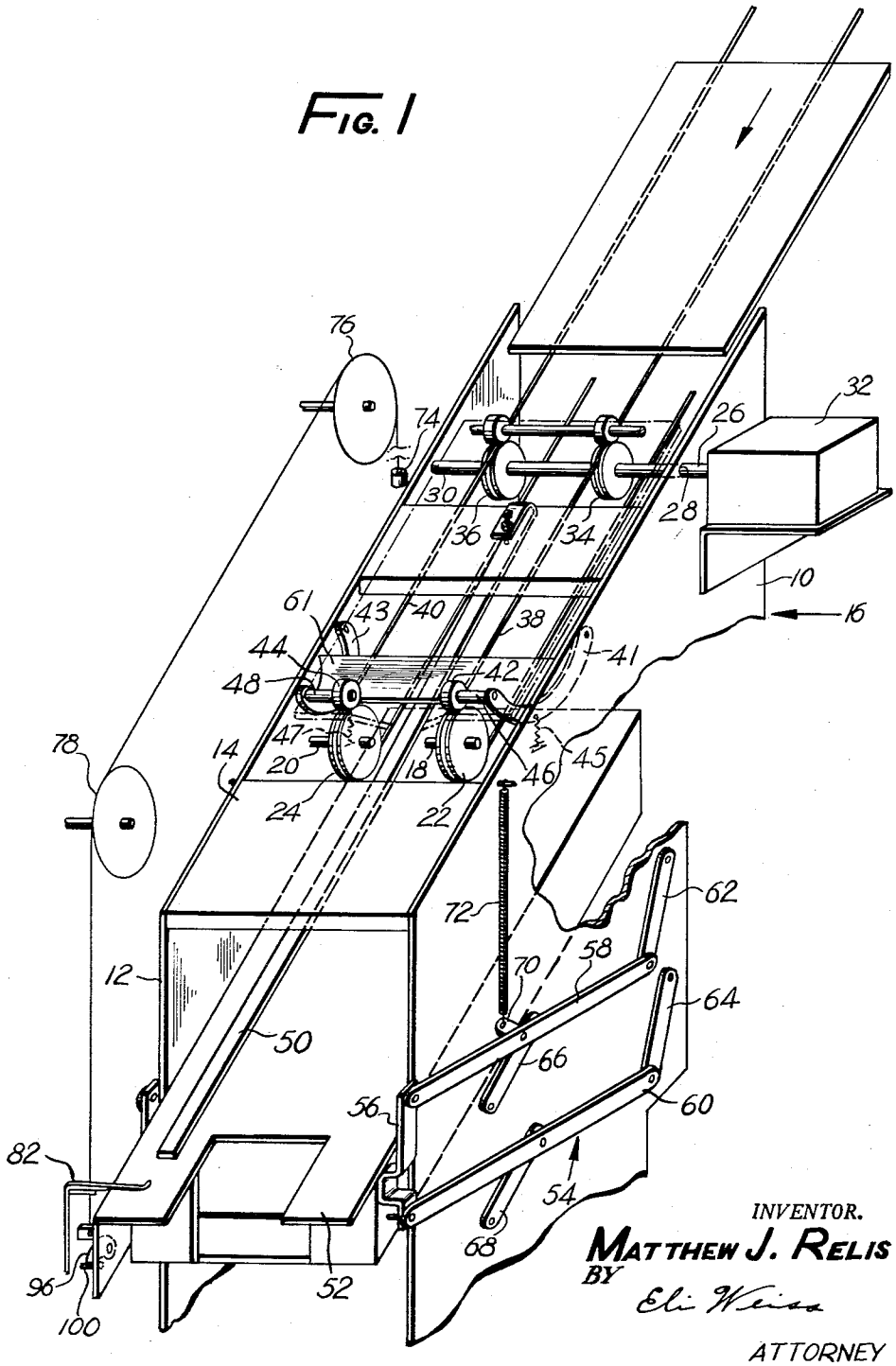
Aug. 1, 1961 M. J. RELIS 2,994,529

SHEET STACKING DEVICE

Filed April 18, 1957 3 Sheets-Sheet 1

FIG. 1



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SHEET STACKING DEVICE

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FIG. 3

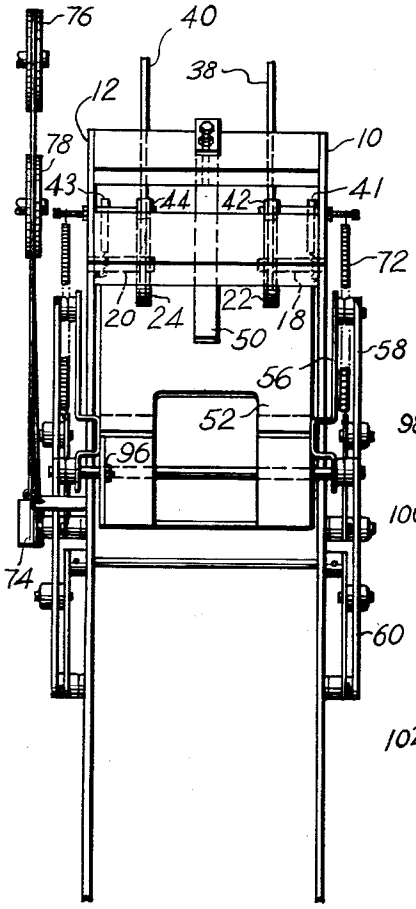
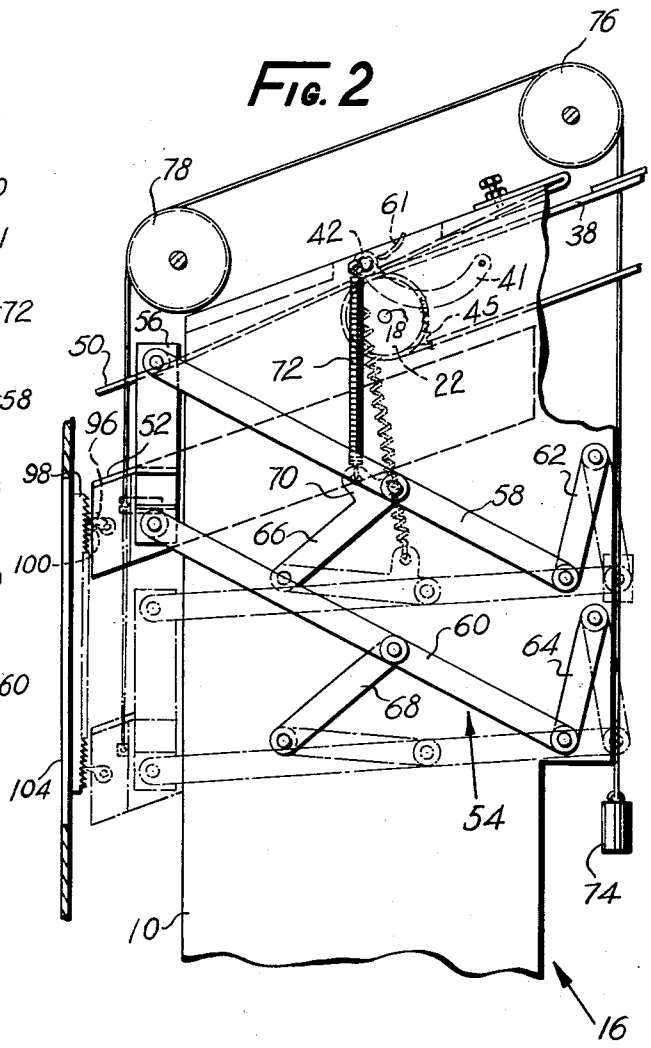


FIG. 2



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SHEET STACKING DEVICE

Filed April 18, 1957 3 Sheets-Sheet 3

FIG. 4

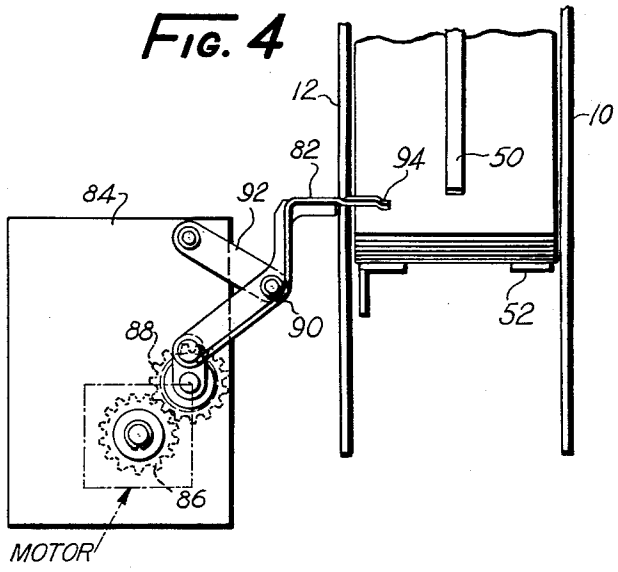


FIG. 6

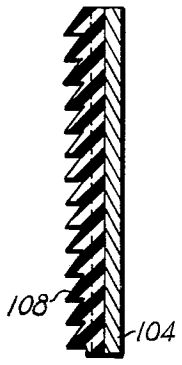
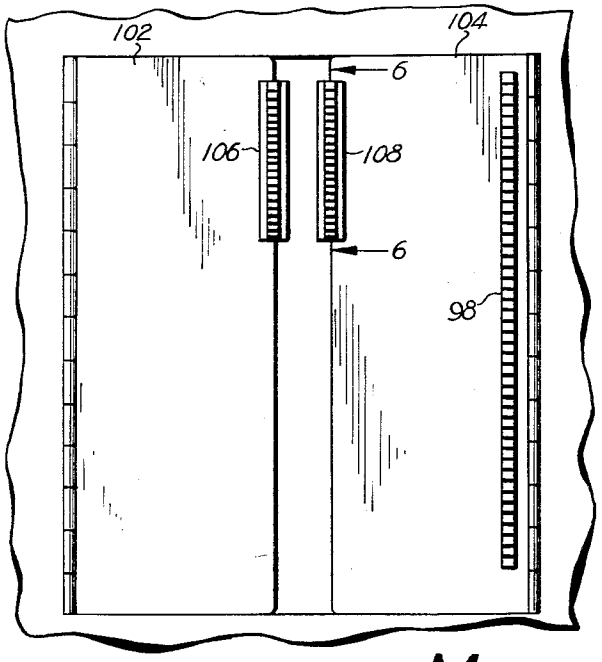


FIG. 5



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United States Patent Office 2,994,529 Patented Aug. 1, 1961

2,994,529

SHEET STACKING DEVICE

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11 Claims. (Cl. 271—68)

This invention relates generally to a sheet stacking device and more particularly to a device that first stiffens temporarily and then arranges sheets of thin paper into stack form.

In some document processing machines, the documents are first processed and then fed sequentially to a stacker where they are positioned one on top of another.

When an attempt is made to automatically stack a plurality of thin sheets of paper sequentially, one on top of another, numerous problems present themselves. For example, a thin sheet of paper lacks rigidity and, therefore is usually driven from the most forward edge. Any attempt to drive the thin sheet of paper from a position other than the most forward edge will generally result in the paper being bunched, bent or deformed. Unless supported along its entire length by an external member a thin sheet of paper tends to droop or sag as a result of its own weight. The free end or ends of a thin sheet of paper has a tendency to curl under or over the body of the sheet, thus making it difficult to transport and stack the sheets in a flat manner. When a stack is being formed by the addition of a number of sheets of thin paper fed one at a time to the top of the stack, the incoming sheet must be released from the feeding means at a point above the topmost sheet of the previously stacked sheets, and must then fall freely to the top of the stack. During this period of free fall, the incoming sheet can twist, sway back and forth, or start to tumble.

If the next appearing thin sheet of paper assumes a bent or curled shape, and/or twists, sways or tumbles during its period of free fall, then it is highly probable that it will not be in alignment with the preceeding sheets that form the stack. It is also possible that the sheet will alight on the topmost sheet of the stack in a curled condition with one of its ends folded under or over the body of the thin sheet of paper. If this condition occurs, the successful stacking of subsequent sheets will be disrupted and the sheets of paper might possibly be creased or mutilated.

Thus, it becomes obvious that each of the above mentioned problems must be completely eliminated if a plurality of thin sheets of paper are to be stacked sequentially, one on top of another.

It is a primary object of this invention to provide an improved device that can stack a plurality of thin sheets of paper sequentially.

It is another object of this invention to provide an improved sheet stacking device that temporarily stiffens a thin sheet of paper along its longitudinal axis while it is driven in that direction.

It is another object of this invention to provide an improved sheet stacking device that limits the free fall of each incoming sheet to a minimum distance.

It is an additional object of this invention to provide an improved sheet stacking device that prevents incoming sheets of thin paper from twisting, tumbling or folding prior to contacting the topmost sheet of a stack.

It is still another object of this invention to provide an improved sheet stacking device that stacks the incoming sheets in the order of transmission.

It is still another object of this invention to provide an improved sheet stacking device that is economical to produce and reliable in operation.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the apparatus becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is an isometric view of the invention showing in detail a movable tray that is supported by a parallel orienting mechanism and the structure for the preshaping of a thin sheet of paper as it enters the stacking device to give it rigidity along its longitudinal axis;

FIG. 2 is a side view of the invention showing two extreme positions of the tray, the vertically moving parallel orienting arms that support the tray, and a ratchet mechanism which maintains the tray in a selected position;

FIG. 3 is a front end view of the invention looking into the open area where the thin sheets of paper are assembled into a stack;

FIG. 4 is an enlarged view of the stack height adjusting arm and its associated linkages utilized to position the topmost sheet of the stack of sheets to a predetermined position;

FIG. 5 is a view of the back of two doors which cover the stack forming area and a ratchet gear and two bumpers which define a position for the incoming sheets; and

FIG. 6 is a side view of one of the bumpers of FIG. 5.

Briefly, two pairs of rollers are spaced apart and aligned one behind the other, each pair positioned to rotate about a common axis. Two parallel belts couple the aligned rollers of each pair of rollers to each other. The distance between the belts is less than the width of the sheets of paper that are being stacked, and the distance between each pair of rollers is less than the length of the sheets of paper being stacked. A strip spring traces a path which extends in the direction the paper sheets are fed by the parallel belts and slopes diagonally downwards between the parallel belts. It starts at a point above the upper surface of the belts and ends at a point below the lower surface of the belts. An idler wheel is located immediately above each of the rollers. The thin sheets of paper that are to be assembled to form a stack are fed, one at a time, longitudinally to the belts which are driven continuously by means of a motor coupled directly to one of the pairs of rollers. The parallel belts, in combination with the idler wheels drives the leading edge of the driven sheet into the underside of the strip spring to initiate a bow along the longitudinal axis of the sheet of paper. As the sheet of paper is driven further into the magazine it rides down the underside of the strip spring to preserve the bowed shape in the front of the sheet of paper and to shape the rest of the sheet to provide longitudinal stiffening along its entire length. In this manner each sheet can be driven continuously along its entire length without sagging, bending or folding. Immediately after the rear end of the sheet leaves the driving means it is carried forward along the underside of the strip spring by momentum until its forward edge strikes a stop position. The sheet then falls flat to alight on the topmost sheet of the stack being formed.

A tray positioned substantially parallel to and below the strip spring supports the stack that is being formed. A parallel arm linkage system allows the tray to move in a vertical direction parallel to the strip spring. A withdrawable arm positions the topmost sheet of the stack a predetermined ditsance below the strip spring to allow clearance for the next appearing incoming sheet. A pawl and ratchet mechanism maintains the top terminal sheet of the stack at the predetermined position determined by the withdrawable arm. In this manner the top terminal sheet is always parallel to and at a fixed distance below the spring strip.

Referring to FIG. 1, two side plates **10** and **12** and a top plate **14** are connected together by means of screws,

solder or the like to form a rigid inverted U-shaped container or magazine **16**. Two shafts **18** and **20** are aligned along a common axis and are coupled securely to the side plates **10** and **12** respectively of the magazine **16**. The shafts **18** and **20** project into the interior of the magazine and support rotatable wheels **22** and **24** respectively. A second rotatable shaft **26** having an axis that is parallel to the axis of the shafts **18** and **20** is positioned above and behind the shafts **18** and **20** and rotatably supported by the bearings **28** and **30** located in the end plates **10** and **12**. One end of the shaft **26** is coupled to and driven by a motor **32** that is coupled to the side plate **10** by bolts or other convenient means. Two wheels **34** and **36** are coupled rigidly to the rotatable shaft **26** and aligned respectively with the rotatable wheels **22** and **24**. Each wheel **22**, **24**, **34** and **36** contains an annular groove centrally located and circumscribing a path around its circumference. A first endless belt **38** is accommodated by the annular grooves to couple the wheel **34** to the wheel **22**. A second endless belt **40** couples the wheel **36** to the wheel **24**, in a similar manner. The distance between the longitudinal axis of the shafts **18** and **20** and the rotatable shaft **26** is preset to be slightly less than the length of the sheets of paper that are being stacked, and the spacing between the wheels **22** and **24**, and **34** and **36**, and consequently the two endless belts **38** and **40** are preset to be less than the width of the sheets of paper that are being stacked. The belts **38** and **40** are parallel to each other and are driven continuously at the same rate of speed by a motor **32** acting through the shaft **26** and the wheels **34** and **36**. Idler wheels **42** and **44** are positioned to contact the wheels **22** and **24** respectively at the upper points of tangency of the wheels **22** and **24** with their belts **38** and **40** respectively. Two shafts **46** and **48** support the rotatable idler rollers **42** and **44** respectively. Members **41** and **43** pivotally couple shafts **46** and **48** respectively to side plates **10** and **12**. Springs **45** and **47** maintain idler rollers **42** and **44** respectively in contact with the wheels **22** and **24**.

One end of a strip spring **50** is mounted securely to the top plate **14** of the magazine **16** by means of bolts or the like. The strip spring slopes downward at a shallow angle relative to the plane defined by the endless belts starting from a point above the top of the belts and tracing a path which passes centrally between the endless belts. A plate **61** is secured to the side plates **10** and **12** of the magazine and positioned immediately above the belts **38** and **40** to facilitate the entry of the driven sheet between the wheels **44** and **24**, and **42** and **22**. A bifurcated tray is positioned within the magazine **16** parallel to and below the strip spring **50**. One end of a parallel linkage system **54** is pivotally connected to a side plate of the magazine **16**, and its other end is connected to the tray. The parallel linkage system permits the tray **52** to move vertically up or down and still remain parallel to the strip spring **50**.

The parallel linkage system consists of an end bracket **56** coupled rigidly to the tray **52** and coupled pivotally, at its ends, to rocker arms **58** and **60**. The other ends of the rocker arms **58** and **60** are pivotally coupled to anchor arms **62** and **64** respectively which anchor arms are pivotally coupled at their other ends to the side plate **10**. Fulcrum arms **66** and **68** are pivotally coupled at one of their ends to the side plate **10** and at the other of their ends to a central area of the rocker arms **58** and **60**. A small ear **70** projects from the rocker arm **58** and is coupled to the side plate **10** through a spring **72** which acts in tension. A balancing weight **74** acting through a flexible cable **80** and two pulleys **76** and **78** is coupled to exert a continuously applied upward force to the tray **52** through a vertical member secured to the tray. The magnitude of this force is equal substantially to the weight of the tray. A second parallel linkage system and spring similar to the parallel linkage system **54** and spring **72** is positioned adjacent to and coupled to the side plate **12** and the other side of the tray **52**.

A sensing arm **82** is operationally positioned relative to the tray **52** to position the topmost sheet of the stack to a predetermined position. Referring to FIG. 4 a mounting plate **84** positioned substantially at a right angle to the side plate **12** of the magazine **16** supports a motor which is coupled to drive a driving gear **86**. A follower gear **88** rotatably supported by the plate **84** and driven by the driving gear **86** is pivotally coupled to the lower end of the sensing arm **82** through an eccentrically positioned trunnion. A centrally positioned pivot point **90** of the sensing arm **82** is coupled through an arm **92** to the mounting plate **84**. As the driving gear **86** is rotated, the end **94** of the sensing arm **82** traces a path that is substantially egg shaped. The sensing arm **82** is initially positioned to avoid contacting the tray **52** when the tray is not supporting any sheets of paper. In this manner needless downward thrusts to the tray **52** are prevented when there are no sheets of paper stacked on the tray.

In operation, the sensing arm **82** moves downward immediately after a sheet of paper falls on the top of the stack being formed, however, the operation of the sensing arm **82** is not initiated by nor dependent upon the arrival of the sheet of paper, but operates continuously. Immediately after the arrival of an incoming sheet of paper, the sensing arm moves into the magazine area defined by the side plates **10** and **12**, the top plate **14** and the topmost sheet on the stack, and assumes substantially a horizontal position above the topmost sheet of the stack supported by the tray. As the driving gear **86** continues to rotate, the sensing arm moves vertically downward while maintaining its relatively horizontal position. At some point in its downward path the sensing arm **82** contacts the topmost sheet of the stack, and, acting through the other sheets of the stack, exerts a downward force on the tray **52**.

This downward force is sufficient to overcome the upward forces exerted on the tray by the spring **72** and the weight **74**, to move the tray **52** and the stack of sheets on the tray vertically downwards. In this manner, the topmost sheet of the stack being formed is always positioned a specific distance below the strip spring to allow a sufficient clearance for the next incoming sheet.

To maintain the tray **52**, and its supported stack in the lowermost position as determined by the sensing arm **82**, a pawl and ratchet mechanism is provided. The pawl **96** and ratchet **98** is most clearly illustrated in FIG. 2. As the sensing arm **82** nudges the stack of sheets and the tray **52** downward, the pawl **96** rotates slightly upward and away from its stop **100**. After a sufficient number of sheets have accumulated on the top of the stack the pawl **96** will be lowered a sufficient amount to permit its tip to slip from one ratchet tooth to the next lower ratchet tooth to maintain the top of the stack at a predetermined level. Thus, the pawl and ratchet act in cooperation with the sensing arm to maintain the top sheet of the stack at a predetermined distance below the strip spring.

Referring to FIGS. 2 and 5, the front end of the magazine area is defined by means of two doors **102** and **104**. FIG. 5 is a view of the doors in a closed position as seen from the interior of the magazine. The doors are secured to the sides of the magazine by means of hinges which allow the doors to revolve through an angle that is greater than 90°. The doors are maintained in their closed position by means of springs.

The two doors **102** and **104**, when closed, are spaced apart relative to each other to permit an operator's fingers to pass between the doors to open them. The pawl **96** is pivotally coupled to the tray **52**, and its cooperating ratchet is connected to the inside of one of the doors.

When the door **104** is closed the ratchet **98** cooperates with the pawl **96** to inhibit upward vertical movement of the tray **52**, however, when the doors **102** and **104** are opened to remove the stack of papers from the tray, the ratchet is swung away from the pawl **96** and the tray **52** can move freely up or down. The bifurcated tray facilitates the removal of the formed stack of sheets by allowing the operator to insert his fingers beneath the bottommost sheet of the stack.

Two stops **106** and **108** made of yieldable material such as rubber or the like are coupled securely to the doors **102** and **104** respectively. A profile view of the stops (FIG. 6) resemble the teeth of a saw. The stops inhibit the forward motion of the incoming sheet and allows the sheet to fall in a flat position.

In the operation of this device it shall be assumed that the sheets are fed sequentially into the stacker at a uniform rate of speed. Referring to FIG. 1, a sheet of paper is positioned longitudinally on the two belts **38** and **40** which are driven at a constant rate of speed by the motor **32** through the wheels **34** and **36**. As the sheet of paper is driven into the magazine area its leading edge passes between the rotatable wheels **22** and **24** and their associated idler rollers **42** and **44**. Immediately after the edge of the paper appears from between the rotatable wheels and idler rollers it is driven into the under surface of the strip spring **50**.

The rotatable wheels **22** and **24** and the idler rollers **42** and **44** grip the sheet of paper along its side edges and drive it into the magazine. Immediately after the leading edge of the driven sheet of paper passes out from between the rotatable wheels **22** and **24** and the idler rollers **42** and **44**, it contacts the underside of the strip spring which depresses or bows the center of the leading edge of the document longitudinally. As the document is driven further into the magazine area it is driven along and rides down the underside of the strip spring **50**. Thus, the formed bow shape in the document is preserved and each sheet is provided with longitudinal stiffening which prevents it from folding, bending or sagging about a transverse axis as it is being driven towards the front of the tray. Immediately after the trailing edge of the first appearing sheet of paper emerges from between the rotatable wheels and the idler rollers, the document is substantially parallel to the top surface of the tray and about two inches above it.

The sheet, because of its bowed shape and momentum, continues to move forward along the underside of the strip spring until it strikes the yieldable saw toothed shaped stops located on the inner surface of the doors **102** and **104**. The stops inhibit the forward advance of the document thus allowing it to settle down flat on top of the tray **52**. Immediately after the sheet falls on top of the tray **52**, or even in the absence of the delivery of a sheet to the tray, the sensing arm moves into the magazine area, assumes a substantially horizontal position, moves downward to its lowest predetermined position, and then moves diagonally upward and out of the magazine area. The lower most point of the path traced by the sensing arm is located immediately above but does not contact the tray **52** to prevent the unnecessary application of repeated downward thrusts being applied to the tray **52** when the tray is not supporting any sheets.

As the sheets begin to accumulate, however, in stack form on the tray, the sensing arm contacts and exerts a downward force on the topmost sheet. This force is transmitted through the previously stacked sheets to the tray which responds by moving vertically downward. The downward movement of the tray rotates the pawl **96** slightly away from its stop **100** to permit its tip, and therefore the tray, to move vertically downward one ratchet tooth. Thus, each time that a sufficient number of sheets are accumulated on the tray, the tray and the stack is moved downward a distance equal to the spacing between adjacent ratchet teeth. The vertical downward movement of the tray continues until the pawl **96** contacts the last tooth in the ratchet **98**. Therefore, regardless of the height of the stack of sheets being formed, the topmost sheet is always positioned a predetermined distance below the strip spring to allow the next appearing sheet to freely enter the magazine area.

While it is advisable to have synchronized motion between the entry of a sheet of paper into the magazine and the downward movement of the sensing arms, such cooperation is not essential for the successful operation of this device. For example, if a sheet of paper enters the magazine area when the sensing arm is at the lowest portion of its cycle, the document will probably land on top of the sensing arm. However, immediately after the arm completes its downward cycle it starts to move diagonally up and out of the magazine area, and therefore, out from under the sheet that is resting on top of it to allow that sheet to fall flat on top of the previously stacked sheets. Thus, the motion of the arm **82** does not interfere with, nor hinder the entry of the sheet into the magazine for stacking. The action of the balancing weight **74** and spring **72** combine to exert a continuing net upward force to the tray **52** regardless of the size of the stack of sheets supported by the tray. The counterweight corrects for and substantially neutralizes the weight of the tray. The spring **72** acts in tension and exerts a force slightly greater than that required to neutralize the weight of the documents supported by the tray. Thus the force exerted by the spring **72** increases as the tray **52** moves downward. The combination of the counterweight **74** and spring **72** produces a smooth vertical upward and downward movement of the tray **52**.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A device that stacks thin sheets of paper in a magazine comprising first and second endless belts positioned parallel to each other to support a thin sheet of paper along its longitudinal edges, said endless belts being spaced a distance less than the width of the sheets of paper being stacked, a strip spring coupled to said magazine positioned between and at a shallow angle relative to said first and second endless belts, driving means coupled to said first and second belts to drive said sheet into said strip spring with the mid portion of said sheets underlying said strip spring to form a bowed shaped channel along said sheet as it is driven into said magazine to stiffen temporarily said sheet, a vertically orienting tray having a flat top surface positioned substantially parallel to said incoming sheet and pivotally coupled to said magazine to receive and support said thin sheet of paper, and an orienting sensing arm coupled to said magazine to contact and push down said top supported sheet of the stack to a predetermined level.

2. A device that stacks thin sheets of paper in a magazine comprising first and second feeding means positioned to engage a thin sheet of paper along the paper's longitudinal edge, said feeding means being spaced from each other a distance less than the width of the sheets of paper being stacked, an elongated strip supported in said magazine and positioned in the space between said first and second feeding means and at a shallow angle relative thereto, drive means coupled to said first and second feeding means to drive said sheets along said elongated strip and into said magazine with the mid portions of said sheets underlying said strip to form a bowed shaped channel longitudinally along the sheet driven into said magazine to stiffen temporarily said sheet, a vertically orienting tray coupled to said magazine to receive and support said thin sheet of paper, an orienting sensing arm coupled to said magazine to position the top supported

sheet to a predetermined level, a swingable member coupled to said magazine to define an end of the magazine, yieldable stop means coupled to said member to limit the path of travel of an incoming sheet, and holding means coupled to said tray and said swingable member to maintain the top terminal sheet of the supported sheets at the predetermined level.

3. A device that stacks thin sheets of paper in a magazine comprising first means coupled to said magazine to drive sequentially thin sheets of paper into the interior of said magazine, second means coupled to said magazine to form a bowed shaped channel longitudinally along the sheet driven into said magazine to stiffen temporarily said sheet, a vertically orienting tray coupled to said magazine to receive and support said driven thin sheet of paper, an orienting sensing arm coupled to said magazine to position the top supported sheet to a predetermined level, a swingable member coupled to said magazine to define an end of the interior of the magazine, saw tooth shaped strips of yieldable material coupled to said swingable member to define the maximum horizontal displacement of an incoming sheet, and holding means coupled to said tray and said member to maintain the top terminal sheet of the supported sheets at the predetermined level.

4. A device that stacks thin sheets of paper in a magazine comprising first means coupled to said magazine to drive sequentially thin sheets of paper into the interior of said magazine, a vertically orienting tray coupled to said magazine to receive and support said thin sheet of paper, an orienting sensing arm coupled to said magazine to position the top supported sheet to a predetermined level, a counter weight coupled to said tray to compensate for the weight of the tray when empty, and a spring coupled to said tray to compensate for the weight of the sheets supported by said tray, said counterweight and said spring acting to produce a smooth vertical movement to the tray and to exert continuously a small upwards force to said tray.

5. A device that stacks thin sheets of paper in a magazine comprising first means coupled to said magazine to drive sequentially thin sheets of paper into the interior of said magazine, second means coupled to said magazine to form a bowed shaped channel longitudinally along the sheet driven into said magazine to stiffen temporarily said sheet, a vertically orienting tray coupled to said magazine to receive and support said thin sheet of paper, an orienting sensing arm coupled to said magazine to position the top supported sheets to a predetermined level, a counter weight coupled to said tray to compensate for the weight of the tray when empty, and a spring coupled to said tray to compensate for the weight of the sheets supported by said tray, said counterweight and said spring acting to produce a smooth vertical movement to the tray and to exert continuously a small upwards force to said tray.

6. A device that stacks thin sheets of paper in a magazine comprising first means coupled to said magazine to drive sequentially thin sheets of paper into the interior of said magazine, second means coupled to said magazine to form a bowed shaped channel longitudinally along the sheet driven into said magazine to stiffen temporarily said sheet, a vertically orienting tray coupled to said magazine to receive and support said thin sheet of paper, an orienting sensing arm coupled to said magazine to position the top supported sheets to a predetermined level, a swingable member coupled to said magazine to define an end of the magazine, holding means coupled to said tray and said member to maintain the top terminal sheet of the supported sheets at the predetermined level, a counterweight coupled to said tray to compensate for the weight of the tray when empty, and a spring coupled to said tray to compensate for the weight of the sheets supported by said tray, said counter weight and said spring acting to produce a smooth vertical movement to the tray and to exert continuously a small upward force to said tray.

7. A device that stacks thin sheets of paper in a magazine comprising first means coupled to said magazine to drive sequentially thin sheets of paper into the interior of said magazine, second means coupled to said magazine to form a bowed shaped channel longitudinally along the sheet driven into said magazine to stiffen temporarily said sheet, a vertically orienting tray coupled to said magazine to receive and support said thin sheet of paper, an orienting sensing arm coupled to said magazine to position the top supported sheet to a predetermined level, a swingable member coupled to said magazine to define an end of the magazine, saw tooth shaped strips of yieldable material coupled to said swingable member to define the maximum horizontal displacement of the driven sheet, holding means coupled to said tray and said swingable member to maintain the top terminal sheet of the supported sheets at the predetermined level, a counterweight coupled to said tray to compensate for the weight of the tray when empty, and a spring coupled to said tray to compensate for the weight of the sheets supported by said tray, said counterweight and said spring acting in combination to produce a smooth vertical movement to the tray and to exert continuously a small upward force to said tray.

8. A device for stacking thin sheets of paper in a magazine comprising first and second feeding means positioned parallel to each other to engage a thin sheet of paper along the paper's longitudinal edges, said feeding means being spaced from each other a distance less than the width of the sheets of paper being stacked, an elongated strip supported in said magazine and positioned in the space between said first and second feeding means and at a shallow angle relative to the plane defined by said feeding means, said strip extending in the direction said sheets are fed by said feeding means, and drive means coupled to said first and second feeding means to drive said sheets along said elongated strip and into said magazine with the mid portions of said sheets underlying said strip to form a bowed shaped channel along said sheets as each is driven into said magazine, whereby said sheets are temporarily stiffened as they are driven into said magazine.

9. A device for stacking thin sheets of paper in a magazine comprising first and second belt feeding means positioned parallel to each other and each having a roller for sequentially engaging between each roller and its belt thin sheets of paper along the papers' longitudinal edges, said belt feeding means being spaced a distance less than the width of the sheets of paper being stacked, an elongated strip supported in said magazine and positioned in the space between said first and second feeding means and at a shallow angle relative to the plane defined by said feeding means, said strip extending in the direction said sheets are fed by said feeding means, and drive means coupled to said first and second feeding means to drive said sheets along said elongated strip and into said magazine with the mid portions of said sheets underlying said strip to form a bowed shaped channel longitudinally along said sheets as each is driven into said magazine, whereby said sheets are temporarily stiffened as they are driven into said magazine.

10. A device for stacking thin sheets of paper in a magazine comprising feeding means engageable with said sheets of paper for feeding same into said magazine, drive means coupled to said feeding means to drive said sheets into said magazine in stacked formation, a tray in said magazine for receiving said sheets of paper as they are fed and stacked in said magazine, means periodically contacting the topmost sheet of the stack for exerting a downward force thereon whenever the topmost sheet is above a predetermined level, whereby a downward force is transmitted by the stack of sheets to the tray, parallel linkage mechanism coupling said tray to said magazine to permit the tray to move downwardly when subjected to said force while maintaining the top surface of the tray substantially parallel to the incoming sheets, and pawl and ratchet mechanism for retaining said tray in the moved positions.

11. A device for stacking thin sheets of paper in a magazine comprising first and second feeding means positioned parallel to each other to engage a thin sheet of paper along the paper's longitudinal edges, said feeding means being spaced from each other a distance less than the width of the sheets of paper being stacked, an elongated strip supported in said magazine and positioned in the space between said first and second feeding means and at a shallow angle relative to the plane defined by said feeding means, said strip extending in the direction said sheets are fed by said feeding means, drive means coupled to said first and second feeding means to drive said sheets along said elongated strip and into said magazine with the mid portions of said sheets underlying said strip to form a bowed shaped channel along said sheets as each is driven into said magazine, whereby said sheets are temporarily stiffened as they are driven into said magazine, a tray in said magazine for receiving said sheets of paper as they are fed and stacked in said magazine, means periodically contacting the topmost sheet of the stack for exerting a downward force thereon whenever the topmost sheet is above a predetermined level, whereby a downward force is transmitted by the stack of sheets to the tray, and means mounting said tray permitting the tray to move downwardly when subjected to said force.

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2,796,259	Fawcett	June 18, 1957
2,844,373	Van Marle	July 22, 1958