March 2, 1937. E. G. STAUDE 2,072,318

STACKING MECHANISM FOR PAPER BOX MACHINES AND THE LIKE

Filed Dec. 5, 1932 5 Sheets-Sheet 1

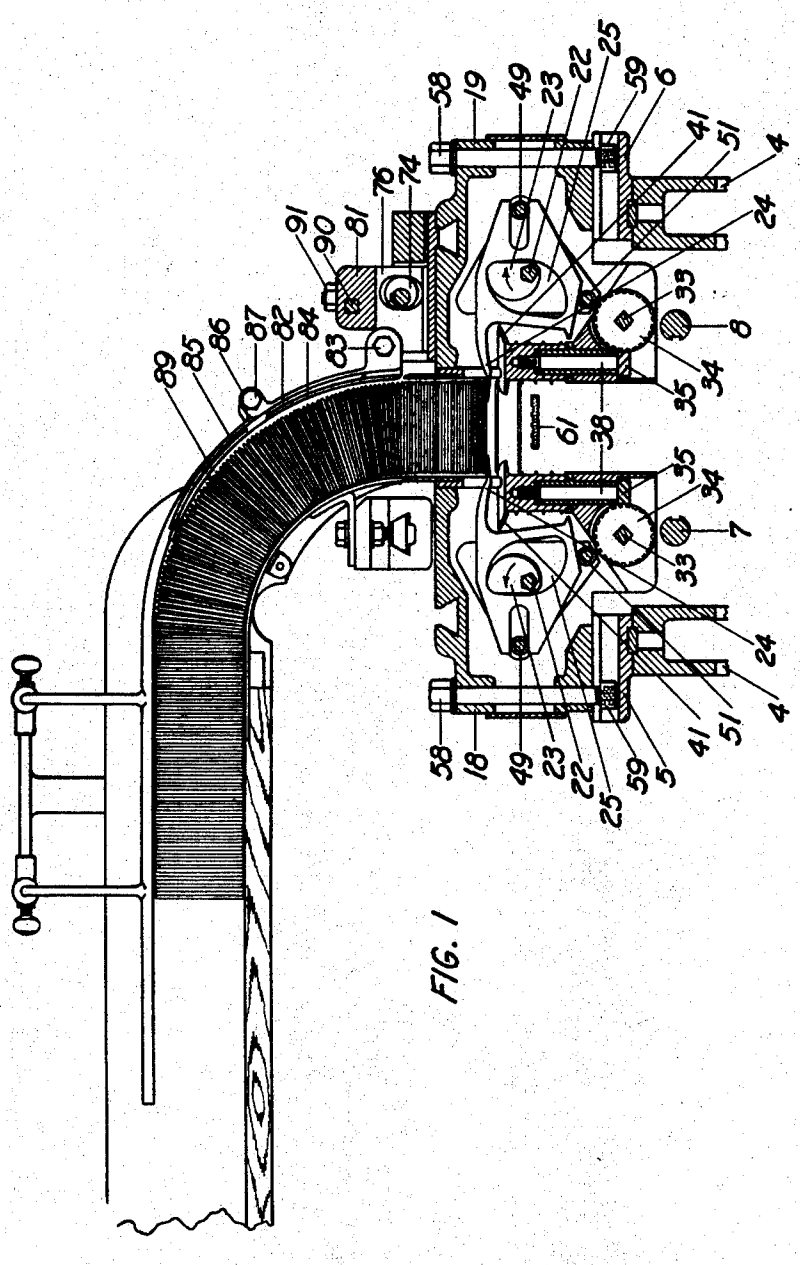

FIG. 1

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STACKING MECHANISM FOR PAPER BOX MACHINES AND THE LIKE

Filed Dec. 5, 1932 5 Sheets-Sheet 2

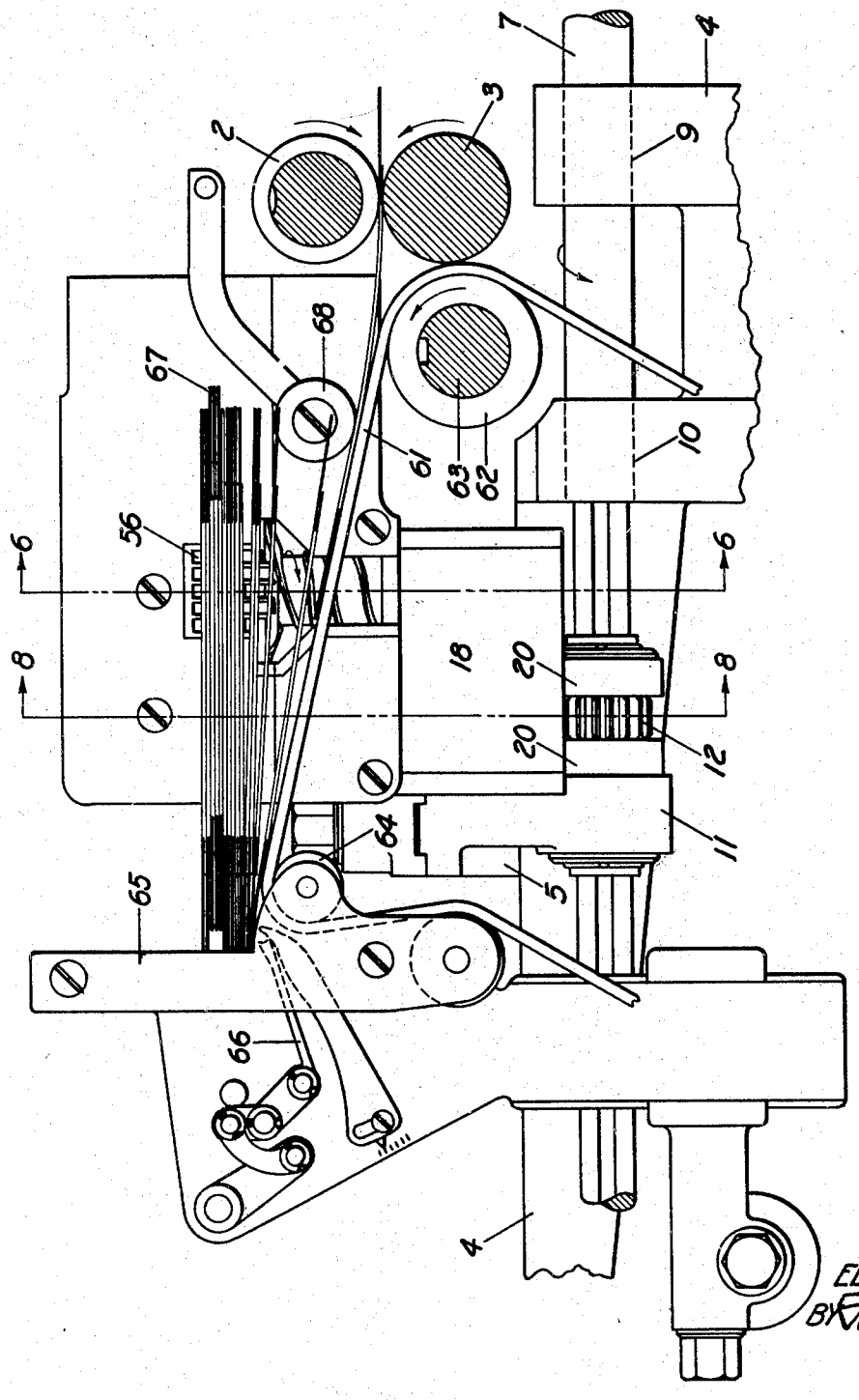

FIG. 2

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STACKING MECHANISM FOR PAPER BOX MACHINES AND THE LIKE

Filed Dec. 5, 1932 5 Sheets-Sheet 3

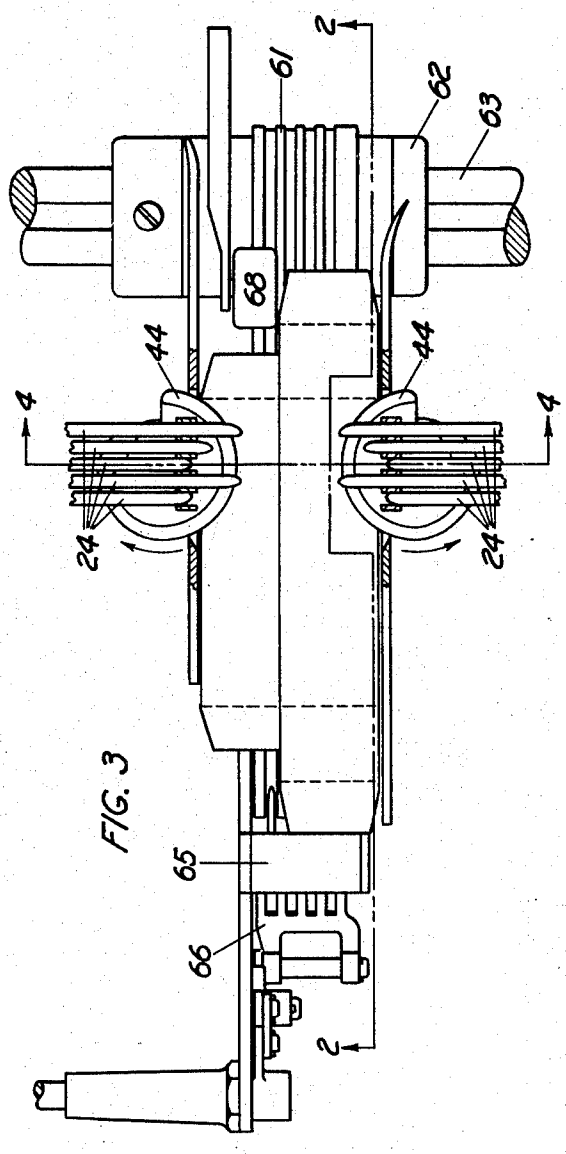

FIG. 3

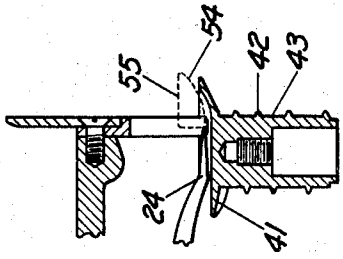

FIG. 5

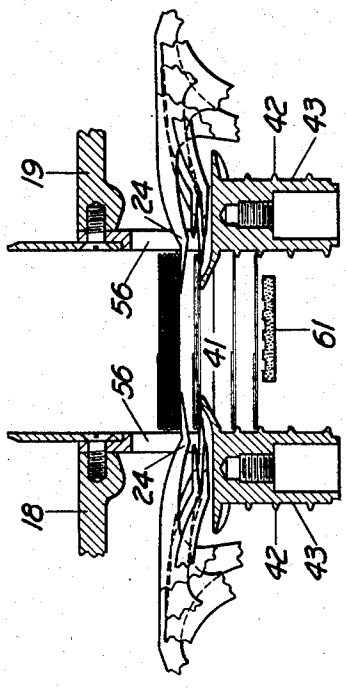

FIG. 4

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STACKING MECHANISM FOR PAPER BOX MACHINES AND THE LIKE

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FIG. 6

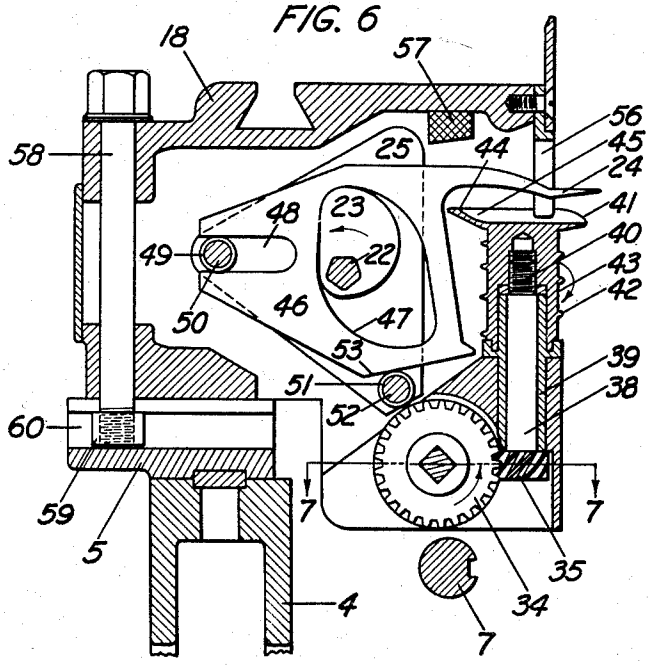
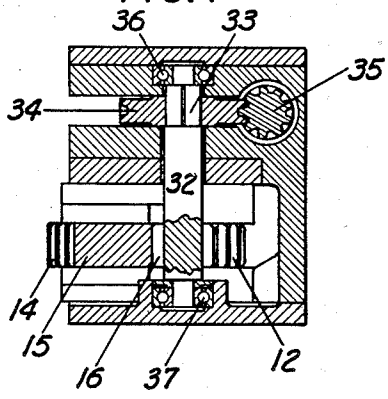


FIG. 7



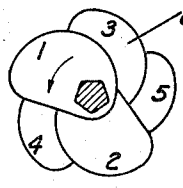


FIG. 10

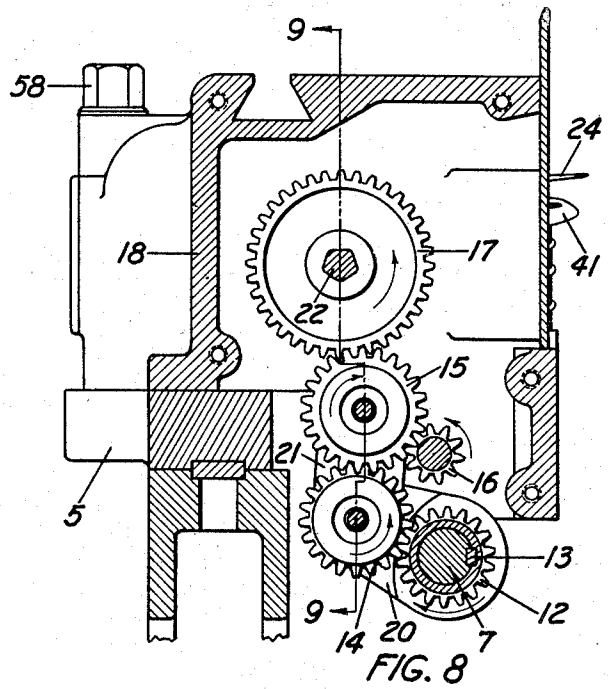


FIG. 8

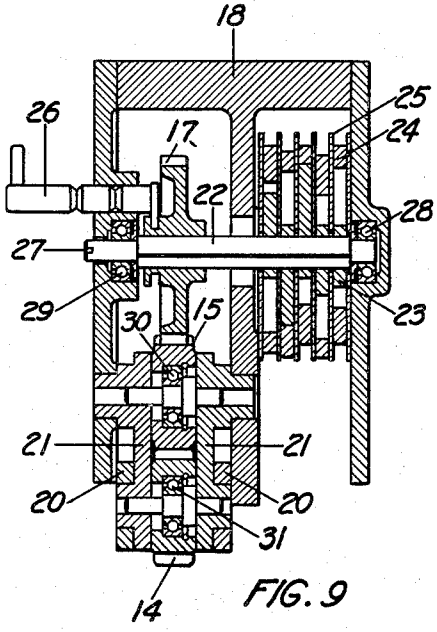


FIG. 9

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March 2, 1937. E. G. STAUDE 2,072,318

STACKING MECHANISM FOR PAPER BOX MACHINES AND THE LIKE

Filed Dec. 5, 1932 5 Sheets-Sheet 5

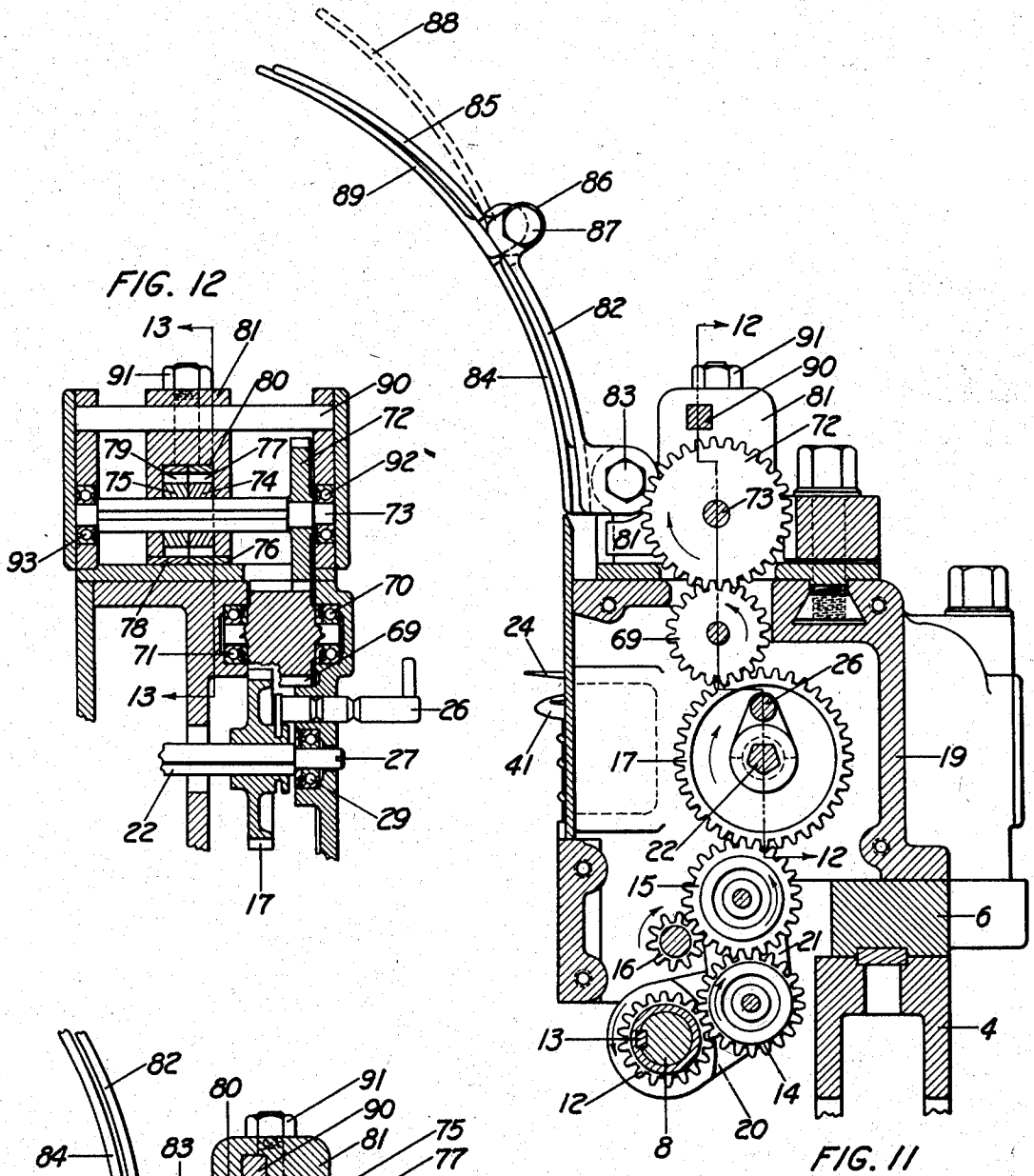

FIG. 12

FIG. 11

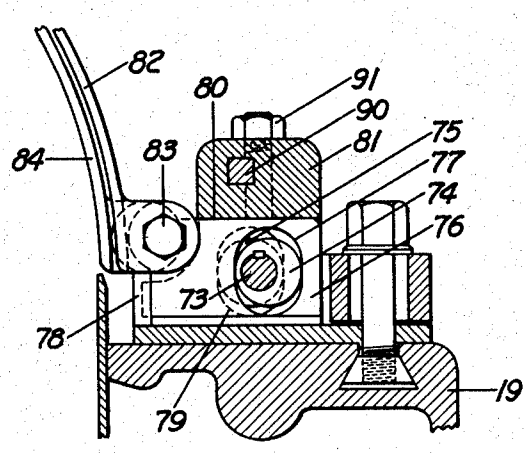

FIG. 13

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Patented Mar. 2, 1937 2,072,318

UNITED STATES PATENT OFFICE

2,072,318

STACKING MECHANISM FOR PAPER BOX MACHINES AND THE LIKE

Edwin G. Staude, Minneapolis, Minn.

Application December 5, 1932, Serial No. 645,710

34 Claims. (Cl. 271—87)

This invention is an improvement upon my Patent No. 1,671,790, dated May 29, 1928.

The object of my invention is to provide an improved stacking mechanism for stacking blanks one underneath the other at high speed without the need of timing the mechanism for receiving the incoming blank, and without marring the delicate surface of highly lithographed or clay coated stock, such as is commonly used for the manufacture of folding cartons, envelopes and other paper goods.

A further object is to provide a mechanism which will successfully stack blanks or cartons ranging from two inches to thirty inches or more in length, without the need of any adjustment in the location or speed of the stacking mechanism.

A further object is to provide a rapid motion to rotating parts and a slower motion to reciprocating parts, so as to eliminate vibration and adapt the unit for stacking blanks or cartons at the rate of one hundred per minute for the long blanks or cartons up to two thousand or more per minute for the short blanks or cartons measuring substantially two inches in length.

Other objects of the invention will appear from the following detailed description.

Features include all details of construction and arrangements of the parts relative to one another, as well as the broader ideas of means inherent in the disclosure. The invention, therefore, includes the various constructions, combinations, and sub-combinations.

In the accompanying drawings, forming a part of this application:

Figure 1 is a vertical section of my stacking mechanism, looking towards the feeder end of the machine. This view shows the general arrangement of the two revolving spirals and the relationship of the lifter fingers to the spirals and the stack of folded cartons, in this instance, and also the location of the jogging or booster members;

Figure 2 is a vertical section on line 2—2 of Figure 3, looking in the direction of the arrow;

Figure 3 is a detailed sectional plan view showing the stacker belt drive, the lifting spirals, the position of the incoming carton, and the location in plan of the lifter fingers;

Figure 4 is a cross-section on line 4—4 of Figure 3;

Figure 5 is a detail of the spiral and a single finger, showing the path of the point of the finger in dotted lines and also how it enters the hollow part at the top of the spiral in timed relationship with the finger, always engaging the underside of the carton and therefore never be in a position to mutilate the carton by striking it on the edge;

Figure 6 is a cross-section of the right-hand side lifter case on line 6—6 of Figure 2, with the exception that the carton and stacker belt shown in Figure 2 are eliminated;

Figure 7 is a horizontal section on line 7—7 of Figure 6;

Figure 8 is a cross-section on line 8—8 of Figure 2, with the exception that the cartons and stacker belt are eliminated;

Figure 9 is a section on line 9—9 of Figure 8;

Figure 10 is a diagram of the finger driving cams, showing their respective location on the drive shaft;

Figure 11 is a vertical section of the left-hand stacking member, similar to Figure 8, and in addition to showing the driving connections it shows the drive for the jogger or booster;

Figure 12 is a section on line 12—12 of Figure 11, showing the driving connection of the jogger or booster mechanism;

Figure 13 is a section on line 13—13 of Figure 12 and shows the cam driving mechanism which operates the jogger or booster mechanism;

In the drawings, 2 and 3 represent delivery feed rolls of a paper box machine. (See Figures 1 and 2.) Numeral 4 represents the frame of a paper box machine upon which my stacking mechanism 5 and 6 is mounted. Shafts 7—8, driven in any suitable manner and preferably from some mechanism on the paper box machine, revolves in suitable bearings 9 and 10, and the bearing 11 of the stacking mechanism 5 the left hand bearing 11 not being shown.

The shafts 7 and 8, see Figures 8 and 11, are provided with gears 12 secured by splines 13 and mesh into gears 14, which in turn mesh into gears 15, the gears 15 meshing into the gears 16 and 17. In order to provide lateral or cross-wise adjustment for the stacking housing 18 and 19, the gear 14 is mounted on links 20 and 21. The gear 17 drives the pentagonal shaft 22 which, in turn, drives the cams 23 and the lifter fingers 24. The cams 23 and lifter fingers 24 are separated from each other by a spacer plate 25.

Referring to Figures 9 and 12, in order to allow the cam shaft 22 for the finger operating cams to be turned independently, to set the lifter fingers with reference to the top of the spiral 41 to obtain the proper timing relation, a shifter member 26 is provided so that the gear 17 may be shifted laterally out of mesh with the gear 15. A screw driver slot 27 on the end of the shaft

22 permits the rotation of the shaft 22 in timed relation with the proper position of the finger on the revolving spiral, at which point the gear 17 is again moved into mesh with the gear 15, as shown in Figure 9. The shaft 22 is provided with suitable ball bearings 28 and 29. A suitable ball bearing 30 is provided for the gear 15 which acts as an idler, and a suitable ball bearing 31 provided for the gear 14. The gear 16, see Figure 17, is formed integral with the shaft 32, which has a square end 33 on its opposite end adapted to receive a worm gear 34, and meshes with a worm gear 35. Suitable ball bearings 36 and 37 are provided for the shaft 32 in the lifter case housing. The gear 35, see Figure 6, is formed integral with the shaft 38 and revolves in a bronze bearing 39. The upper part of the shaft 38 is provided with a threaded portion 40 adapted to receive a threaded portion of an elevating spiral 41.

Since these spirals or screws are right- and left-hand, the thread in the spirals and on the ends of the shafts 38, see Figure 6, must also be right- and left-hand so that during revolution, they will always be positively driven and will properly act in unison to perform their carton-lifting function. Each spiral 41 has a single wind or screw 42 on the hub 43, which wind increases to meet the flange 44, see Figure 3, at the top of the spiral.

The top surface of flange 44 is dished as at 45, the top of the flange being level or horizontal for about 180° of its circumference before it inclines to meet the wind 42. The dishing is for the purpose of allowing the lifting fingers to normally lie beneath a carton, supported upon the top of the flange.

Because the incoming blank or carton may travel at maximum speed at the rate of one thousand feet per minute, and since the hub 43 of the spiral is substantially one inch in diameter, and because it must have substantially the same surface speed as that of the carton to prevent marking, it follows that the spiral operates at very high speeds. It is found in practice that the best results are obtained by revolving the spirals two revolutions for each lifter finger, and since there are five lifter fingers on each side, the gear ratio is such that the spirals 41 will revolve ten times during each oscillation of the lifter fingers. This arrangement permits the lifter fingers to operate at a lower speed, since they are reciprocating, and, therefore, reduces the noise and wear, and at the same time the speed of the lifter fingers is fast enough to take the fullest advantage of blanks or cartons approximately two inches in length, although it may mean that each finger is required to lift two cartons which, since the load of the stack is on the fingers in advance, it can easily do without marring the surface of the blank.

Referring to Figure 6: The lifter finger 24 is provided with a body 46 having an irregular shaped opening 47 within which operates the cam 23. A slot 48, provided for the roller 49 on the shaft 50, serves as a guide for the body of the lifter finger. The roller 51 on the shaft 52 operates on the inclined surface 53 of the body 46 of the lifter finger, and this incline, as the lifter finger is advanced by the cam 23, serves to raise the finger. The path of motion of the carton-engaging portion of the finger is shown by dotted lines at 54 in Figure 5. On continued motion of the cam 23 from its position shown in Figure 6, the finger is moved from beneath the stack along dotted line 55.

Since the spiral makes two revolutions between entries of the finger beneath the pile (see Figure 4), it follows that because the flange 44 of the spiral extends for a distance of 180 degrees, this arrangement in conjunction with that of the speed ratio is sufficient to permit the finger 24 to engage the underside of the pile and complete that part of the motion shown in dotted lines 54 in Figure 5.

The fingers 24, see Figure 6, operate through slots 56 in suitable plates, and are free to rise with the pile of blanks independently of the drive means or cam. This is due to the shape and size or area of the cam surface 47, which is so related to the cam when the finger is in its uppermost position, that body 46 can move upwardly out of contact with the same. A suitable rubber bumper 57 (see Figure 6) is provided to prevent bouncing of the finger 24, and the shape of the outline 47 is such that when the cam 23 moves 180 degrees from the position shown in Figure 6, the finger 24 will then be in its most rearward and lowest position and will be definitely forced down to lie within the dished portion 45 of the spiral 41, and to be below the level of the bottom face of the carton. Thus the finger 24 is caused to emerge from beneath the carton and under that edge which lies on the flange 44 of the spiral 41. The lifter case 18 has limited lateral adjustment by means of the bolt 58 to which a threaded nut 59 is provided, the threaded nut 59 operating in a T slot 60 of the member 5—6.

A suitable stacking belt 61, see Figure 2, operating over a drum 62, driven by a shaft 63, is provided to advance the incoming blank into the path of the revolving spirals (see Figures 1 and 2). The stacker belt 61 passes over an idler 64, secured in a backstop 65. The backstop 65 is provided with suitable counting mechanism 66 which is adapted to indicate the count in predetermined lots, preferably in lots of 25, as shown at 67. A spring-mounted idler roller 68 is provided to hold the carton in contact with the belt 61. The particular cartons shown in the stacker of Figures 1, 2 and 3 are of the so-called "tuck end" type. It is, of course, obvious that cartons of any size and shape can be stacked by this mechanism by merely adjusting the machine for the particular size.

As the spirals and lifter fingers elevate the pile it is necessary that a sufficient number be held in compressed relationship with one another until the adhesive has had time to set. For this purpose (see Figure 1 and also my previous application), the blanks are gradually turned from a horizontal position to a vertical position and are guided in an arcuate boxing. I find, however, that there is a considerable amount of friction between the edges of the cartons and the curved surfaces of the guide. I have further found that if at least one side of the guide has suitable devices for jogging the blanks, a great deal of the load is taken from the top of the lifter fingers, and detrimental friction is overcome. I have further found that timed jogging is more efficient in relieving the friction and improving the feed motion of the blanks.

In order to accomplish the improvements above mentioned, I have added another idler gear 69 meshing with the gear 17, the idler gear 69 being adapted to operate in bearings 70 and 71 (see Figures 11, 12 and 13) and meshing with a gear 72. The gear 72 drives the shaft 73, upon which

are mounted the oppositely disposed eccentrics **74** and **75**, see Figure 13. The eccentric **74** operates in a shoe **76** having an oval slot **77**, and the eccentric **75** operates in a shoe **78** having an oval slot **79**. The purpose of the oval slots **77** and **79** is to permit reciprocating motion horizontally without vertical motion. The shoes slide in suitable bearings **80** in a member **81**.

On the outer end of the shoe **76**, I connect jogger-guide or clamp member **82** which is clamped in position with a cap screw **83**, and on the outer end of the shoe **78**, I connect a similar guide or clamp member **84**, which is secured in a similar manner to the member **78**. Each clamp or guide is about three-quarters of an inch wide, and these strips are arranged close together, as near as possible to the middle of the carton in direction of feed. In order to make the arc of the jogger or booster adjustable to adapt it for cartons of different widths, I provide an extension **85** to the member **82**, hinging same at the point **86** by a cap screw **87**. In this manner I am able to swing the extension as shown by dotted lines at **88** and to secure it in any adjusted position. It will be noted that the cams **74** and **75** are so related that one jogger moves toward the cartons as the other moves away. I provide a similar extension **89** for the member **84**.

In order to adjust the jogging members **82** and **84** transversely with respect to the line of feed, I provide a square shaft **90**, see Figures 11 and 12, upon which the member **81** is mounted, and clamp the member **81** in the desired position by cap screw **91**. The shaft **73**, provided with bearings **92** and **93**, serves to drive the oppositely disposed eccentrics **74** and **75**, causing a reciprocating motion approximating one-fourth of an inch, to be given to each of the members **82** and **84**.

I find that with the construction just described, I am able to successfully count and stack the small razor blade cartons at a rate better than one hundred thousand per hour, without waste or mutilation in any way, and by widening out the machine, or rather adjusting it for wider and longer cartons, I can use the same mechanism for successfully stacking a blank that is twenty inches wide, folded flat, up to more than thirty inches long. These are valuable features. This stacker is particularly desirable where the stock is curly and where the tail end of the carton frequently curls downward into the path of the following blank. By the use of these spirals, which can be placed so as to lift the curled-down part, I am able to lift the rear end of the carton out of the path of the blank following and carry it upward into the path of the lifter finger, regardless of the time that the carton enters the stacking device.

It may be well to point out that because the wind or screw **42** on the body of the spiral **43** is only about one-eighth of an inch high, and because of the high speed at which the spirals revolve, should the carton strike the edge of the wind, it is immediately cleared and lands on the next turn of the wind, after which the carton starts to raise with the wind during the time it enters the stacking mechanism until it strikes the backstop **65**, at which time a long carton will have reached the top **44** of the spiral and be ready to be engaged by the lifter fingers. The shorter cartons or blanks strike the backstop **65** and will be elevated on the way up by the wind, in a manner similar to that shown in Figure 4. The rotation of the spirals is, of course, in the direction to feed the carton or blank inward against the backstop **65**.

An important feature of the invention is that of having spirals operating in conjunction with lifter fingers so that the spirals bring the carton above the initial level of the finger (or fingers) before the finger acts to raise the carton. In other words, a feature is the use of spirals which move the carton part way toward the stack with fingers cooperating for completing that movement. In the present embodiment, the spirals act to raise a carton part way and the fingers act thereafter to complete the upward motion of the carton and to lift and propel the stack.

I claim as my invention:

1. A stacking mechanism comprising means for receiving the articles to be stacked, and guiding them in stacked relation, means for delivering articles one under the other to form a stack in the receiving means, including spirals for advancing and raising the incoming articles, oscillatable fingers associated with said spirals in a manner to receive and support the stacked articles while the spirals advance and raise other incoming articles into stack formation, and means for driving and synchronizing the motions of the spirals and fingers.

2. A stacking mechanism comprising means for receiving the articles to be stacked and guiding them in stacked relation, means for delivering articles to the receiving means including rotatable spirals for advancing the incoming articles, oscillatable fingers associated with said spirals in a manner to receive and support the stacked articles while the spirals advance other incoming articles, and means for driving and synchronizing the motions of the spirals and fingers so that the speed of rotation of the spirals is greater than the rate of oscillation of the fingers.

3. A stacking mechanism comprising means for receiving the articles to be stacked, and guiding them in stacked relation, means for delivering articles to the receiving means including elevating spirals for advancing and raising incoming articles, and fingers associated with said spirals in a manner to receive and support the stacked articles while the spirals advance other incoming articles, and means for driving and synchronizing the motions of the spirals and fingers so that the tops of said spirals finally act to support the article, and said fingers to raise the article after delivery to the tops of the spirals, and begin their raising motion from positions below the tops of said spirals and therefore below the article.

4. A stacking mechanism comprising means for receiving the articles to be stacked, and guiding them in stacked relation, means for delivering articles to the receiving means including spirals for advancing the incoming articles, and fingers associated with said spirals in a manner to receive and support the stacked articles while the spirals advance other incoming articles, and means for operating the fingers, in a manner to allow motion of the fingers with the articles in the stack, independently of said finger operating means.

5. A stacking mechanism for cartons, envelopes, paper blanks or other articles to be stacked or collected one at a time, comprising a receptacle, means for carrying the blanks into the receptacle including elevating spirals projecting into the side of the receptacle for receiving and advancing and raising the incoming articles, a series of oscillatable lifter fingers co-acting with said spirals for supporting the load of the articles while being stacked.

6. A stacking mechanism for cartons, envelopes, paper blanks or other articles to be stacked or collected one at a time, comprising a receptacle, means for carrying the blanks into the receptacle, including elevating spirals for receiving and advancing the incoming articles, a series of lifter fingers co-acting with said spirals for supporting the load of the articles to be stacked, said spirals having dished upper surfaces to receive those portions of the lifter fingers which engage the stacked articles and means for driving and synchronizing the motions of said spirals and fingers so that the lifter fingers start their action from a level beneath the articles supported on the tops of said upper surfaces of said spirals.

7. A stacking mechanism comprising a receptacle, means for carrying the blanks into the receptacle, including means for elevating the blanks vertically, and a jogger for urging the vertical stack of articles into a horizontal position to cause delivery of said articles on edge and horizontally onto a flat surface or table.

8. A stacking mechanism including a pair of elevating spirals, means for delivering an article between the pair of spirals at the lower portions thereof, each spiral being provided at the upper end with an enlarged spiral portion the top of which is dished, a series of reciprocating lifter fingers associated with said spirals in a manner to have a part of their movement occur within the dished area and acting to receive said articles and support the stack, and means for driving and synchronizing the motions of said spirals and fingers to cause the fingers to propel the articles in the same direction as the spirals.

9. A stacking mechanism for cartons, envelopes, paper blanks or other articles to be stacked or collected one at a time, comprising means for delivering the article between the lower end of the barrel or narrow part of a pair of elevating spirals, said spirals being provided with an enlarged portion or dished flange at the top, a series of reciprocating lifter fingers adapted to coact with said spirals and have a part of their movement within the dished space on the enlarged flange of said spirals for receiving said articles and carrying the load of the stack of said articles, said spirals being geared to revolve two or more revolutions for each lifter finger for the purpose specified, and a jogger for urging the vertical stack of articles into a horizontal position.

10. A stacking mechanism for cartons, envelopes, paper blanks or other articles to be stacked or collected one at a time, comprising a receptacle having means for carrying the blanks into the receptacle, elevating spirals projecting into the receptacle for receiving the incoming articles, a series of lifter fingers for each spiral operating through slots in the wall of the receptacle and adapted to receive the articles elevated by the spirals and carry the load of the stacked articles, and while the spirals are operating to feed articles to the fingers.

11. A stacking mechanism for cartons, envelopes, paper blanks or other articles to be stacked or collected one at a time, comprising a receptacle having means for carrying the blanks into the receptacle, elevating spirals projecting into the receptacle for receiving the incoming articles, a series of lifter fingers operating through slots in the wall of the receptacle and adapted to receive the articles elevated by the spirals and carry the load of the stacked articles, and a jogger for urging the vertical stack of articles into a horizontal position.

12. A stacking mechanism for cartons, envelopes, paper blanks or other articles to be stacked or collected one at a time, comprising a receptacle having means for carrying the blanks into the receptacle, elevating spirals projecting into the receptacle for receiving the incoming articles, a series of lifter fingers operating through slots in the wall of the receptacle and adapted to receive the articles elevated by the spirals and carry the load of the stacked articles, and a jogger comprising a pair of reciprocating members for urging the vertical stack of articles into a horizontal position.

13. A stacking mechanism for cartons, envelopes, paper blanks or other articles to be stacked or collected one at a time, comprising a receptacle having means for carrying the blanks into the receptacle, elevating spirals projecting into the receptacle for receiving the incoming articles, a series of lifter fingers operating through slots in the wall of the receptacle and adapted to receive the articles elevated by the spirals and carry the load of the stacked articles, and a jogger comprising a pair of reciprocating members having means for adjusting said jogging members to adapt same for stacking articles of various widths to urge the vertical stack of said articles into a horizontal position.

14. A stacking mechanism comprising means for receiving the articles to be stacked and for guiding them through an arcuate path, means for delivering articles in stacked relation into the guiding means, and means associated with said guiding means for jogging the articles in the arcuate path of said guiding means.

15. A stacking mechanism comprising means for receiving the articles to be stacked and for guiding them through an arcuate path, means for delivering articles in stacked relation into the guiding means, and means associated with said guiding means for jogging the articles in the arcuate path of said guiding means, and means for operating the jogging means in timed relation to the article-delivering means.

16. A stacking mechanism comprising means for receiving the articles to be stacked and for guiding them through an arcuate path, means for delivering articles in stacked relation into the guiding means, and means movable to change the arcuate contour of the arcuate path of said guiding means.

17. A stacking mechanism comprising means for receiving the articles to be stacked and for guiding them through an arcuate path, means for delivering articles in stacked relations into the guiding means, plural means movable to change the arcuate contour of the arcuate path of said guiding means, and means to separately move each of said plural means toward and away from said articles while moving during the stacking operation.

18. A stacking mechanism comprising means for receiving the articles to be stacked and for guiding them through an arcuate path, means for delivering articles in stacked relations into the guiding means, plural means movable to change the arcuate contour of the arcuate path of said guiding means, means to separately move each of said plural means toward and away from said articles while moving during the stacking operation, and means for timing the last mentioned means relative to the article-delivering means.

19. A stacking mechanism comprising means for feeding articles to be stacked, rotatable means adapted to receive articles from the feeding

means and to advance each article in direction transverse to the direction of feed, oscillatable means for receiving each article from the rotatable means and continuing their advance in the same direction, and means synchronizing the motions of the rotating and oscillating means to have the former operate at substantially greater speed than the latter.

20. A stacking mechanism comprising means for feeding articles to be stacked, rotatable means adapted to receive articles from the feeding means and to selectively advance each article in direction transverse to the direction of feed, oscillatable means for receiving each article from the rotatable means and continuing their advance in the same direction, and means synchronizing the motions of the rotating and oscillating means to have the former make at least two revolutions for each oscillation of the last mentioned means.

21. A stacking mechanism comprising means for feeding articles to be stacked, rotatable means adapted to receive articles from the feeding means and to selectively advance each article in direction transverse to the direction of feed, oscillatable means adapted to be projected and withdrawn from beneath the articles for receiving each article from the rotatable means and continuing their advance in the same direction, and means synchronizing the motions of the rotating and oscillating means to have the former make at least two revolutions for each oscillation of the last mentioned means.

22. A stacking mechanism comprising, means for receiving articles to be stacked and for guiding them through an arcuate path, means for delivering articles in stacked relation into the guiding means, oscillatable means forming part of a wall of said guiding means, and means for oscillating said means, to jog the articles.

23. A stacking mechanism comprising, means for receiving articles to be stacked and for guiding them through an arcuate path, means for delivering articles in stacked relation into said guiding means, means engageable with the articles in said arcuate path, and means for oscillating said means, to jog the articles.

24. In a vertical stacking mechanism vertically arranged spirals for raising the articles to stacking position, means for feeding the articles to the spirals, a plurality of oscillatable fingers associated with each spiral and adapted to engage and raise the article and continue its advance, and means synchronizing the motions of the spirals and fingers so that the number of rotations of each spiral is greater than the sum of oscillations of all fingers of the corresponding spiral.

25. In a stacking mechanism, spirals for advancing the articles to stacking position, means for feeding the articles to the spirals, a plurality of oscillatable fingers associated with each spiral and adapted to engage and continue its advance, and means synchronizing the motions of the spirals and fingers so that each spiral makes at least two revolutions for each oscillation of each of its fingers.

26. In a vertical stacking mechanism vertically arranged spirals for raising the articles to stacking position, means for feeding the articles to the spirals, a plurality of oscillatable fingers associated with each spiral and adapted to move in a vertical plane from a position above the spiral and in a vertical plane inwardly and upwardly from a level below the top of the spiral to engage and raise the article, and then move outwardly and downwardly to be disengaged from the article, said fingers acting to continue the advance of the article and support it and the pile of stacked articles, and means synchronizing the motions of the spirals and fingers.

27. In a stacking mechanism, spirals for advancing the articles to stacking position, means for feeding the articles to the spirals, a plurality of oscillatable fingers associated with each spiral and adapted to engage and continue its advance, and means synchronizing the motions of the spirals and fingers so that some of the fingers of each spiral act to advance the articles while others are conditioned to subsequently so act.

28. A stacking mechanism comprising means for feeding articles to be stacked, rotatable means adapted to receive and advance the articles received from said feeding means, oscillatable means for continuously receiving the articles from the rotatable means and continuing their advance in the same direction and supporting the articles in stacked relation by application of force beneath the stack, and means for synchronizing the motions of said rotatable and oscillatable means.

29. A stacking mechanism comprising means for feeding articles to be stacked, spirals adapted to receive and advance the articles received from said feeding means, oscillatable fingers, a group for each spiral, for receiving the articles from the spirals and continuing their advance in the same direction and supporting the articles in stacked relation by application of force beneath the stack, and means for synchronizing the motions of said spirals and fingers.

30. A stacking mechanism comprising means for feeding articles to be stacked, rotatable means adapted to receive articles from the feeding means and to advance each article, oscillatable means for assisting in the stacking operation and constantly operable for receiving the articles from the rotatable means and continuing their advance and for supporting the stacked articles while other articles are fed by the rotating means.

31. A stacking mechanism comprising means for feeding articles to be stacked, rotatable means adapted to receive articles from the feeding means and to advance each article, oscillatable means, a plurality for each rotatable means and adapted for constantly receiving the articles from the rotatable means and continuing their advance and supporting the articles while some of said oscillatable means receive and advance articles fed by the rotating means.

32. A stacking mechanism comprising means for feeding articles to be stacked, spirals between which the articles are delivered by the feeding means and adapted to receive and advance each article, oscillatable means, a plurality for each spiral for receiving the articles from the spirals and continuing their advance, and means synchronizing the motions of the rotating and oscillating means to cause the spirals to deliver each sheet to the oscillatable means and to cause said oscillatable means to support a stack of articles while other oscillatable means are receiving and advancing articles fed by the spirals.

33. A stacking mechanism comprising means for feeding articles to be stacked including a pair of spirals each having a flange at its top into which the spiral merges, means for feeding a sheet between the spirals, to be raised thereby, oscillatable elements, a plurality for each spiral, each element having a finger arranged above the spiral and each spiral being dished on its top to

receive the fingers and permit them to lie at a level below a sheet supported on the top of the flange, means for successively moving the oscillatable elements of each spiral into the feeding path of the spirals and article, then raising the finger above the spiral, then withdrawing the finger from the feeding path, then lowering the finger to the disk at a level below the top of the spiral, and means for synchronizing the motions of the oscillatable elements and spirals for the purpose set forth.

34. A stacking mechanism for cartons, envelopes, paper blanks or other articles one at a time comprising stacking spirals, means for carrying the blanks into operative relation with the spirals for stacking by said spirals and a series of oscillatable lifter fingers coacting with the spirals and moving in a direction axially of the spirals and assisting in the stacking operation and supporting the articles while being stacked by the spirals, and means for synchronizing the motions of the spirals and fingers.

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