it will be understood that the contact sectors may or may not be the only controlling contacts or the only means that control the driving relation between the actuating or motor means and the roll. It is preferred in certain circumstances not to make the contact sectors the only controlling contacts and to include in the circuit a controlling member responsive to the tension of the web on the run. Such a member is indicated at 15 which shows an arm pivoted at 16 and provided with a roll 17 around which the web is trained, said roll being normally urged in one direction by a spring or a weight. One wire of the circuit leads to arm 15 and another to contact 19 and it will now be apparent that in response to an increased tension on the web (due, we will say, to the inertia of a roll when starting it rotating) the circuit will be closed and the motor will be energized, and when the tension is relaxed the circuit will be opened again. It will be seen that when this construction is used it is possible to have the contact sectors of such length that the brushes of the motor will still engage them when a roll occupies its final feeding position (position of roll 2). Suitable brake mechanism may be used in connection with the device, such means taking, in the present instance, the following form: as shown in Fig. 1, arm 15 has an extension 15<sup>a</sup> on which is carried an adjustable counterweight 15<sup>b</sup>, and there is also a dashpot 15<sup>c</sup> associated with a member 15<sup>d</sup> of arm 15. 15<sup>e</sup> indicates a lever pivoted at 15<sup>f</sup> and acted upon by roll 15<sup>g</sup> against tension of spring 15<sup>h</sup> and 15<sup>i</sup> a rod that controls each brake mechanism 20 as it comes into feeding position in the manner fully set forth in Scott Patent No. 1,610,713. In general, the action is such that when the web on the run becomes slack the variable brake mechanism is applied. In the construction here shown each roll is mounted on a spindle but it will be understood that it can be mounted on chucks and controlled in the same way as fully disclosed for example in Patents Nos. 1,670,637 and 1,671,685. It will be evident, therefore, that here we have a variable brake mechanism controlled by the slackness of the web on the run and a boosting motor con-

trolled by the tension of the web, or by the pasting device or by the movement of the replenishing roll into feeding position, or by a combination of several of these factors.

5 The boosting motor can be of such construction that, when energized, it develops sufficient power to drive a roll, but, preferably, it will be a torque motor of such character that, when energized, it will be unable to drive a  
10 roll. When, however, a slight pull is exerted by the web on the run, after the active and replenishing webs have been joined, the extra power supplied by the pull of said web on the run will be sufficient to start the replenishing  
15 roll from a standing position.

In Fig. 3 is shown a modified form of the invention in which the circuit is controlled by an arm 21 pivoted at 22, the outer end of the arm resting on the web on the run. It will be  
20 seen that when reel 4 is turned to bring a new roll into position said roll will engage the web on the run and move arm 21 up thereby closing a contact at 23 and supplying energy to sectors 12 from battery 13<sup>a</sup>. If desired,  
25 arm 15 and a contact controlled thereby can be included in series with arm 21 and contact 23, so that the circuit will be closed only when the tension on the web increases beyond a certain point. In this drawing a large part  
30 of the brake controlling mechanism has been omitted for the sake of simplicity but it will be understood that the brake mechanism may be controlled by the web as explained in connection with Fig. 1, and also that the boosting  
35 motor may or may not be of sufficient power to drive a roll unaided.

In the modification shown in Fig. 4, web 24 of the replenishing roll is placed on a pasting device 25, here an extensible apron, and a roller 26, operated by handle 27 is moved  
40 against the apron to bring web 24 against web 7. The circuit for the boosting motor may be controlled by arm 15 or it may be controlled by handle 27 through contacts  
45 27<sup>a</sup> or both by handle 27 and arm 15 in series.

In the foregoing exemplifications of the invention electric motors have been shown, but it will be evident to those skilled in the art that various other expedients may be used.

50 In Fig. 5 is shown an all mechanical construction. In this form of the invention a bevel gear or other rotating member 28 is carried by reel 4, and meshing with this bevel gear is a plurality of bevel pinions 29, one for each  
55 web roll. Each of these bevel pinions is connected by means of a shaft 30 to another bevel pinion 31 that meshes with a bevel gear 32 on the roll. Interposed in each shaft 30 is a clutch 33 urged into its closed position by a  
60 spring 34 and opened by means of a cam 35. This cam is fast on shaft 5 and is so shaped that only the clutch of the roll moving into feeding position is closed. Bevel gear 28 may be driven from any source as from shaft  
65 36 by means of bevel gears 37, sprocket 38,

chain 39 and sprocket 40 fast to bevel gear 28. Shaft 36 can be driven from the printing machine and can be driven continuously or a clutch, controlled by arm 15, can be interposed in the train of connections as will be  
70 apparent.

In Fig. 6 is shown a construction similar to the so-called Stone reel. In the disclosure here made, the construction may be substantially the same as that shown in Fig. 1, except  
75 that reel 4 rotates counter-clockwise. The apron or belt that engages the expiring web, in the regulation Stone reel has also been omitted as being unnecessary.

In Fig. 7 the invention is shown applied to the construction of Patent No. 1,671,685. Here the two rolls 51 and 52 are also arranged side by side and we will assume that 51 is the active web roll and 52 is the replenishing  
80 roll. The rolls are mounted in movable arms 53 that pick the rolls up from the floor after they have been inserted in the chucks of the arms as fully described in said patent. Arms 15 and 15<sup>a</sup> control the circuits to the motors when switch 54 or 55 is closed. Or the circuits can be controlled by the movement of  
85 arms 53 or jointly by 53, 15 and 15<sup>a</sup> as will be understood. The automatic brake mechanism shown may or may not be used as desired.

I claim:

1. Web supply means including: supporting means for a plurality of rotatable web rolls, the web of one of which is active by  
100 being threaded into a machine, capable of movement to bring successive replenishing rolls into feeding position so that the web of a replenishing roll may be joined to that of an active roll, actuating means, carried by the supporting means, to tend to rotate a replenishing  
105 roll, and controlling means to render the actuating means operative to rotate said replenishing roll substantially at the time of uniting the active and replenishing webs.

2. Web supply means including: supporting means for a plurality of rotatable web rolls, the web of one of which is active by  
110 being threaded into a machine, capable of movement to bring successive replenishing rolls into feeding position so that the web of a replenishing roll may be joined to that of an active roll, actuating means, carried by the supporting means, to tend to rotate a replenishing roll, and controlling means, responsive to the tension of the active web, to render the actuating means operative to rotate the  
115 replenishing roll when the strain on the united webs increases beyond a certain point.

3. Web supply means including: supporting means for a plurality of rotatable web rolls, the web of one of which is active by  
120 being threaded into a machine, capable of movement to bring successive replenishing rolls into feeding position so that the web of a replenishing roll may be joined to that  
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of an active roll, actuating means, carried by the supporting means, to tend to rotate a replenishing roll, and controlling means, to render the actuating means operative to rotate the replenishing roll, governed by the movement of the supporting means to bring a replenishing roll toward feeding position.

4. Web supply means including: supporting means for a plurality of rotatable web rolls, the web of one of which is active by being threaded into a machine, capable of movement to bring successive replenishing rolls into feeding position so that the web of a replenishing roll may be joined to that of an active roll, actuating means, carried by the supporting means, to tend to rotate a replenishing roll, and controlling means to render the actuating means operative to rotate the replenishing roll governed by the tension of the active web.

5. Web supply means including: supporting means for a plurality of rotatable web rolls, the web of one of which is active by being threaded into a machine, capable of movement to bring successive replenishing rolls into feeding position so that the web of a replenishing roll may be joined to that of an active roll, actuating means, carried by the supporting means, to tend to rotate a replenishing roll, controlling means to render the actuating means operative to rotate said replenishing roll substantially at the time of uniting the active and replenishing webs, brake mechanism for the active roll controlled by the tension of the active web, and means to render the brake mechanism inactive with respect to the active roll and active with respect to the replenishing roll substantially at the time of uniting the webs.

6. Web supply means including: supporting means for a plurality of rotatable web rolls, the web of one of which is active by being threaded into a machine, capable of movement to bring successive replenishing rolls into feeding position so that the web of a replenishing roll may be joined to that of an active roll, actuating means, carried by the supporting means, to tend to rotate a replenishing roll, controlling means, responsive to the tension of the active web, to render the actuating means operative to rotate the replenishing roll when the strain on the united webs increases beyond a certain point, brake mechanism for the active roll controlled by the tension of the active web, and means to render the brake mechanism inactive with respect to the active roll and active with respect to the replenishing roll substantially at the time of uniting the webs.

7. Web supply means including: supporting means for a plurality of rotatable web rolls, the web of one of which is active by being threaded into a machine, capable of movement to bring successive replenishing rolls into feeding position so that the web of

a replenishing roll may be joined to that of an active roll, actuating means, carried by the supporting means, to tend to rotate a replenishing roll, controlling means, to render the actuating means operative to rotate the replenishing roll, governed by the movement of the supporting means to bring a replenishing roll toward feeding position, brake mechanism for the active roll controlled by the tension of the active web, and means to render the brake mechanism inactive with respect to the active roll and active with respect to the replenishing roll substantially at the time of uniting the webs.

8. Web supply means including: supporting means for a plurality of rotatable web rolls, the web of one of which is active by being threaded into a machine, capable of movement to bring successive replenishing rolls into feeding position so that the web of a replenishing roll may be joined to that of an active roll, actuating means, carried by the supporting means, to tend to rotate a replenishing roll, controlling means to render the actuating means operative to rotate the replenishing roll governed by the tension of the active web, brake mechanism for the active roll controlled by the tension of the active web, and means to render the brake mechanism inactive with respect to the active roll and active with respect to the replenishing roll substantially at the time of uniting the webs.

9. Web supply means including: supporting means for a plurality of rotatable web rolls, the web of one of which is active by being threaded into a machine, capable of movement to bring successive replenishing rolls into feeding position so that the web of a replenishing roll may be joined to that of an active roll, a plurality of electric motors, one for each roll, carried by the supporting means, and means to establish an energizing circuit through the motor of a replenishing roll substantially at the time its web is united with that of the active web.

10. Web supply means including: supporting means for a plurality of rotatable web rolls, the web of one of which is active by being threaded into a machine, capable of movement to bring successive replenishing rolls into feeding position so that the web of a replenishing roll may be joined to that of an active roll, a plurality of electric motors, one for each roll, carried by the supporting means, and means, responsive to, the tension of the active web, to establish an energizing circuit through the motor of a replenishing roll the web of which roll is being united with the active web.

11. Web supply means including: supporting means for a plurality of rotatable web rolls, the web of one of which is active by being threaded into a machine, capable of movement to bring successive replenishing

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rolls into feeding position so that the web of a replenishing roll may be joined to that of an active roll, a plurality of electric motors, one for each roll, carried by the supporting means, and means, responsive to the movement of the supporting means, to establish an energizing circuit through the motor of a replenishing roll the web of which roll is being united with the active web.

12. Web supply means including: supporting means for a plurality of rotatable web rolls capable of movement to carry the web rolls successively into and out of feeding position, actuating means carried by the supporting means to successively rotate the web rolls, and means governed by the movement of the supporting means to control the driving relation of the actuating means with respect to the web rolls.

13. Web supply means including: supporting means for a plurality of rotatable web rolls capable of movement to carry the web rolls successively into and out of feeding position, a plurality of electric motors, one to drive each web roll, carried by the supporting means, and means governed by the movement of the supporting means to control the establishing of circuits through the motors.

14. Web supply means including: a rotatable core-engaging member to support an active web roll the web of which is threaded into a machine, a rotatable core-engaging member to support a replenishing web roll the web of which is to be united to the web of the active roll, an electric motor to tend to drive the core-engaging member of the replenishing roll, and through it said roll, means to close a circuit through said motor substantially at the time of uniting the webs, and means to move the replenishing roll into feeding position and to thereby control the closing of said circuit.

15. Web supply means including: means to support a plurality of rotatable web rolls capable of movement so that each of said rolls is alternately an active roll with its web threaded into a machine and a replenishing roll the web of which is to be united to the web of an active roll, a plurality of electric motors, one for each roll, and means controlled by the movement of a replenishing roll into feeding position, to establish an energizing circuit through the motor of that roll the web of which is being united to the web of an active roll.

16. Web supply means including: a reel, for a plurality of rotatable web rolls the web of one of which is active by being threaded into a machine, rotatable to bring successive replenishing rolls into feeding position so that the web of a replenishing roll may be joined to that of an active roll, a plurality of motor means, one for each web roll, carried by the reel, and controlling means to render the motor means of a replenishing roll

operative to tend to rotate said replenishing roll substantially at the time of uniting the active and replenishing webs.

17. Web supply means including: a reel, for a plurality of rotatable web rolls the web of one of which is active by being threaded into a machine, rotatable to bring successive replenishing rolls into feeding position so that the web of a replenishing roll may be joined to that of an active roll, a plurality of motor means, one for each web roll, carried by the reel, and controlling means, responsive to the tension of the active web, to render the motor means of a replenishing roll operative to tend to rotate said replenishing roll when the strain on the united webs increases beyond a certain point.

18. Web supply means including: a reel, for a plurality of rotatable web rolls the web of one of which is active by being threaded into a machine, rotatable to bring successive replenishing rolls into feeding position so that the web of a replenishing roll may be joined to that of an active roll, a plurality of motor means, one for each web roll, carried by the reel, and controlling means, governed by the movement of the reel to bring a replenishing roll toward feeding position, to render the motor means of a replenishing roll operative to tend to rotate said replenishing roll.

19. Web supply means including: a support having an active web roll the web of which is threaded into a machine, a support having a replenishing web roll the web of which is to be united to the web of the active roll, means to bring the periphery of the replenishing roll into contact with the running web from the active web roll, means normally ineffective to drive the replenishing roll, and means to render the drive means effective to tend to rotate the replenishing roll substantially at the time the periphery of the replenishing roll is brought into contact with the running web from the active roll.

20. Web supply means including: means to support a plurality of rotatable web rolls, each of which is alternately an active roll with its web threaded into a machine and a replenishing roll the web of which is to be united to the running web of an active roll, capable of movement to bring the surface of a replenishing roll into contact with the running web of an active roll, means normally ineffective to drive the replenishing roll, and means to render the drive means effective to tend to rotate the replenishing roll substantially at the time the surface of the replenishing roll is brought into contact with the running web from the active roll.

21. Web supply means including: a rotatable core-engaging member to support an active web roll the web of which is threaded into a machine, a rotatable core-engaging member to support a replenishing web roll

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the web of which is to be united to the running web of the active roll, means to bring the surface of a replenishing roll into contact with the running web of an active roll, means normally ineffective to drive the core-engaging member of the replenishing roll, and means to render the driving means effective to tend to rotate the core-engaging member of the replenishing roll substantially at the time the surface of the replenishing roll is brought into contact with the running web from the active roll.

22. Web supply means including: a supporting means, to carry a plurality of rotatable web rolls one of which is an active roll the web of which is threaded into a machine and another of which is a replenishing roll the web of which is to be united to the running web of an active roll, rotatable to bring the periphery of a replenishing roll into contact with the running web of an active roll, means normally ineffective to drive the replenishing roll, and means, controlled by the movement of the rotatable supporting means, to render the driving means effective to tend to rotate the replenishing roll substantially at the time the surface of the replenishing roll is brought into contact with the running web from the active roll.

30 Signed at Plainfield, in the county of Union and State of New Jersey, this 21st day of May, 1930.

WALTER C. SCOTT.

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