

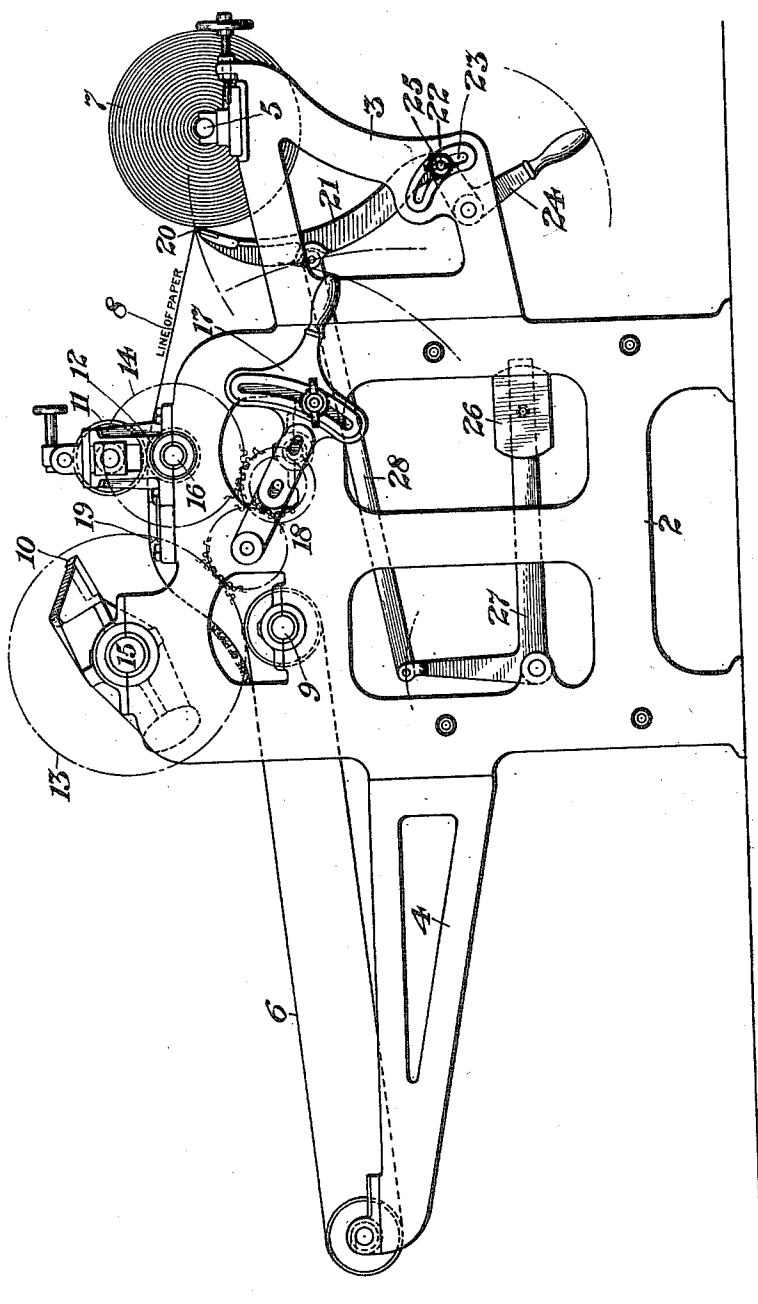
1,038,860.

H. DE SMITH.
SHEET CUTTING MACHINE.
APPLICATION FILED DEC. 19, 1908.

Patented Sept. 17, 1912.

3 SHEETS—SHEET 1.

Fig. 1



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Albert J. Clow

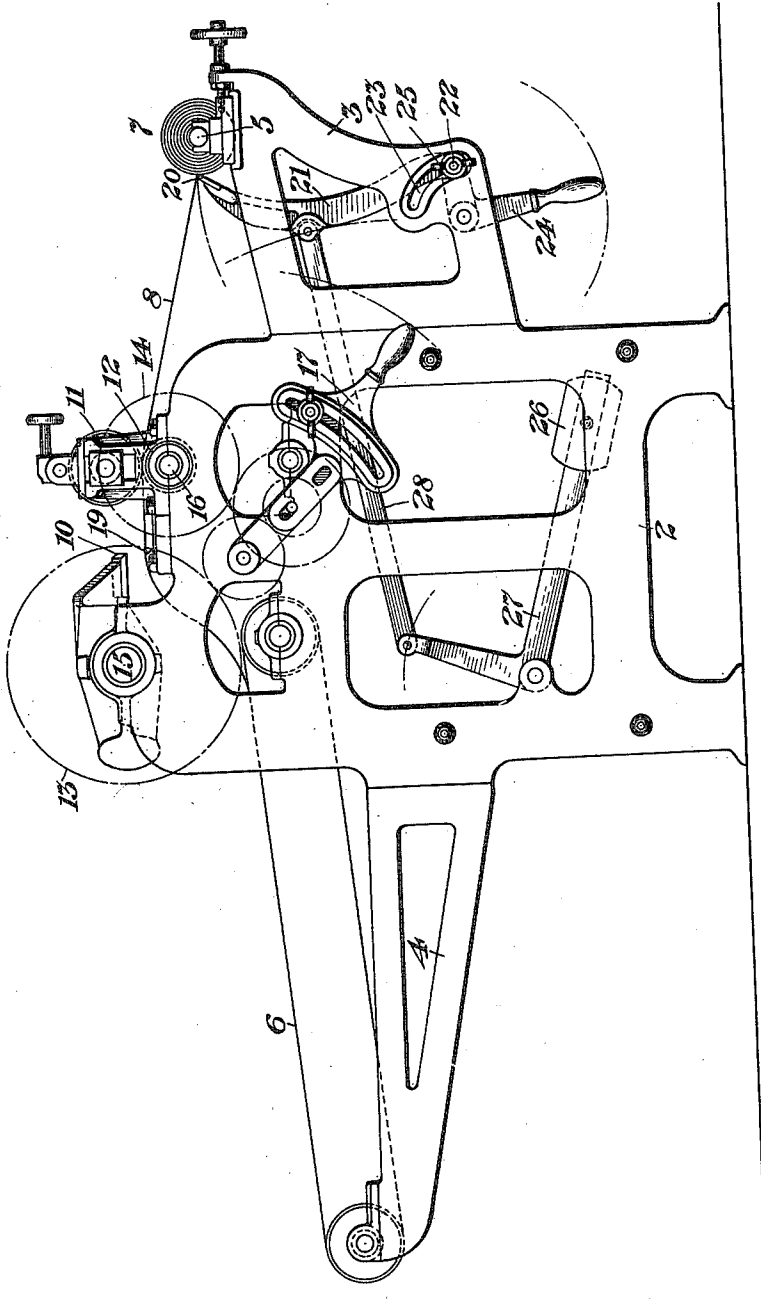
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3 SHEETS—SHEET 2.

Fig. 2



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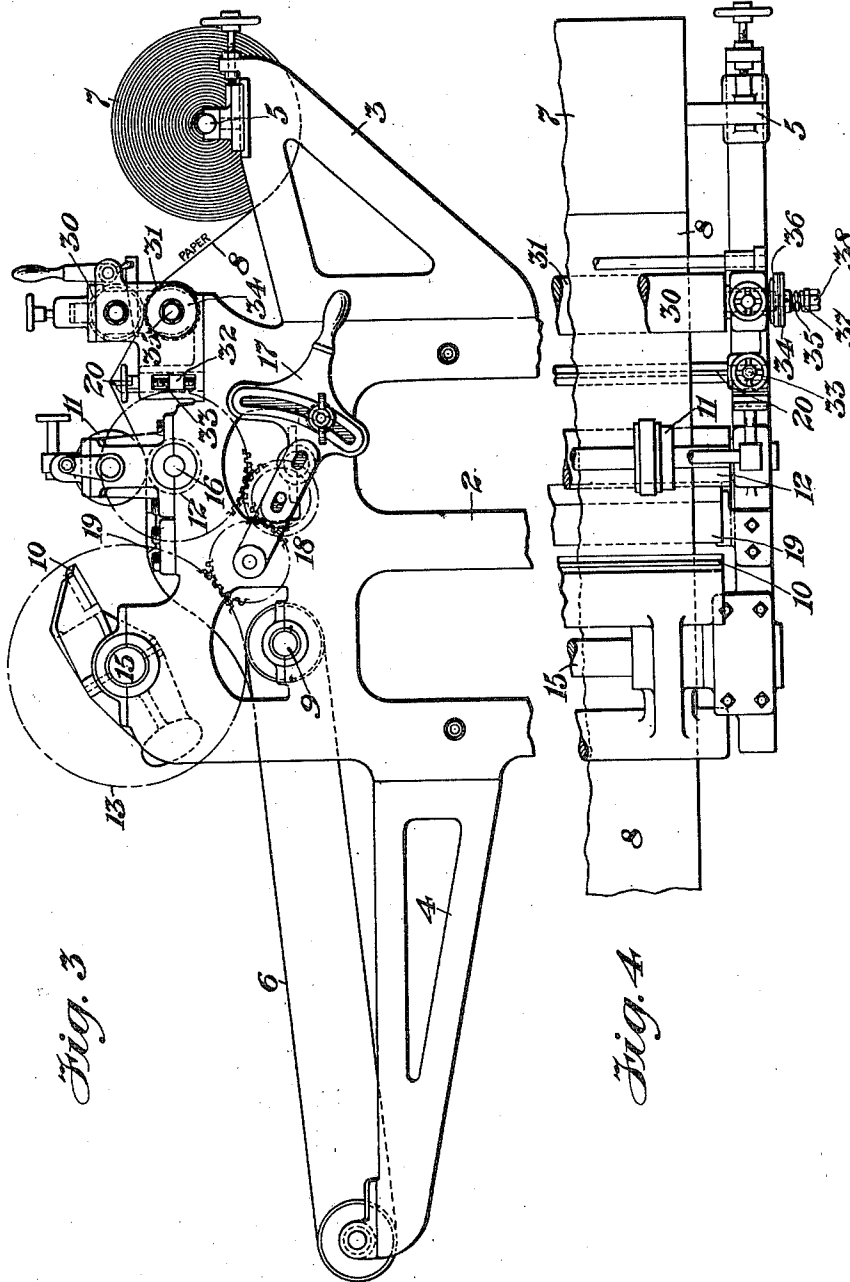
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3 SHEETS—SHEET 3.

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UNITED STATES PATENT OFFICE.

HENRY DE SMITH, OF ROCHESTER, NEW YORK, ASSIGNOR TO M. D. KNOWLTON COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

SHEET-CUTTING MACHINE.

1,038,860.

Specification of Letters Patent.

Patented Sept. 17, 1912.

Application filed December 19, 1908. Serial No. 468,320.

To all whom it may concern:

Be it known that I, HENRY DE SMITH, citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Sheet-Cutting Machines, of which the following is a specification.

This invention relates to sheet-cutting machines for severing roll-stock of various kinds and weights of material into sheets of any desired length, and the special object of the invention is to provide in a machine of this kind means for taking out the curl in the roll stock before it is severed into sheets.

It is well known that paper, card-board and other materials which are wound up in single lengths into the form of rolls become set in a short time and take a curved form, the set of the material being particularly marked when the material has been rolled up for a considerable length of time. Much difficulty has been experienced with roll stock when cut into sheets owing to the fact that the material retains this curvature and is usually delivered as cut sheets curled more or less and correspondingly difficult to handle.

The present invention is based upon the fact that the curvature of a sheet of paper or other material that has been rolled up can be most readily taken out by bending or rolling it in a direction opposite to that in which it was rolled originally, and the present improved sheet-cutting machine is provided with means for performing a substantially similar operation on a web passing off from a roll. The preferred means employed for the purpose is a straight-edge in contact with a roll and so located as to make with the roll and with the web passing off from the roll such angles as will assure the taking out of the curl in the paper, and the consequent straightening of the same, so that the sheets when severed from the web will lie flat. In connection with a device for taking out the curl from such roll-stock means are also preferably provided for adjusting the position thereof so that it may be readily adapted for different kinds of stock, and also means for maintaining the device in contact with the roll as the diameter of said roll decreases.

In the drawings—Figure 1 is a side ele-

vation of a sheet-cutting machine embodying a device suitable for taking out the curl in roll-stock as it passes off from a roll, and illustrates the parts in one position, with a full roll. Fig. 2 is a similar view showing the parts in another position and cooperating with a roll that has been almost completely unwound. Fig. 3 is a view similar to that of Figs. 1 and 2 showing a slightly modified embodiment of the invention. Fig. 4 is a partial plan view of the machine shown in Fig. 3.

Similar characters designate like parts in all the figures of the drawing.

The present invention may be embodied in any usual or suitable type of sheet-cutting machine. The drawings illustrate a well-known machine of this class having the usual framework, designated generally by 2, from opposite ends of which project extended frames of brackets 3 and 4, the extension 3 serving to support a roll-holder 5, preferably adjustable, while the extension 4 supports suitable conveying means, such as the endless belt 6, for receiving and carrying off sheets cut from a continuous web passing off from a roll, such as 7, carried by said roll-holder. The web delivered from this roll is indicated at 8 and passes through suitable feeding and cutting mechanism, also of well-known construction, for severing the web into sheets of the desired length. All of the operating mechanism may be driven, as usual, from a main shaft 9, from which by suitable gearing, the pitch-lines of which are indicated, a rotary cutter 10 is illustrated as actuated, and also a pair of feed-rolls 11 and 12. The conveyer 6 is illustrated as driven directly from the shaft 9. In one type of sheet-cutting machines of this class it is customary to provide change-gears for determining the length of the sheet to be cut from the web that is unwound from the roll, and such change-gearing is illustrated in the drawings. Fixed gears, such as 13 and 14, may be used on the driven shafts of the cutter and the main feed-roll, these shafts being indicated at 15 and 16. The change-gearing for operating the gears 13 and 14 may be carried by an adjustable swinging frame, such as 17, also of well-known construction, which may be set in suitable position to bring any desired set of gears, such as the gearing designated generally by 18, into

operative relation with the driven gears of the cutter and the feed-rolls.

The line of travel of the paper as it passes off from the roll 7 is clearly indicated in the drawings. It is drawn off from the roll by the feed-rolls and passes thence over a fixed cutter 19 coöperative with the rotary cutter 10, the web being severed at the edge of the fixed cutter 19 in the usual manner and falling onto the conveyer 6, by which it is carried to a suitable receiver or bank (not shown).

At some suitable point after it leaves the roll the web of paper is subjected to the action of means for taking out the curl in the web due to keeping the paper in roll form for a considerable period of time. This device will preferably operate at a point between the roll of stock and the feed-rolls, and it has been found that the desired result can be accomplished by simply passing the web over a straight-edge properly located and positioned at such an angle as may be necessary for the particular material that is to be cut and straightened. The straight-edge is usually brought into contact with the roll of stock and the line of departure of the paper from the roll and from the straight-edge is at such an angle opposite to the angle of set, as will remove the set of the fibers and restore them and the paper itself to their natural straight condition. The device shown in Figs. 1 and 2 of the drawings for taking out the curl of the material is illustrated as embodying as its main element a straight-edge 20 over which the paper passes and which is in contact with the outer side of the web passing off from the periphery of the roll. At its outer side the web of paper is bent over this straight-edge at a considerable angle, the angle being sufficient in all cases to overcome the curvature or set of the material. This angle will of course vary with different materials, and the means employed for taking out the curl of the material operated upon should therefore be adjustable for different kinds of materials. Here the straight-edge 20 is carried by an arm 21 and is pivoted at 22, the pivot being adjustable in a slot 23 in the extension 3 of the framework. For the purpose of shifting the straight-edge and its carrier-arm 21, suitable means, such as the angular hand-lever 24, may be provided. A clamp-nut 25 or any other suitable means may be employed for holding the straight-edge and the arm 21 in any desired adjusted position.

In addition to providing for the adjustment of the device 20 to different positions corresponding to the different kinds of materials to be straightened, means should also be provided for maintaining the straight-edge, or other element used for the purpose of taking out the curl, in operative relation

with the roll 7 as the diameter of the same decreases, so as to assure the web being drawn over said straight-edge under proper tension to remove the curl therefrom. A power device will preferably be employed for automatically keeping the straight-edge up to the work as the diameter of the roll is reduced. For this purpose a weight is illustrated at 26, said weight being shown as carried by the long arm of an angle-lever 27 pivoted on the main framework 2, the short arm of the angle-lever being pivotally connected with the carrier-arm 21 of the straight-edge 20, as by a link 28. It will be clear that in descending from the position shown a substantially constant pressure will be exerted on the straight-edge to maintain it in contact with the periphery of the roll 7 as it gradually approaches the center of the roll.

By means of the construction just described not only can any desired angular position of the straight-edge, within limits, be obtained to correspond to the stiffness, weight, etc. of the material to be straightened out, but the angle made by the straight-edge between the periphery of the roll and the web passing off therefrom may also be maintained practically constant from the beginning to the end of the unwinding of any given roll. It has been found in practice that by means of these devices adjustments may be obtained which permit of the straightening of a great many varieties and weights of material put up in roll form and requiring to be cut into flat sheets.

Referring now to Figs. 3 and 4 of the drawings, illustrating a slightly different embodiment of the invention, the straight-edge 20, instead of being supported for contact with the stock roll 7, is shown as being located at a point distant from said stock roll, and an additional or second pair of rolls 30, 31, are shown as being mounted on the machine at a point between said straight-edge and stock roll for engaging the web 8 and coöperating with the feed rolls in causing said web to feed over the straight-edge under proper tension to remove the curl. In this case the straight-edge is shown as being vertically adjustable between the oppositely located pairs of rolls in order to cause the web in passing thereover to assume any desired angle opposite to the angle of set, according to the different kinds of material to be straightened. Such adjustment of the straight-edge is provided for in the present case by supporting the straight-edge at each end on a slidably mounted block 32 which is vertically adjustable by an engaging screw 33.

The tension of the web in passing over the straight-edge between the two pairs of rolls should also preferably be capable of adjustment, and this is provided for in the

present case by attaching a friction disk 34 on the shaft 35 of the tension roll 30 and causing it to yieldingly bear with more or less pressure against a cooperating stationary friction disk 36 on the frame of the machine by means of a spring 37 and adjusting nut 38, as clearly shown in Fig. 4.

While I have shown and described different embodiments of my invention, I do not wish to be understood as confining myself to the details of construction which I have disclosed, for it is obvious that considerable latitude within the skill of a mechanician may be indulged in without departing from the principles of my invention, and as all such obvious changes are within the purview of my invention, I do not limit myself to anything shown and described except so far as I am limited by the prior art to which the invention belongs. Furthermore, while I have shown and described my invention as applied to a sheet cutting machine, I do not wish to be understood as limiting myself to such application of the invention, as it is obvious that it may be equally applicable to, or for use in connection with, other machines using roll stock from which it may be desired to remove the curl.

The term "straight-edge" as used throughout the description and in the following claims is intended to cover any device or element, whether stationary or movable, having a straight line surface of any suitable area, and adapted to perform the function of the so-called "straight edge" herein shown and described.

What I claim is:

1. In a sheet cutting machine, the combination with a roll holder, of feeding means for drawing off a continuous web from a roll on said roll holder, means for cutting said web into sheets, and means engaging against the outer side of said web and deflecting the same out of line with the normal path of the web at one point for taking out the curl in said web before it is severed into sheets.

2. In a sheet cutting machine, the combination with a roll holder, of feeding means for drawing off a continuous web from a roll on said roll holder, means for cutting said web into sheets, means between the roll holder and said feeding means engaging the outer face of the web and holding it out of line with respect to its path between the roll holder and the feeding means for taking out the curl in said web, said means being adjustable whereby to accommodate webs varying in thickness and to insure the taking out of the curl of the same.

3. In a sheet-cutting machine, the combination with a roll-holder, of feeding means for drawing off a continuous web from a roll on said roll-holder, means for cutting said web into sheets, a device for taking out the

curl in said web before it is severed into sheets, and means for maintaining said device in contact with a roll on said roll-holder.

4. In a sheet-cutting machine, the combination with a roll-holder, of feeding means for drawing off a continuous web from a roll on said roll-holder, means for cutting said web into sheets, and a straight-edge in position to engage the outer side of the web passing off from a roll on said roll-holder and form therewith an angle sufficient to take out the curl in said web before it is severed into sheets.

5. In a sheet-cutting machine, the combination with a roll-holder, of feeding means for drawing off a continuous web from a roll on said roll-holder, means for cutting said web into sheets, and a straight-edge in position to engage the periphery of a roll on the roll-holder and form with the web passing off from said roll an angle sufficient to take out the curl in said web before it is severed into sheets.

6. In a sheet cutting machine, the combination with a roll holder, of feeding means for drawing off a continuous web from a roll on said roll holder, means for cutting said web into sheets, a device engaging the outer face of said web and deflecting it out of line relative to the normal path of the web to take the curl out of the same, and means for adjusting said device relative to the degree of curl of the web.

7. In a sheet-cutting machine, the combination with a roll-holder, of feeding means for drawing off a continuous web from a roll on said roll-holder, means for cutting said web into sheets, a straight-edge in position to engage the outer side of the web passing off from a roll on said roll-holder and form therewith an angle sufficient to take out the curl in said web before it is severed into sheets, and means for maintaining said straight-edge in contact with said roll as the diameter of the roll decreases.

8. In a sheet-cutting machine, the combination with a roll-holder, of feeding means for drawing off a continuous web from a roll on said roll-holder, means for cutting said web into sheets, a straight-edge in position to engage the outer side of the web passing off from a roll on said roll-holder and form therewith an angle sufficient to take out the curl in said web before it is severed into sheets, and means for maintaining said straight-edge in contact, and at substantially the same angle, with said roll as the diameter of the roll decreases.

9. In a sheet-cutting machine, the combination with a roll-holder, of feeding means for drawing off a continuous web from a roll on said roll-holder, means for cutting said web into sheets, a straight-edge in position to engage the outer side of the web passing

off from a roll on said roll-holder and form therewith an angle sufficient to take out the curl in said web before it is severed into sheets, and power means for maintaining
 5 said straight-edge in contact with said roll as the diameter of the roll decreases.

10. In a sheet-cutting machine, the combination with a roll-holder, of feeding means for drawing off a continuous web from a
 10 roll on said roll-holder, means for cutting said web into sheets, a pivoted device for taking out the curl in said web before it is severed into sheets, and means for maintaining said device in contact with a roll on said
 15 roll-holder.

11. In a sheet-cutting machine, the combination with a roll-holder, of feeding means for drawing off a continuous web from a roll on said roll-holder, means for cutting
 20 said web into sheets, a pivoted device for taking out the curl in said web before it is severed into sheets, and power means for gradually turning said device on its pivot to maintain it in contact with said roll as the
 25 diameter of the roll decreases.

12. In a sheet-cutting machine, the combination with a roll-holder, of feeding means for drawing off a continuous web from a roll on said roll-holder, means for cutting
 30 said web into sheets, a straight-edge in position to engage the outer side of the web passing off from a roll on said roll-holder and form therewith an angle sufficient to take out the curl in said web before it is
 35 severed into sheets, and means for adjusting said straight-edge to change said angle.

13. In a sheet cutting machine, the combination with a roll holder, of feeding means for drawing off a continuous web from a
 40 roll on said roll holder, means for cutting said web into sheets, and an adjustable device engaging at one point against the outer face of said web and deflecting the latter sufficiently out of line from the normal path
 45 of the web to take out the curl in said web.

14. In a sheet-cutting machine, the combination with a roll-holder, of feeding means for drawing off a continuous web from a roll on said roll-holder, means for cutting

said web into sheets, means for engaging
 50 said web before it is severed into sheets and bending it solely in a direction opposite its direction of curl in the roll, and means for adjusting the position of said web-engaging means, for the purpose set forth. 55

15. In a sheet cutting machine, the combination with a roll holder, of feeding means for drawing off a continuous web from a roll on said roll holder, means for cutting said web into sheets, and a single edged device
 60 engaging the outer face of the web and deflecting the same from its normal path sufficiently for taking out the curl in the web.

16. In a sheet-cutting machine, the combination with a roll-holder, of feeding means
 65 for drawing off a continuous web from a roll on said roll-holder, means for cutting said web into sheets, means for engaging said web before it is severed into sheets and bending it solely in a direction opposite its
 70 direction of curl in the roll, and means for adjusting the tension of the web in its engagement with said web-engaging means, for the purpose set forth.

17. In combination, a roll-holder, feeding
 75 means for drawing off a continuous web from a roll on said roll-holder, means engaging said web and bending it solely in a direction opposite its direction of curl in the roll, and means for adjusting the position of said web-engaging means, for the
 80 purpose set forth.

18. In combination, a roll-holder, feeding means for drawing off a continuous web from a roll on said roll-holder, means for
 85 engaging said web and bending it solely in a direction opposite its direction of curl in the roll, and means for adjusting the tension of the web in its engagement with said web-engaging means, for the purpose set forth. 90

Signed at Rochester, in the county of Monroe, and State of New York, this 12th day of December, A. D. 1908.

HENRY DE SMITH.

Witnesses:

DENNIS CHURCH,
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