

April 20, 1926.

1,581,847

M. MACDONALD

FEEDING MECHANISM FOR AUTOGRAPHIC REGISTERS

Filed March 31, 1924

3 Sheets-Sheet 1

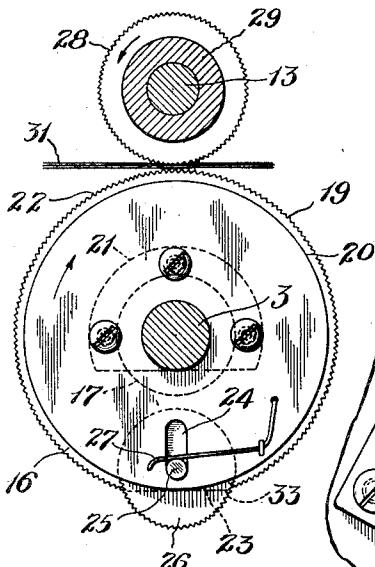


FIG. 2.

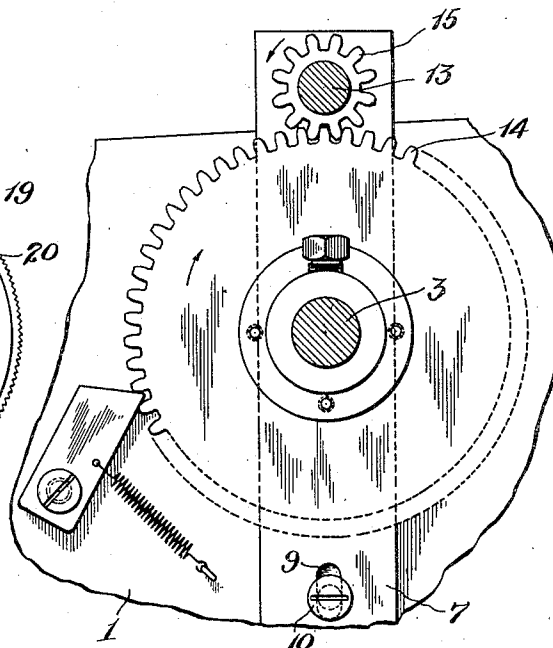


FIG. 3.

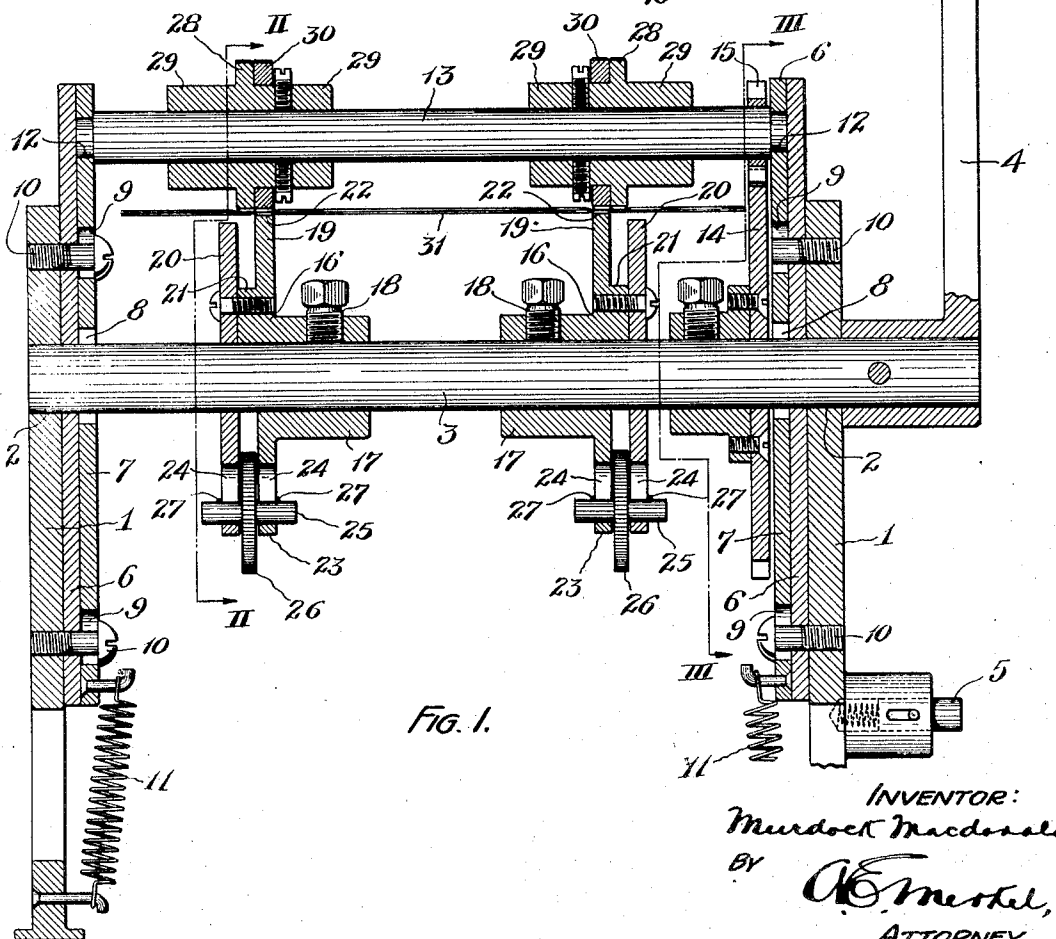


FIG. 1.

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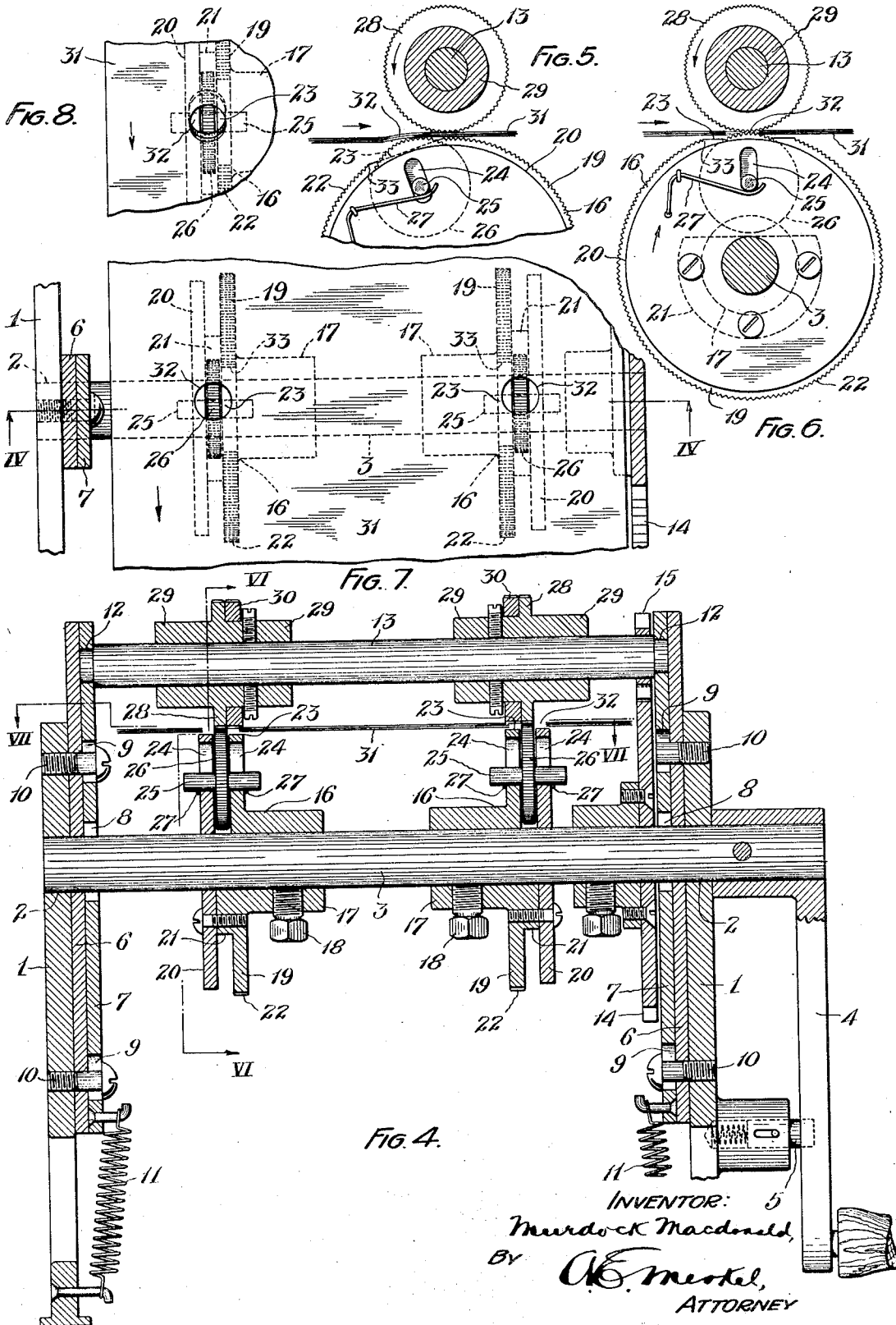
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3 Sheets-Sheet 2



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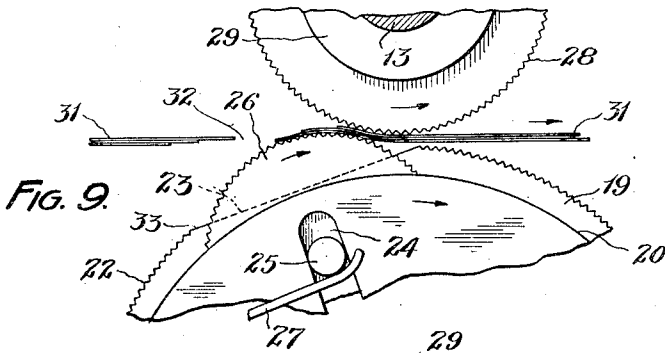
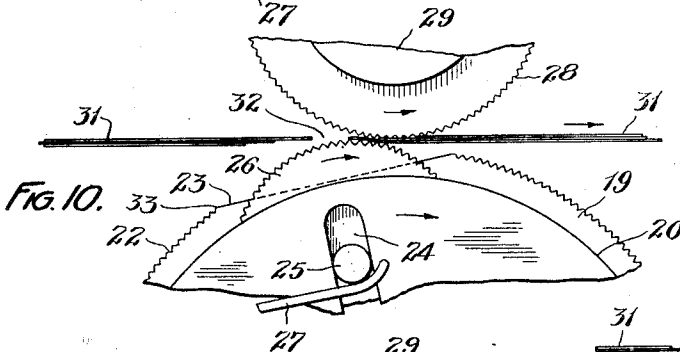
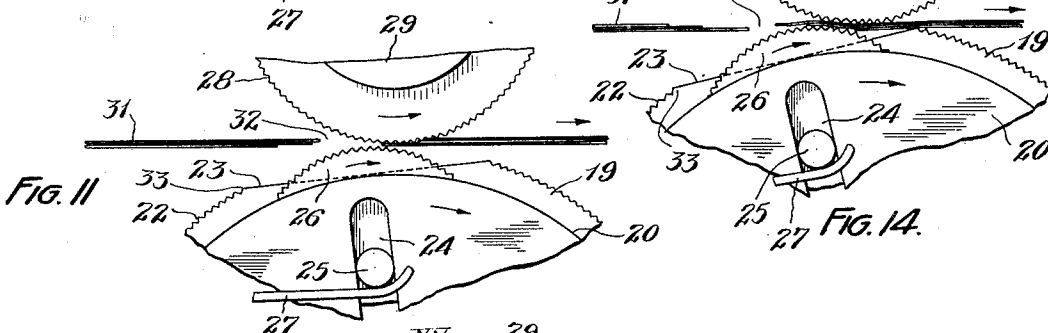
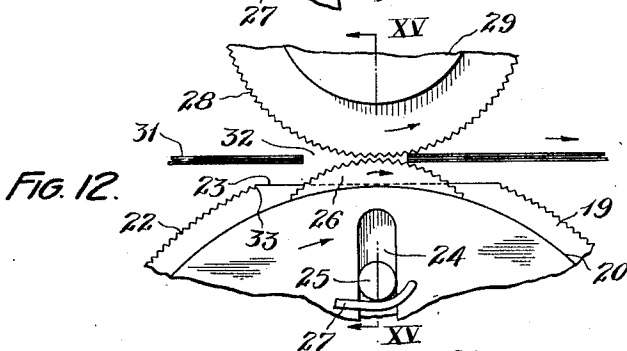
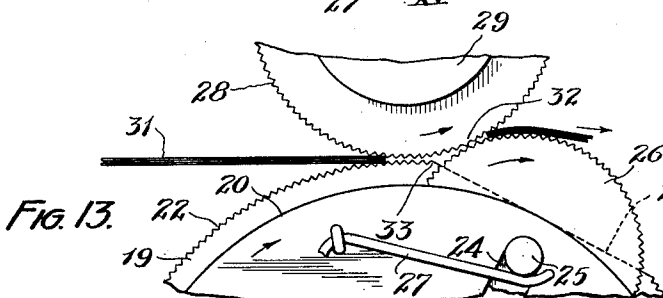
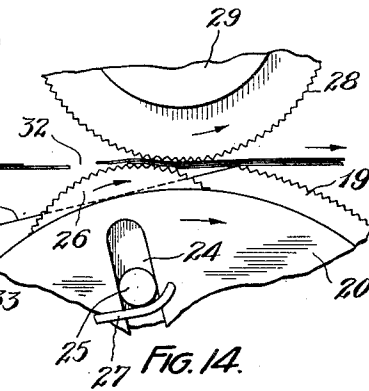
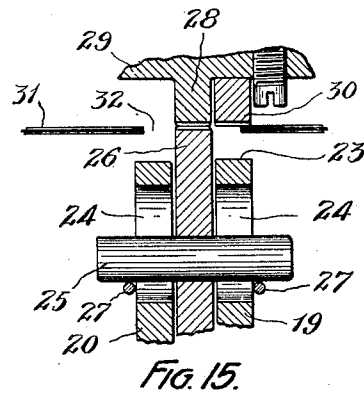
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FEEDING MECHANISM FOR AUTOGRAPHIC REGISTERS

Filed March 31, 1924

3 Sheets-Sheet 3



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Patented Apr. 20, 1926.

1,581,847

UNITED STATES PATENT OFFICE.

MURDOCK MACDONALD, OF CLEVELAND, OHIO.

FEEDING MECHANISM FOR AUTOGRAPHIC REGISTERS.

Application filed March 31, 1924. Serial No. 703,021.

To all whom it may concern:

Be it known that I, MURDOCK MACDONALD, a citizen of the United States, resident of the city of Cleveland, county of Cuyahoga, and State of Ohio, have invented new and useful Improvements in Feeding Mechanism for Autographic Registers, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to devices for feeding superposed sheets of paper in an autographic register and in which means are provided for longitudinally realining the sheets periodically so as to restore registration thereof.

The object of the invention is to provide a simple and effective mechanism for effecting such realinement and registration.

The said invention consists of means hereinafter fully described and hereinafter particularly set forth in the claims.

More specifically the invention is applicable to that class of realining devices in connection with which the paper is provided with longitudinally spaced perforations such as are shown, for example, in my pending application, Serial Number 416,349, filed October 12, 1920.

The annexed drawings and the following description sets forth in detail certain means embodying my invention, the disclosed means, however, constituting but one of the various mechanical forms in which the principle of the invention may be employed.

In said annexed drawings:—

Figure 1 represents a transverse cross-section of an autographic register feeding mechanism embodying my invention, parts cut by the plane of section being shown in elevation.

Fig. 2 represents a detail section taken upon the planes indicated by lines II—II, Fig. 1, and viewed in the direction indicated by the arrows associated with said line.

Fig. 3 represents a fragmentary section taken upon the planes indicated by lines III—III, Fig. 1, and viewed in the direction indicated by the arrows.

Fig. 4 represents a section similar to that of Fig. 1 showing the parts in a different position.

Figs. 5 and 6 represent detail sections

similar to that of Fig. 2 showing the parts in different positions.

Fig. 7 represents a fragmentary section taken upon the planes indicated by lines VII—VII, Fig. 4.

Fig. 8 represents a fragmentary plan showing the position of the paper sheets when they are out of register.

Figs. 9 to 14 inclusive illustrate, on an exaggerated scale, views similar to those of Figs. 2, 5, and 6, and in which the paper is shown of proportionally much greater thickness as compared with the dimensions of the mechanism with which it cooperates, than exists in actual practice, such increased thickness being adopted in order that the action of such paper as a result of the operation of the realining mechanism may be more readily followed in the subsequent description.

Fig. 15 represents a magnified section taken upon the plane indicated by line XV—XV, Fig. 12.

In the illustrated embodiment of my invention, upon the frame 1, Fig. 1, is mounted, in suitable bearings 2, a longitudinal primary driving shaft 3, which projects laterally upon one side of the frame and has secured to such projecting end an operating handle 4. A spring-actuated pin 5 is also mounted on said frame and projects laterally therefrom into the path of movement of said handle so as to punctuate one complete revolution of the latter, in a manner heretofore employed, and as will be readily understood. Said pin may be pressed inwardly toward the frame by the hand, when it is desired to turn the handle to effect the next feeding operation.

Against the inner faces of the two sides of the frame are fixedly secured in any suitable manner, two bearing plates 6—6, Fig. 1, and in contact therewith are two vertically reciprocable carrier slides 7—7. These slides are centrally positioned with reference to the axis of the shaft 3 and each is provided with an enlarged opening 8, through which said shaft extends. Each slide is furthermore formed with two guide-slots 9, through which extend screws 10—10, threaded into suitable holes in the frame as shown. The heads of the screws are upon the inside of the frame and thus retain the slides in place, while at the same time permitting them to reciprocate vertically in a path limited by the length of the slots 9.

To the bottom of each slide is secured one end of a coil-spring 11, the other end of which is suitably secured to the frame.

The upper end of each slide is provided with a bearing 12 in which are mounted the ends of a secondary or counter driving shaft 13 parallel with and vertically above shaft 3, as shown in Fig. 3.

Mounted upon and fixed to shaft 3 is a gear wheel 14 which meshes with a pinion 15 mounted upon and fixed to the shaft 13, Figs. 1 and 3. Also mounted upon said shaft 13, and intermediately of its ends and between the plates of the frame are two primary feed-rolls 16—16. Each of these rolls includes a hub 17, and set screw 18 by means of which the roll is fixed upon the shaft, a driving-portion 19, and a circular plate 20 spaced from the portion 19 by a boss 21. The driving-portion has a cylindrical knurled peripheral surface 22, interrupted by a flat section 23, Figs. 9 to 13. The plate 20 is of less diameter than the circular part of the roll portion 19.

Said roll portion 19 and the plate 20 are each provided with radial slots 24 which are laterally in alinement with each other, having their longitudinal axes lying in a plane perpendicular to the middle of the flat section 23, and are located in proximity to said section.

These slots form a bearing for the spindle 25 of an idle-roll 26, which spindle projects laterally from opposite sides of the roll portion 19 and plate 20, as shown in Figs. 1 and 4. These projecting opposite ends are engaged by two leaf springs 27—27, Figs. 1 and 2, which are mounted respectively upon the outer faces of roll portion 19 and plate 20. These springs urge the spindle outwardly to engage the outer ends of the slots 24 as shown in Fig. 1. In this position of said spindle the periphery of the idle roll 26 projects some distance outwardly beyond the periphery of roll portion 19 as shown in Fig. 2, excepting at certain times during the operation of the device, as will be hereinafter described. Rolls 26 have their cylindrical surfaces knurled.

Upon the counter-shaft 13 are fixedly secured two secondary feed-rolls 28—28 having knurled cylindrical surfaces, and each formed with a hub 29 extending from both sides thereof as shown in Figs. 1 and 4. Each such roll is in vertical alinement with one of the idle rolls 26. Mounted and rotatable upon one of the portions of each of the hubs 29 is a primary idle roll 30, having a knurled cylindrical surface, each of such rolls being in vertical alinement with one of the primary feed-roll portions 19.

The peripheral width of the secondary feed-rolls 28—28 and the width of the secondary idle-rolls 26—26 is made less than the diameter of the perforations 32, and the

latter are so spaced transversely that said rolls are positioned centrally with reference to said perforations, all as shown in Fig. 15.

The diameter of the secondary feed-rolls 28—28 is made greater than that of the pinion 15, and the diameter of the peripheral feed-surface 22 is made less than the diameter of the gear wheel 14. As a consequence, the linear velocity of the periphery of roll portion 19 is less than the linear velocity of the pitch-line of gear 14. The linear velocity of the pitch-line of pinion 15 is the same as that of gear 14, and the linear velocity of the periphery of roll 28—28 is greater than that of the pitch-line of pinion 15. The linear velocity of the periphery of rolls 28—28 is therefore considerably greater than that of the periphery of roll-portion 19.

It will be noted from the above construction that the springs 11—11 tend to move the shaft 13 toward the shaft 3, hence to move the primary idle-rolls 30 into contact with the portion 19—19 of the primary feed-rolls 16—16, and at the same time urge the secondary feed rolls 28 toward the said primary feed rolls 16—16.

It will also be noted that when the idle-rolls 26 (which I shall hereinafter designate as the "secondary idle-rolls") project outwardly from the primary feed-rolls 16—16, a circle drawn through the outermost peripheral portion of either of them and having its center in the axis of the shaft 3, will intersect the corresponding secondary feed roll 28, as will be seen from an inspection of Fig. 9.

The parts are so related that when the handle 4 is in contact with the pin 5, rolls 16—16 are in a position in which the secondary idle-rolls 26—26 are above the shaft 3, and will have passed a little beyond their uppermost position, as shown in Fig. 13.

Having described the construction and relation of the parts of the invention, I shall now describe its operation.

Let it be assumed that the superposed sheets 31 of paper have been inserted between the oppositely disposed rolls, that the handle is in the position shown in Fig. 4, in which it is in engagement with the pin 5, and the paper sheets are in alinement, that is the perforations 32 thereof are in alinement with each other. The parts are furthermore so arranged that at this time the secondary idle-rolls 26—26 will be located beneath and in contact with the secondary feed-roll 28—28, as shown in Fig. 12, the perforations will be located just beyond the rearmost edges 33 of the flat sections 23, the feed surfaces 22 of the primary feed-rolls 16—16, and the cooperating knurled surfaces of the primary idle-rolls 30—30 will have taken hold of the paper behind the perforations 32, so that a subsequent rotation of these rolls would feed

the paper forwardly, the direction of such feed being indicated by the arrows.

The parts and paper being in the above described position, the pin 5 is pushed back and the handle so released. Upon then turning the handle, the paper is fed through by the primary feed-rolls 16—16, and the cooperating primary idle-rolls 30, the secondary idle-rolls 26 revolving around the axis of the shaft 3 and in disengagement with the secondary feed-rolls 28—28.

During such forward feeding, let it now be assumed that the sheets are or become disalined as shown in Fig. 9, the uppermost sheet advancing beyond the lowermost, for example.

As the next perforations 32 approach the feed-rolls and the forward movement of the sheets is continued, the flat sections 23 come opposite the primary idle-rolls 30—30 and render the portions 19—19 of the primary feed-rolls 16—16 inoperative. At about the same time, the secondary idle-rolls 26—26 cooperate with the secondary feed-rolls 28—28 to continue the forward feeding of the sheets, such secondary idle-rolls being caused to yield inwardly toward the axis of the shaft 3, and pressing the paper against the secondary rolls 28—28. The operativeness of the secondary feed-rolls 28—28 continues as long as the flat-sections 23 render the primary feed-rolls inoperative, (a proper length of such section being adopted to accomplish this) and during such period, the feeding operation takes place at a rapid rate as a result of the previously described greater linear velocity of the periphery of the rolls 28—28.

Fig. 9 shows the position of the paper and perforations with reference to the feed-rolls, after the secondary feeding has been begun, and Fig. 10 after such feeding has advanced still further.

Should the sheets be out of alinement, as shown in Fig. 9, the secondary rolls 28—28 and 26—26 will advance the lower sheets progressively as indicated in Figs. 10 and 11, until they are again in alinement, as shown in full lines in Fig. 12.

Should the sheets be in the position of disalinement as shown in Fig. 14, in which the lower sheets are in advance of the upper one, the secondary feeding mechanism will advance the uppermost sheets progressively until they are realined.

The forward feeding by the secondary feeding means continues until the secondary idlers 26—26 cease to exert sufficient pressure upon the paper to continue to be effective, at which time the handle 4 strikes the pin 5 and further operation is discontinued, such discontinuance marking the time at which the paper which has been fed forwardly out of the machine is to be torn off.

The comparative rapid operation of the

secondary feeding means, insures the completion of the realining action, even though the length of the arc through which such means are operative, be comparatively short.

What I claim is:

1. In a device of the character described, two pairs of oppositely disposed feed-rolls; each set consisting of a positively driven and an idle feed-roll; the rolls of one pair being arranged to be intermittently inoperative and the rolls of the other pair being arranged to become operative during said period of inoperation, and inoperative during the period of operation of the other pair.

2. In a device of the character described, two pairs of oppositely disposed feed-rolls, each pair consisting of a positively driven and an idle roll; the rolls of the one pair being arranged to be intermittently inoperative and the rolls of the other pair being arranged to become operative during the period of operation of the other pair; the arrangement being further such that the periphery of the one driven roll will have a greater linear velocity than that of the other driven roll.

3. In a device of the character described, the combination with two parallel shafts and means for driving same in opposite directions; of two pairs of oppositely disposed feed-rolls mounted upon said shafts, each pair consisting of a fixed and an idle roll, but one fixed and one idle roll being mounted upon each shaft; the rolls of the one pair being arranged to become intermittently inoperative and the rolls of the other pair being arranged to become intermittently operative during the period of inoperation and intermittently inoperative during the period of operation of the other pair.

4. In a device of the character described, the combination of a primary driving feed-roll; a primary idle feed-roll cooperating with said driving roll; a secondary driving feed-roll mounted coaxially upon said idle roll; and a secondary idle feed-roll having an axis of rotation parallel with the axis of rotation of said primary driving roll, mounted so as to revolve about the axis of the latter and adapted to cooperate with said secondary driven roll.

5. In a device of the character described, the combination of a primary driving feed-roll; a primary idle-feed roll cooperating with said driving-roll; a secondary driving feed-roll mounted coaxially with said idle roll; and a secondary idle feed-roll having an axis of rotation parallel with the axis of rotation of said primary driving roll, mounted so as to revolve about the axis of said primary driving roll and adapted to cooperate with said secondary driving roll; said secondary idle roll being also

mounted so as to be capable of yielding toward the axis of the primary driving roll.

6. In a device of the character described, the combination of a primary driving feed-roll; a primary idle feed-roll cooperating with said driving roll; a secondary driving feed-roll mounted coaxially with said idle roll; and a secondary idle feed-roll having an axis of rotation parallel with the axis of rotation of said primary driving roll, mounted so as to revolve about the axis of and synchronously with primary driving-roll; and adapted to cooperate with said secondary driving-roll; said secondary idle roll being also mounted so as to be capable of yielding toward the axis of said primary driving roll.

7. In a device of the character described, the combination of a primary driving feed-roll; a primary idle-feed-roll cooperating with said driving roll; a secondary driving feed-roll mounted coaxially with said idle roll; and a secondary idle feed-roll having an axis of rotation parallel with the axis of rotation of said primary driving roll, mounted so as to revolve about the axis of said primary driving roll and adapted to cooperate with said secondary driving roll; said secondary idle roll being also mounted so as to be capable of yielding toward the axis of said primary driving roll and also so that a circle having its center in the axis of said primary driving roll and passing through the outermost surface of said secondary idle roll when in its non-yielding position, will intersect the said secondary driving roll.

8. In a device of the character described, the combination of a primary driving feed-roll; a primary idle feed-roll cooperating

with said driving roll; said primary roll having a cut-out section whereby said two rolls are periodically rendered inoperative; a secondary idle feed-roll mounted upon said primary driving roll and eccentrically with relation thereto; and a secondary driving roll lying in the path of movement of said secondary idle roll whereby the latter is caused to intermittently cooperate with said secondary driving roll; said secondary idle roll being positioned laterally adjacent said cut-out section, whereby said secondary driving roll becomes operative when the primary driving roll becomes inoperative.

9. In a device of the character described, the combination of two parallel shafts; gearing connecting same whereby they may be simultaneously driven; a primary feed-roll mounted upon and fixed to one of said shafts; a feed-roll rotatably mounted upon the other shaft and adapted to cooperate with said first-named feed-roll to feed superposed sheets of paper therebetween; a secondary feed-roll mounted upon and fixed to the other shaft and laterally adjacent to said rotatably mounted roll; and an idle roll mounted upon the primary feed-roll, eccentrically with relation thereto and adapted to cooperate intermittently with the fixedly mounted secondary roll to also feed such sheets; the primary feed-roll being arranged to be intermittently inoperative and said idle roll being arranged to cooperate with the secondary feed-roll during the period of inoperation of said primary feed-roll.

Signed by me this twentieth day of March, 1924.

MURDOCK MACDONALD.