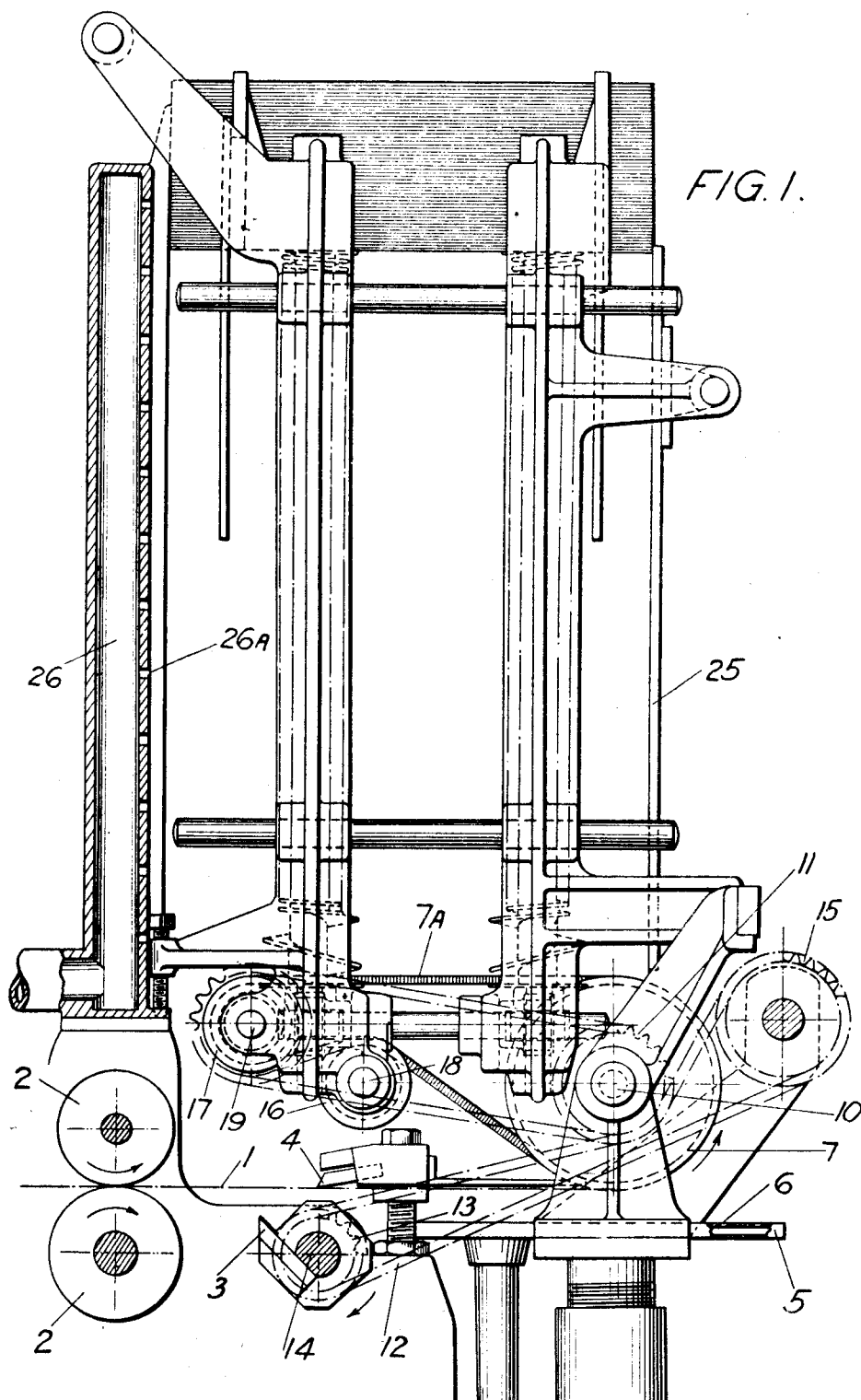


Jan. 17, 1928.

1,656,285

W. E. MOLINS
SHEET DELIVERING APPARATUS FOR USE WITH PRINTING, CUTTING,
AND THE LIKE MACHINES
Filed Jan. 22, 1926

5 Sheets-Sheet 1



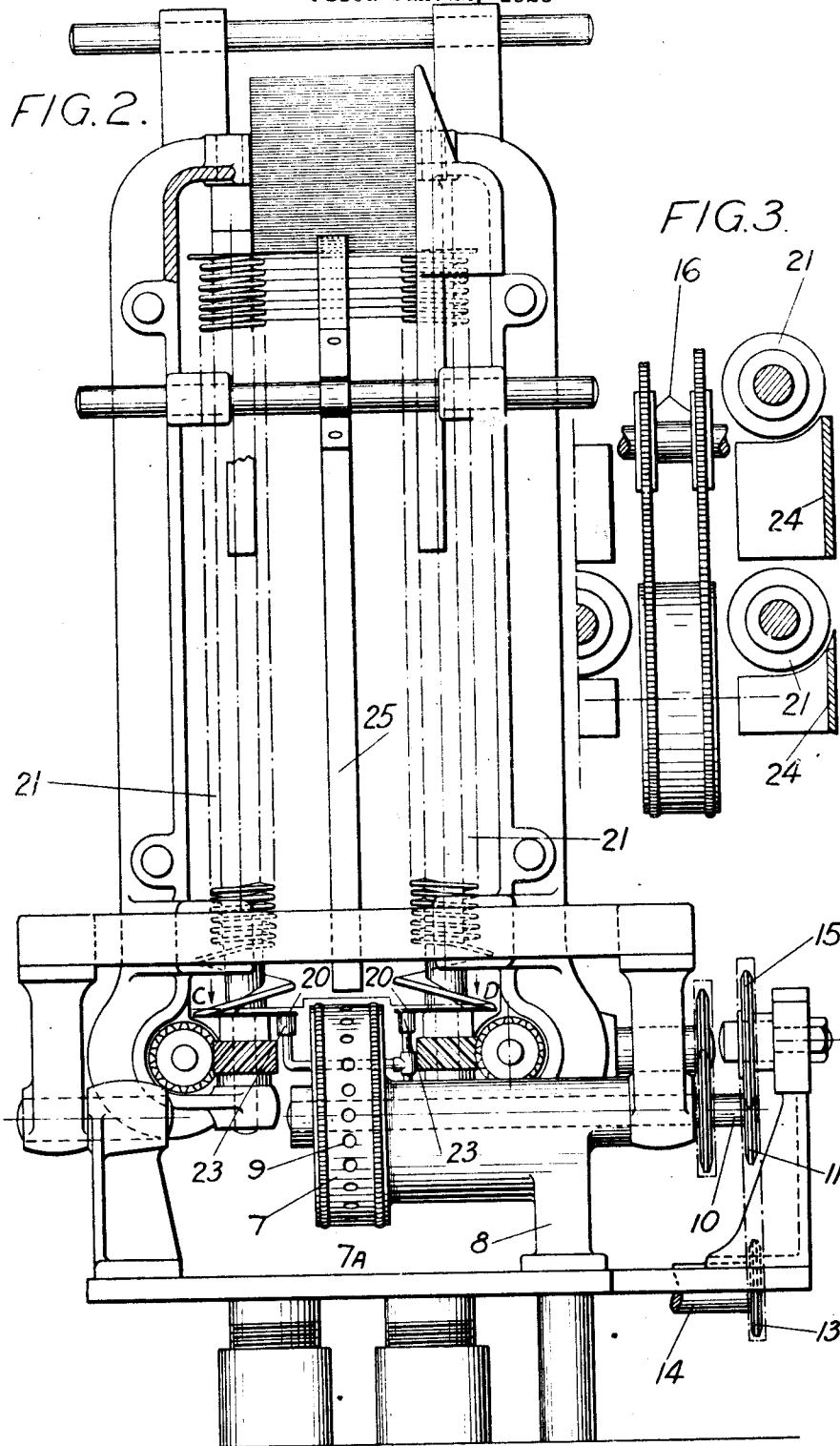
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5 Sheets-Sheet 2



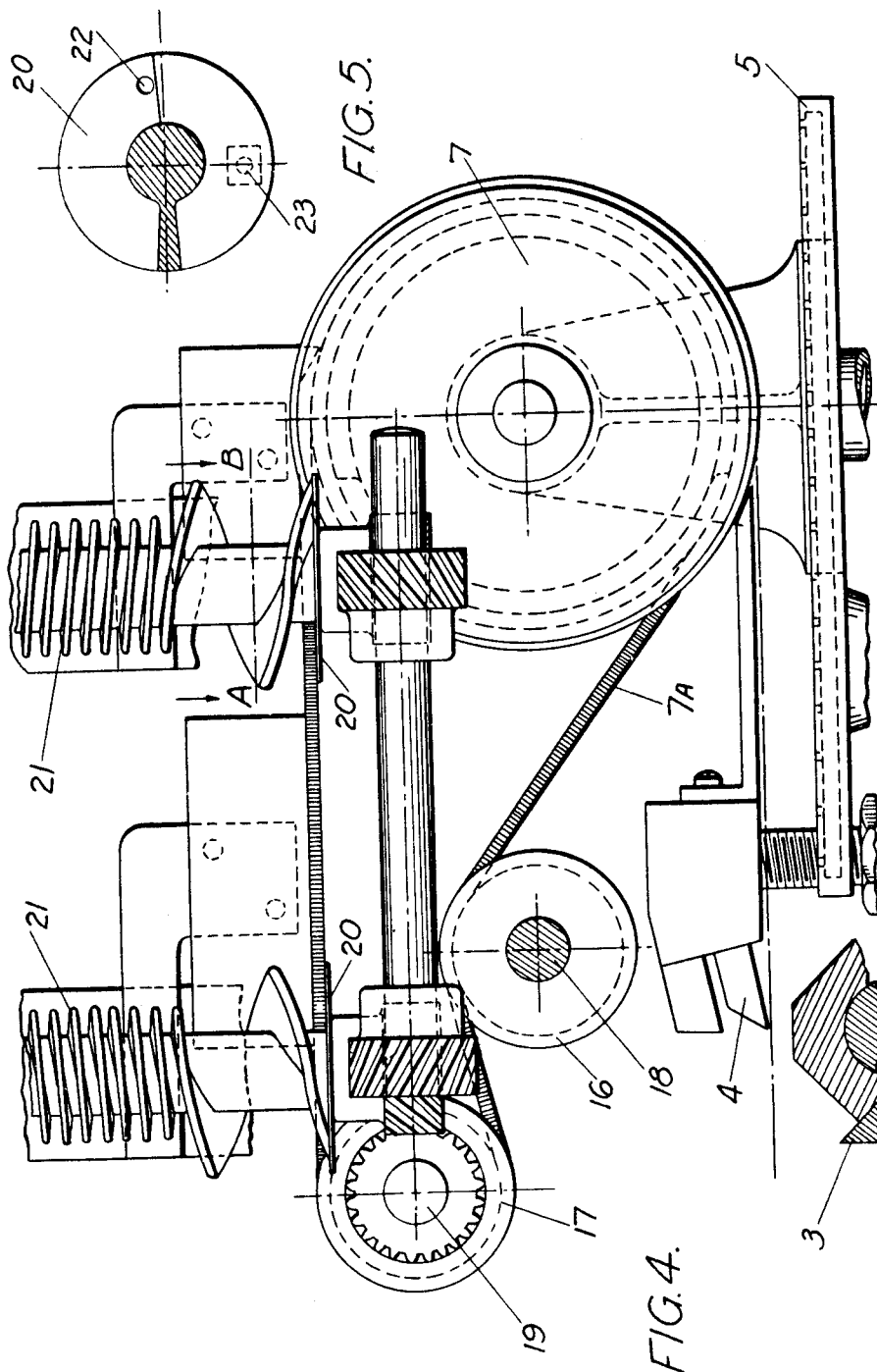
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5 Sheets-Sheet 3



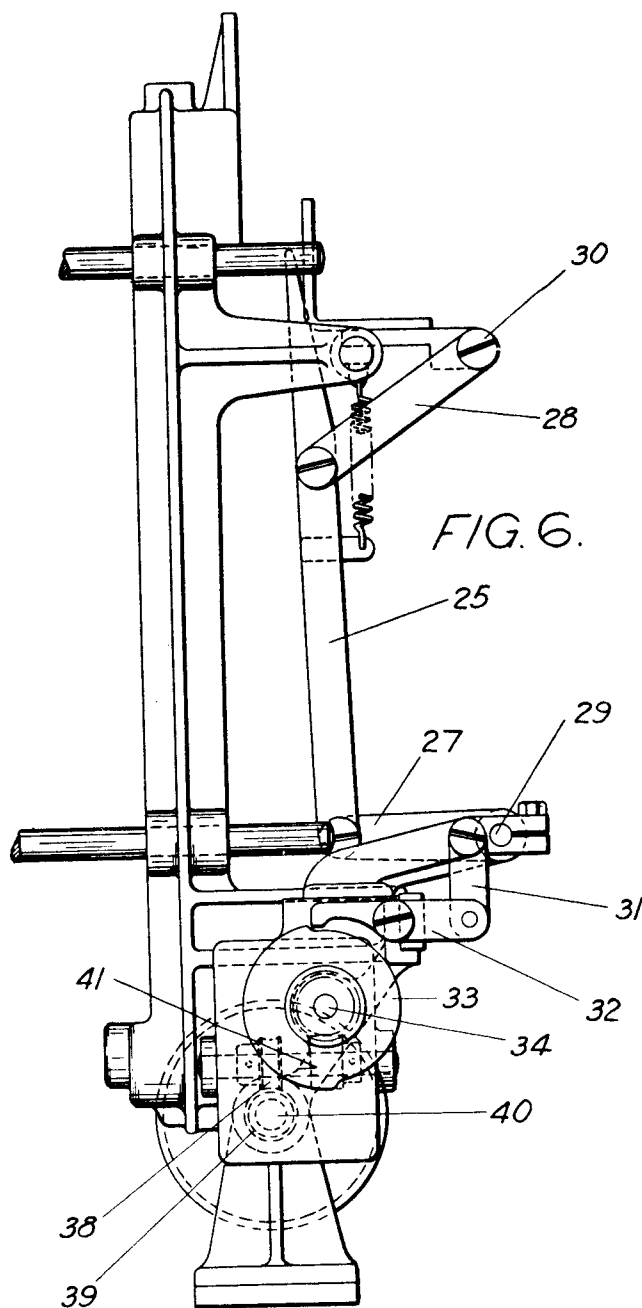
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5 Sheets-Sheet 4



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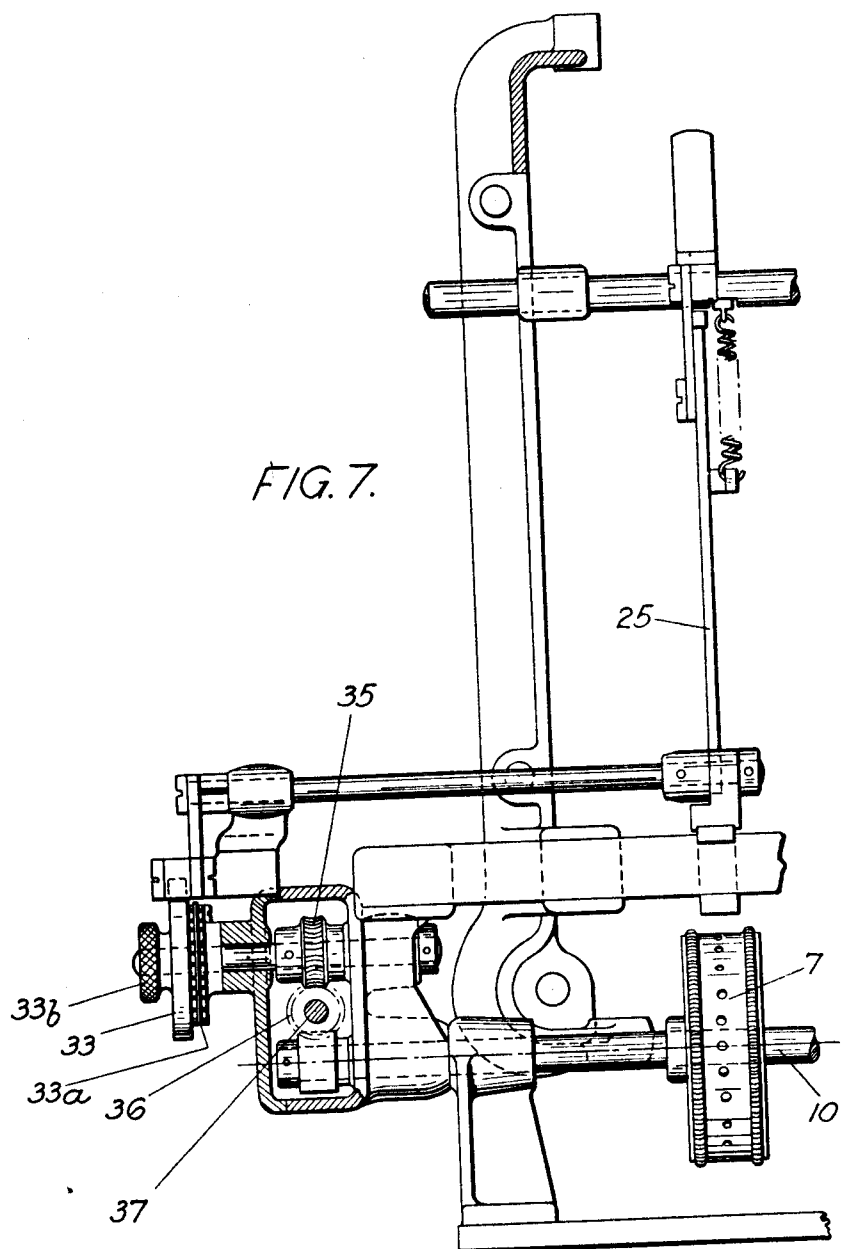
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Filed Jan. 22, 1926 5 Sheets-

5 Sheets-Sheet 5

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UNITED STATES PATENT OFFICE.

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SHEET-DELIVERING APPARATUS FOR USE WITH PRINTING, CUTTING, AND THE LIKE MACHINES.

Application filed January 22, 1926, Serial No. 83,091, and in Great Britain February 25, 1925.

This invention is for improvements in or relating to a method and means for forming strips of paper or the like into a stack or stacks and more particularly to a method and means for severing a paper or like web into lengths and thereafter forming the successive strips into a stack or stacks.

The object of the present invention is to provide a method and means whereby strips of paper may be stacked in a simple and efficient manner, the successive strips being preferably placed one under the other in rapid succession.

The present invention consists of a method of forming strips of paper or the like into a stack or stacks which comprises:—

- (a) Feeding the strips in line, with successive strips spaced apart or otherwise;
- (b) Moving successive strips out of line and into parallel relationship, and
- (c) Advancing the successive parallel strips into surface contact with each other.

Further the present invention consists of a method of severing a paper or like web into lengths and thereafter forming the successive strips into a stack or stacks which comprises:—

- (a) Severing a web of paper or the like into strips;
- (b) Moving the successive strips out of line and into parallel relationship, and
- (c) Advancing the successive parallel strips into surface contact with each other.

Again the present invention consists of strips of paper or the like when stacked by the method set forth in either of the two preceding paragraphs.

Further the present invention consists of a device for stacking strips of paper or the like which comprises means adapted to deliver the strips in line and means adapted to move the successive strips out of line and into parallel relationship and advance the successive parallel strips into surface contact with each other.

Again the present invention consists of a device for severing a web of paper or the like into lengths and thereafter stacking the successive strips, which comprises means for severing a web of paper or the like into strips, means adapted to move the successive strips out of line and into parallel relationship and advance the successive parallel

strips into surface contact with each other.

This invention is more particularly described with reference to the accompanying drawings, in which:—

Fig. 1 illustrates a side elevation of a device constructed according to the present invention;

Fig. 2 is a side elevation of Fig. 1;

Fig. 3 is a part sectional plan view of Fig. 2 on the line C—D.

Fig. 4 is an enlarged detailed view of the mechanism employed for moving the strips out of line and into parallel relationship;

Fig. 5 is a sectional plan view on the line A—B of Fig. 4;

Fig. 6 is a modification of the device illustrated in Figs. 1 and 2; and

Fig. 7 is a side elevation of Fig. 6.

The device which constitutes the subject matter of the present invention will be hereinafter described with reference to an intaglio printing device wherein a travelling web of paper, subjected to a multi-colour printing operation, is severed into strips or labels which are formed into a stack or stacks.

Referring to the drawings, a travelling web 1 which has been subjected to a multi-colour intaglio printing operation is fed by means of a pair of rollers 2, to a cutting mechanism which comprises a rotary cutting blade 3 and a fixed cutting blade 4. The cutting mechanism is preferably constructed in the manner described in my co-pending British patent application No. 25,810 of 15th October, 1925, and No. 29,880 of 26th November, 1925.

The web 1, as it passes between the rotary blade 3 and the fixed blade 4, passes above a bed 5 which is preferably constructed in the form of a hollow chamber adapted to receive air under pressure and emit the same through apertures 6 so as to form a cushion support for the web in its forward movement and prevent the printed surface of the web from coming into contact with the bed of the machine, and further it assists in drying the ink upon the web.

Mounted so as to rotate above the bed 5 is a suction drum 7, which is connected through the conduit 8 to a centrifugal pump which is adapted to draw air through the aperture 9 formed in the periphery of the drum.

When the leading edge of the web approaches the suction drum 7 it is drawn by suction into contact with the periphery thereof and is assisted forwardly by the rotation of the drum.

The drum 7 is carried upon a spindle 10, which carries a sprocket wheel 11 adapted to engage with a chain 12 which engages with a sprocket wheel 13 mounted on the spindle 14 which carries the rotary cutter 3.

The spindle 14 is driven from the main drive of the machine and the chain 12 passes round the idler 15 for the purpose of reversing the direction of rotation of the drum 7 relatively to the spindle 14. The sprocket wheel 11 is adapted to drive the drum 7 at a peripheral speed greater than the speed of the travelling web 1 such that when the leading edge of the web is gripped by suction upon the drum 7 that portion of the web located between the feed rollers 2 and the drum 7 is maintained in tension, thus ensuring that the web 1 is only severed into strips whilst the portion of the web between the feed rollers 2 and the drum 7 is held taut.

Adapted to engage with grooves formed in the periphery of the drum 7 are belts 7^a. The belts are adapted to engage with pulleys 16 and 17 mounted on spindles 18 and 19 carried in such a manner that one portion of each belt is always supported in a horizontal direction. Thus when a strip is severed from the web 1, the drum 7 carries the same at a higher speed than the oncoming leading edge of the severed web, thus separating the strip from the web and carrying the same through a half rotation so as to reverse the same, whereupon the strip is removed from the drum and carried upon the belts 7^a into a horizontal position. In this horizontal position the web engages with discs 20 formed in the lower end of four spirals 21. The discs 20 are provided with apertures 22 which are adapted to register periodically with the suction pipes 23 which draw the strip down and ensures that each strip is brought into engagement with the discs 20 and is arrested against any further longitudinal movement.

The lower ends of the spirals 21 are formed of a coarser pitch than the upper portion and each severed strip, when drawn into engagement with the discs 20, is engaged by the lower end of the spirals 21 and supported at four points around its edge as it is elevated quickly in a horizontal position by means of the said spirals.

After the strip has been initially raised from the discs 20 it is carried by the upper portion and gradually raised to the top of the said spirals. The strips, which are supported round their edges by the said spirals, have their leading edges prevented from dropping below the level of the discs 20 by

flanges 24 which are mounted flush with the discs 20.

The ends of the strips which, as the strips are being elevated, are located above the drum 7, are adapted to engage with a guide member 25 and located adjacent to the other ends of the strips is a tubular element 26 adapted to receive air under pressure and emit the same through orifices 26^a.

The tubular element 26 with the air jets emitted therefrom, tends to move the successive strips which are supported upon the spirals 21 against the guide member 25 and also assists the strips in the upward travel, at the same time subjecting the strips to a further drying operation.

Thus it will be seen that as the successive strips are cut from a travelling web they are moved by the suction drum into engagement with the spiral feeds 21, which move the successive strips in parallel relationship and advance them to the top of the said spirals where they are placed one under the other and formed into a stack.

Referring to the Figures 6 and 7, the guide member 25 mounted above the drum 7 is adapted to be moved towards and away from the tubular element 26 mounted directly opposite. The movable guide member 25 is carried by two links 27 and 28, which are pivoted about spindles 29 and 30 carried by the machine. The pivotal link 27 is secured at a point along its length to a pivotal link 31, which is connected at its free end to a pivotal link 32, the free end of which is adapted to engage with a cam 33 connected to a spindle 34 through the medium of a ratchet and pawl 33^a which permits the cam to be moved backwards by the knob 33^b. This enables the cam to be moved to zero whilst the machine is running. The spindle 34 is driven by a worm wheel 35 which engages with a worm 36 formed upon the spindle 37. The spindle 37 is driven by a worm wheel 38 which engages with a worm 39 formed upon a spindle 40, which is driven from the main drive of the machine.

The double worm connection between the cam 33 and the spindle 40 which is connected with the main drive constitutes a reduction of 500 to 1.

The cam 33 is divided into two sections such that in each complete revolution the cam moves the guide member 25 towards and away from the tubular element 26.

As the reduction in the drive is 500 to 1 it will be observed that the guide member 25 is moved forwardly and backwardly for every 250 strips which are fed to the spiral feed.

Thus it will be seen that with the arrangement hereinbefore described, the stack formed at the head of the spiral feeds is divided into batches of 250 strips each. It

will be appreciated that the drive between the cam and the main drive of the machine may be constructed to separate the strips in batches of any desired number.

5 The spiral feed and the driving mechanism therefor, are preferably constructed in a manner similar to that indicated in the accompanying drawings wherein the framework which supports the spirals and their
10 drive is pivotally secured to the bed of the machine by a yoke 41 pivotally mounted on the spindle 10 upon which the suction drum 7 rotates. This feature permits the stacker to be swung into a horizontal position so as
15 to facilitate the free manipulation of the cutting mechanism.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A method of severing a moving web
20 into lengths and thereafter forming the successive strips into a stack which comprises, severing a moving web into strips, moving the traveling severed strips out of line and into parallel relationship, and advancing the
25 successive parallel strips into surface contact with each other.

2. A method of severing a traveling web into lengths and thereafter forming the successive strips into a stack which comprises,
30 severing a traveling web into strips, moving the successive strips out of line and into parallel relationship, supporting the successive parallel strips at points around their edges, and advancing the strips so supported
35 into surface contact with each other.

3. A method of severing a web into lengths and thereafter forming the successive strips into a stack which comprises, feeding the web continuously, separating the
40 web into strips without interfering with the continuous feeding thereof, separating the successive strips from each other and thereafter moving them into parallel relationship, supporting the successive parallel strips at
45 points around their edges, and advancing the strips so supported into surface contact with one another.

4. A method of forming strips into a stack which comprises, feeding the strips in line, moving the successive strips out of line and
50 into parallel relationship, arranging the strips while in parallel relationship into batches, each comprising a definite number of strips, and advancing the successive strips
55 into surface contact with each other.

5. A method of severing a traveling web into lengths and thereafter forming the successive strips into a stack, which comprises, severing the traveling web into strips, holding
60 the web taut as each strip is severed therefrom, moving the traveling severed strips out of line and into parallel relationship, and advancing the successive parallel strips into surface contact with each other.

6. A method of severing a web into

lengths and thereafter forming the successive strips into a stack which comprises, feeding the web continuously, severing the web into strips without interfering with the continuous feeding of the same, and at the
70 same time holding the web taut during the cutting operation, simultaneously separating and reversing the successive strips and thereafter moving them into parallel relationship, supporting the successive parallel strips at
75 points around their edges, and advancing the strips so supported into surface contact with each other.

7. A method of forming strips into a stack which comprises, feeding the strips in line, moving the successive strips out of line and into parallel relationship, advancing the successive strips into surface contact with each other, and subjecting the strips to an air draught while they are being advanced into
85 surface contact with one another.

8. A device for stacking strips which comprises, means for delivering the strips in line, means for spacing the successive strips from one another and means adapted to receive the separated strips and thereafter move them in parallel relationship into surface contact with each other.

9. A device for stacking strips, which comprises, means for delivering the strips in line, means including a suction drum for spacing the successive strips from one another, and means adapted to receive the separated strips and thereafter move them in parallel relationship into surface contact
100 with each other.

10. A device for stacking strips which comprises, means for delivering the strips in line, a suction drum adapted to grip the successive strips and separate them from one another, and means adapted to receive the separated strips, support them around their edges and advance them in parallel relationship into surface contact with one another.

11. A device for separating a web into lengths and thereafter forming the successive strips into a stack, which comprises means for separating a web into strips, means adapted to move the successive strips into parallel relationship and simultaneously advance the successive strips into surface contact with each other.

12. A device for separating a web into lengths and thereafter forming the successive strips into a stack, which comprises, means for feeding the web continuously, means adapted to sever the web without interfering with the continuous feeding thereof, means adapted to separate the successive strips from one another and means adapted to receive the separated strips and move them in parallel relationship into surface contact with each other.

13. A device for severing a web into lengths and thereafter forming the successive

sive strips into a stack, comprising a pair of rollers for feeding the web continuously, a rotary cutter adapted to sever the web without interfering with the continuous feed thereof, a rotatable suction drum adapted to separate the successive strips from one another and a rotatable spiral feed adapted to receive the separated strips and move them in parallel relationship into surface contact with each other.

14. A device for severing a traveling web into lengths, and thereafter forming the successive strips into a stack, comprising, a pair of rotatable rollers adapted to feed the web continuously, a fixed cutting blade having the edge arranged in line with the tangential plane common to the said rollers, a rotary blade adapted to engage with said fixed blade to sever the web into strips, a rotatable suction drum adapted to receive the severed strips and separate them from one another and a spiral feed adapted to receive the separated strips and move them in parallel relationship into contact with one another.

15. A device for stacking strips, comprising means adapted to deliver strips in line, means for moving the successive strips into parallel relationship, said means further operating to advance the successive parallel strips into surface contact with each other, and means operating on the strips while in separated parallel relationship for automatically arranging the stacked strips in batches of a predetermined number of strips.

16. A device for severing a web into lengths and thereafter forming the successive strips into a stack, comprising a cutter for severing the web into strips, without interfering with the continuous feed thereof, and adapted to separate the successive strips from one another, a stacking device including a suction drum receiving the strips and a device disposed between the cutter and the suction drum for supplying an air cushion for the traveling web and strips.

17. A device for severing a web into lengths and thereafter forming the successive strips into a stack, comprising a cutter for severing the web into strips, without interfering with the continuous feed thereof, a rotatable suction drum for holding the web taut during the cutting operation and adapted to separate the successive strips from one another, means receiving the sheets from the drum for forming a stack thereof, and a device disposed between the cutter and

the suction drum for supplying an air cushion for the traveling web and strips.

18. A device for severing a web into lengths and thereafter forming the successive strips into a stack, comprising, a pair of rollers for feeding the web continuously, a rotary cutter adapted to sever the web without interfering with the continuous feed thereof, a rotatable suction drum adapted to cooperate with the feeding rollers for holding the web taut during the cutting operation and also adapted to separate the successive strips from one another, and further means for forming a stack thereof.

19. A device for stacking strips, comprising, means adapted to deliver the strips in line, means adapted to reverse the strips and simultaneously move them out of line into parallel relationship, and means for advancing the successive parallel strips into surface contact with each other.

20. A device for stacking strips, comprising means for delivering strips in line, means for feeding the successive strips into parallel relationship, means to advance the successive parallel strips into surface contact with each other, and a pneumatic device for subjecting the successive parallel strips to an air draught as the same are being advanced into contact with each other.

21. Strip stacking mechanism, comprising in combination, a device forming a pneumatic cushion adapted to receive strips as they are cut from the traveling web, means for simultaneously reversing and elevating the strips in succession, and further means, receiving said strips from said elevating and reversing means adapted to elevate said strips in parallel spaced relation and deliver the strips in a compact stack.

22. Strip stacking mechanism, comprising in combination, a device forming a pneumatic cushion adapted to receive strips as they are cut from the traveling web, means for simultaneously reversing and elevating the strips in succession, said means operating to position the strip above and parallel its position when severed from said web and further means, receiving said strips from said elevating and reversing means, adapted to elevate said strips in parallel spaced relation and deliver the strips in a compact stack.

In testimony whereof I hereunto affix my signature.

WALTER EVERETT MOLINS.