Feb. 18, 1936. P. E. KLEINEBERG 2,030,880

WRAPPING MACHINE

Filed June 13, 1934 4 Sheets-Sheet 1

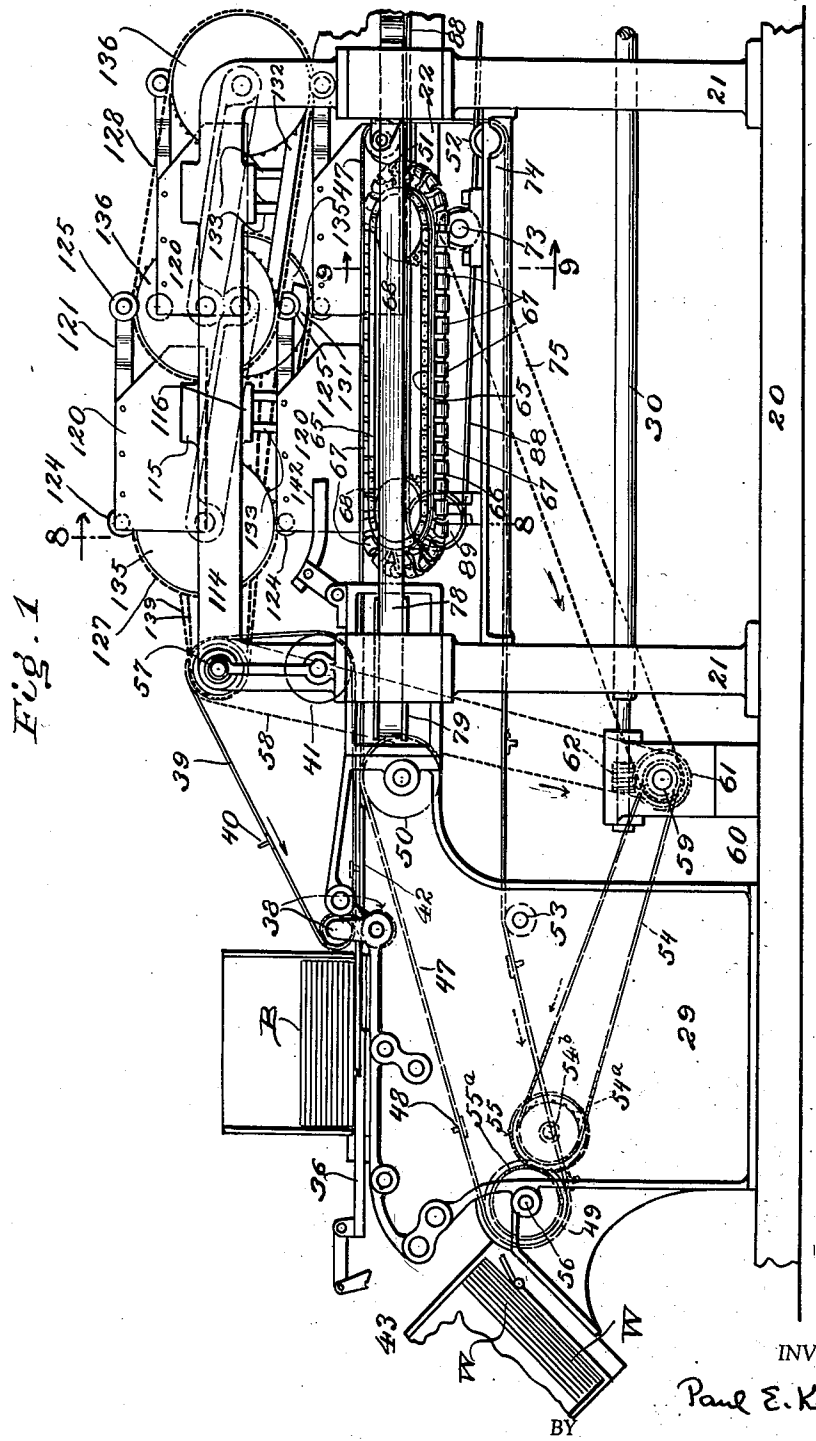


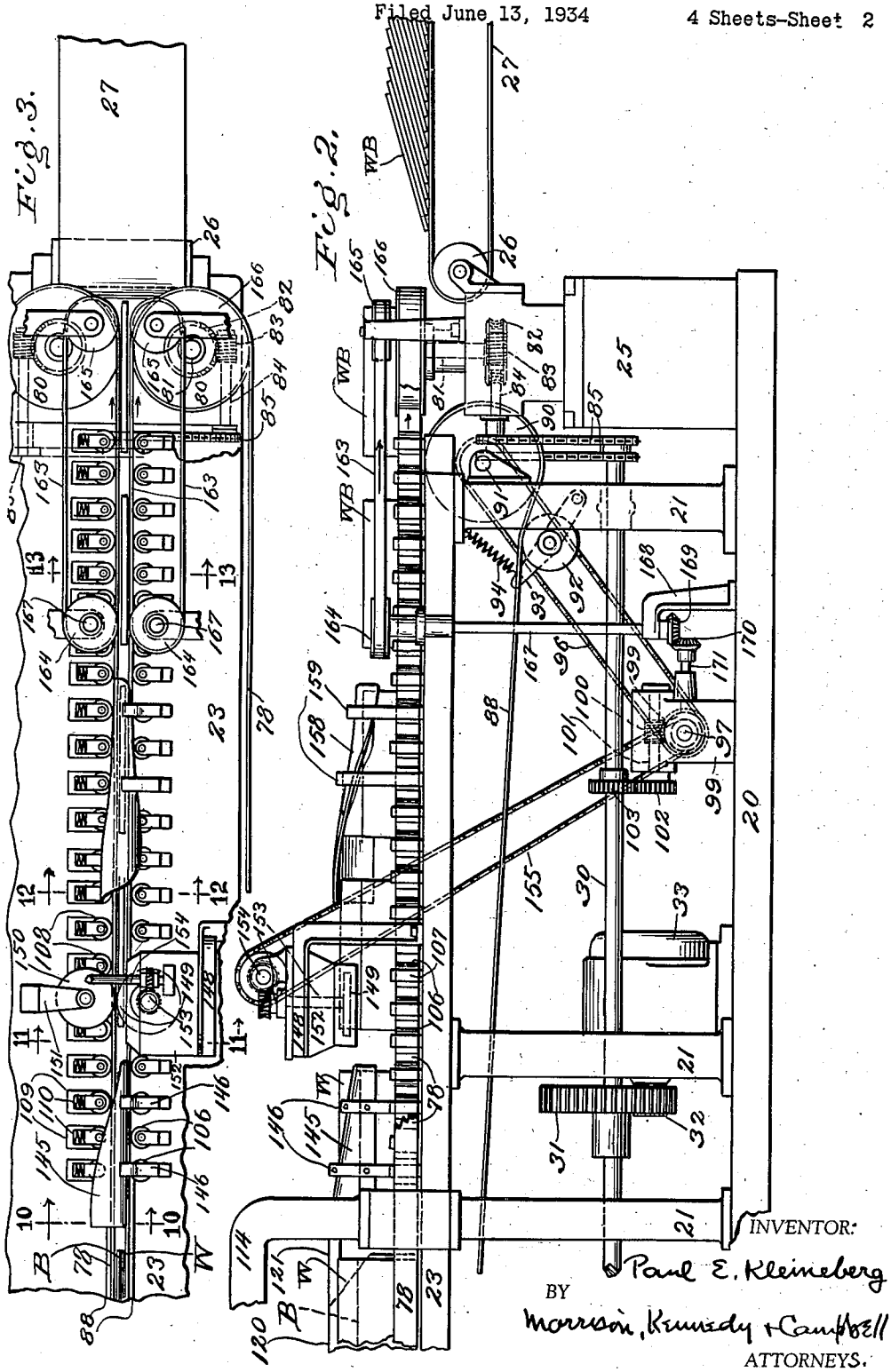
Fig. 1

INVENTOR:
Paul E. Kleineberg
BY
Morrison, Kennedy & Campbell
ATTORNEYS.

Feb. 18, 1936. P. E. KLEINEBERG 2,030,880

WRAPPING MACHINE

Filed June 13, 1934 4 Sheets-Sheet 2

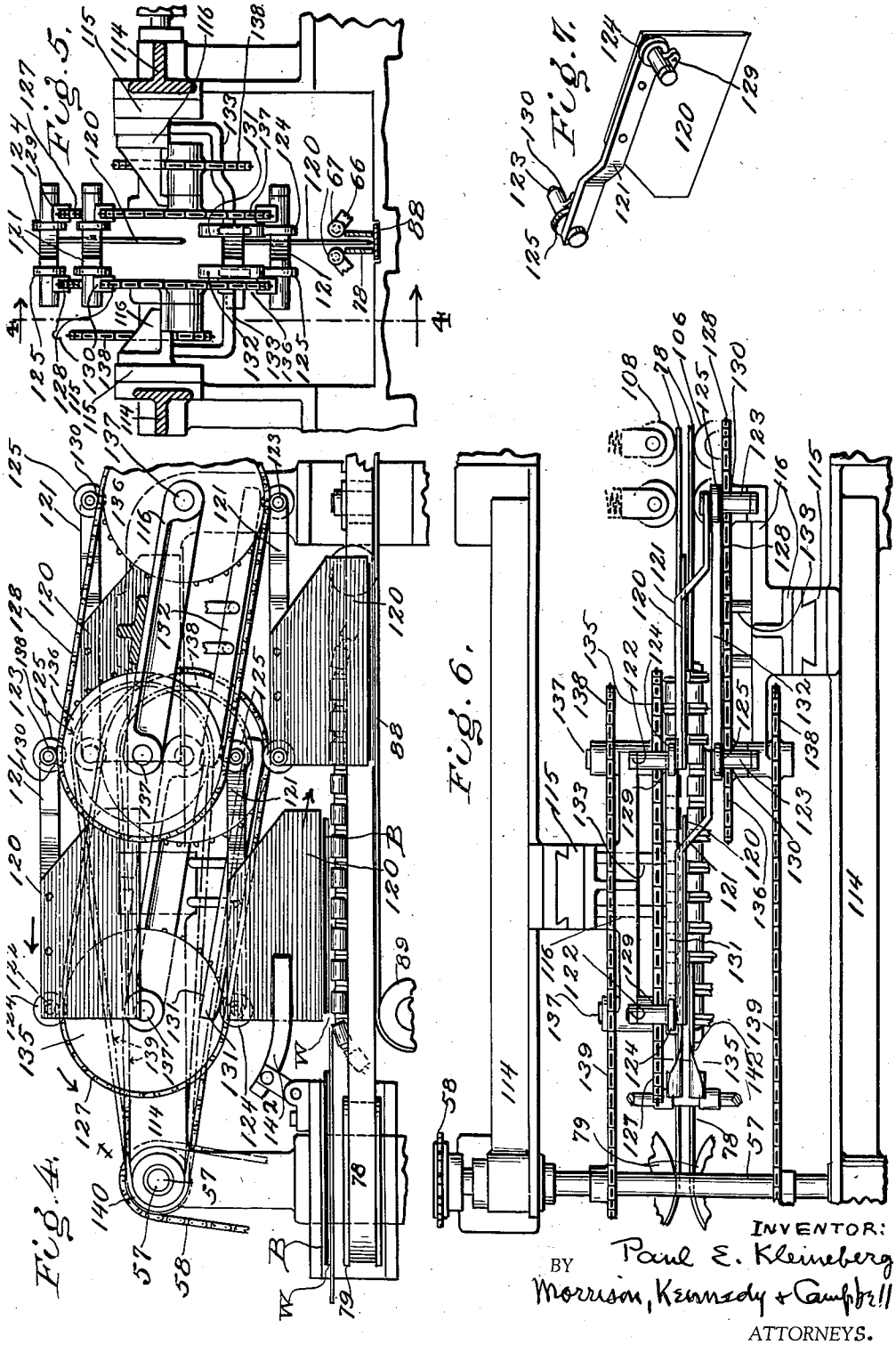


INVENTOR:
Paul E. Kleineberg
BY
Morrison, Kennedy & Campbell
ATTORNEYS.

Feb. 18, 1936. P. E. KLEINEBERG 2,030,880

WRAPPING MACHINE

Filed June 13, 1934 4 Sheets-Sheet 3

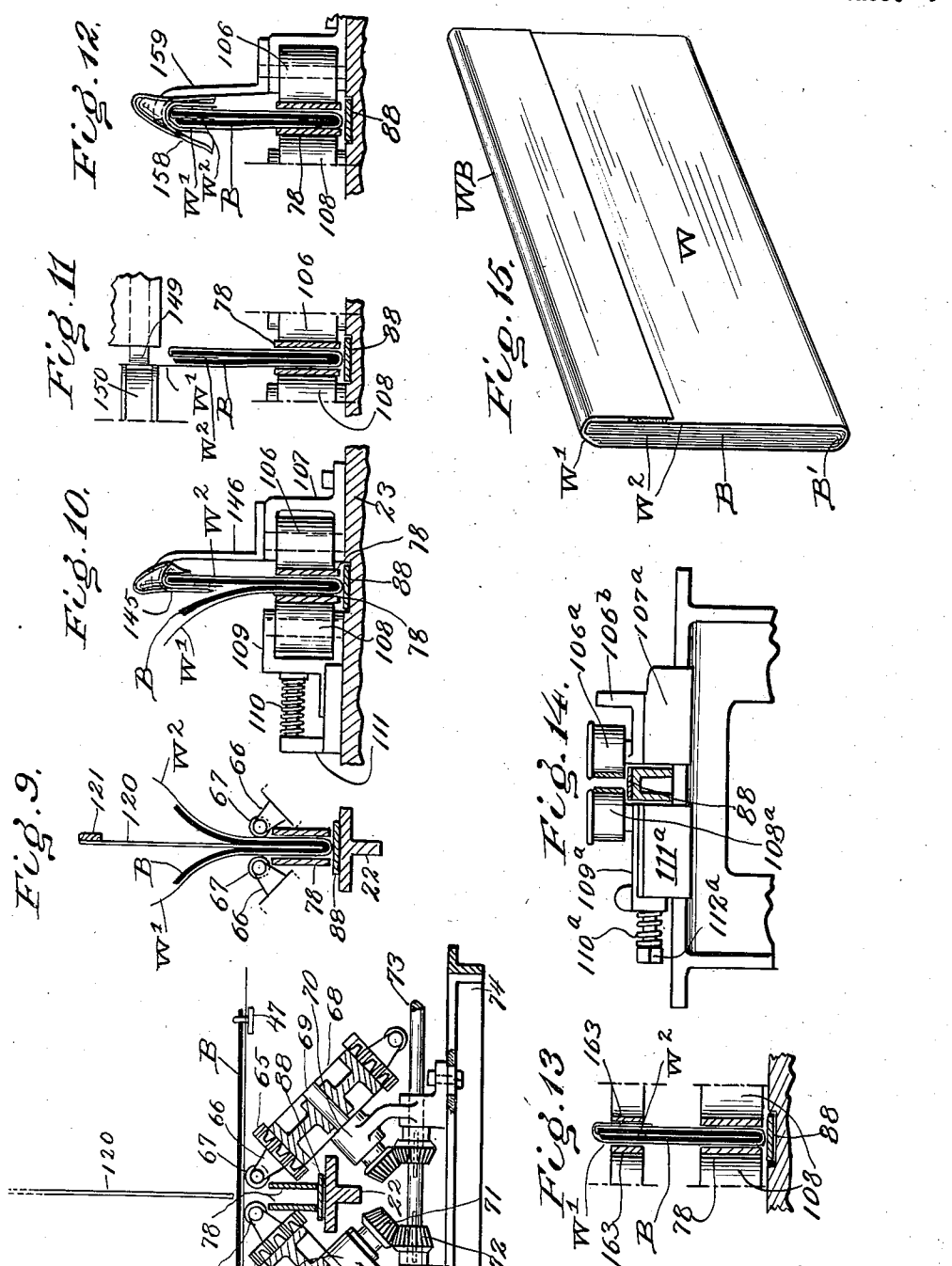


INVENTOR:
Paul E. Kleineberg
BY
Morrison, Kennedy & Campbell
ATTORNEYS.

Feb. 18, 1936. P. E. KLEINEBERG 2,030,880

WRAPPING MACHINE

Filed June 13, 1934 4 Sheets-Sheet 4



INVENTOR:
Paul E. Kleineberg
BY
Morrison, Kennedy & Campbell
ATTORNEYS.

Patented Feb. 18, 1936 2,030,880

UNITED STATES PATENT OFFICE

2,030,880

WRAPPING MACHINE

Paul E. Kleineberg, Easton, Pa., assignor to T. W. & C. B. Sheridan Company, New York, N. Y., a corporation of New York

Application June 13, 1934, Serial No. 730,377

14 Claims. (Cl. 93—2)

This invention relates to wrapping machines, and more particularly automatic machines for the wrapping of periodical magazines, catalogs or other books or pamphlets, or analogous articles, for example for mailing purposes.

The general object of the present invention is to afford a wrapping machine of the class referred to which will be completely automatic in operation, rapid and accurate in output and delivering the article securely wrapped and preferably sealed by adhesive in readiness for shipping or mailing. A special object is to afford an automatic wrapping machine in which the feed or travel of a series or procession of the articles to be wrapped, and a procession of wrapping sheets therefor, and the application and securing of the wrapping sheets to the articles, are effected with efficient cooperation during continuous travel or advance so as to deliver at the discharge end a series of completely wrapped and secured articles.

Another object is to afford a wrapping machine through which the article, the wrapping sheet, and the wrapped article, advance not only with continuous travel, the operations performed while in motion, but along a straight line of feed or travel, the article entering the machine at the infeed end and advancing straightly and horizontally through the machine for discharge in the same straight line of travel, thereby permitting high rate of operation.

A further object is to afford such a continuous-travel wrapping machine wherein the book or pamphlet and the wrapper are first assembled flatly, and the combined book and wrapper are then folded, preferably by a single fold located near the center of the width of the book, this action being performed during travel, the folded book, with the wrapper folded about it, thereafter advancing edgewise for the succeeding operations.

A further object is to afford an open construction of machine in which the several operations are in plain view, and the operating parts readily accessible for purposes of adjustment and repair or for the removal of books or wrappers in case of defective operation.

Further objects include the provision of specific mechanisms for performing the successive operations on the article or book and the sheet or wrapper as will be herein described.

Other and more particular objects and advantages of the invention will be explained in the hereinafter following description of an illustrative embodiment thereof or will be understood by those conversant with the subject. To the attainment of such objects and advantages the present invention consists in the novel wrapping machine and the novel features of operation, combination, mechanism and construction herein illustrated or described.

In the accompanying drawings, Figure 1 is what may be described as a front elevation of the left half of a wrapping machine embodying the present invention, especially adapted for the wrapping of magazines, books or the like, with a single fold therein.

Fig. 2 is a front elevation corresponding to Fig. 1 of the right half of the same machine, Fig. 2 partly showing certain parts in common with Fig. 1, the two figures thus being combinable as a complete elevation view.

Fig. 3 is a top plan view of that part of the machine shown in Fig. 2.

Fig. 4 is a front elevation on a larger scale and in greater detail of the folding mechanism shown in Fig. 1, taken partly in section on the line 4—4 of Fig. 5.

Fig. 5 is a right elevation of the folding mechanism shown in Fig. 4.

Fig. 6 is a top plan view of the folding mechanism shown in Figs. 4 and 5.

Fig. 7 is a detached perspective view of one of the folding members.

Figs. 8 and 9 are transverse vertical left elevations partly in section respectively on the section lines 8—8 and 9—9 of Fig. 1.

Similarly Figs. 10, 11, 12 and 13 are transverse vertical left elevations partly in section respectively on the lines 10—10, 11—11, 12—12 and 13—13 of Fig. 2.

Fig. 14 is a transverse vertical left elevation and section showing a modification of the devices shown in Fig. 8.

Fig. 15 is a detached perspective view of the completed folded, wrapped and sealed product or book.

The illustrated wrapping machine may be considered as operating upon relatively thin pamphlets B or other books or analogous assemblages of sheets; and the construction is such that each book is formed with a substantially central fold B', and the wrapper W having been infed with the book is folded therewith, one of its sides or flaps W' being folded over and down for sealing by adhesive, the other flap W^2 having previously been folded over and down and tucked in between the two portions of the folded book. The books and wrappers are shown as being infed horizontally and assembled, and thereafter folded

or forced downwardly along the center line, so that the folded book thereafter stands edgewise, and advances in a vertical plane through the machine, with the fold B' downward, for the subsequent operations of tucking in the flap W^2, applying adhesive, overfolding the flap W' and applying pressure to fix and seal the completed product or wrapped book W B.

Various adjustments for differences in thickness of book will be understood, and adjustments also for differences in width of book, that is the vertical dimension thereof when traveling through the machine. The horizontal length of the traveling books is of no consequence excepting that shorter books may be fed in more frequently than longer ones. In any case the infeed of the wrappers to the successive books is to be carefully synchronized by the timing and adjustment of the action. Certain adjustments are shown for variations in book dimension and analogous ones will be understood where not shown.

Referring first to some of the general parts of the machine, above a base **20** is shown a system of legs or columns **21** carrying a first table or support in the form of an angle iron **22** at the left and a second or main table **23** at the right. To the right of these parts is mounted on the base a large column **25** carrying the operating parts at that end of the machine. This column carries also a transverse roller **26** about which travels an apron or belt **27** constituting a conventional delivery means, arranged to receive the discharged products W B and convey them slowly to a suitable receiving point.

At the extreme left of the base **20** is shown the frame **29** which supports the hoppers for the books and wrappers, although the latter might be supplied from a paper roll fed and severed in a well known manner. In the lower part of the machine turning in the columns **21** is the longitudinal main or power shaft **30**, which may be driven continuously through a gear **31** carried on the shaft meshing with a pinion **32** on the shaft of a driving motor **33**.

The book hopper **35** is shown only diagrammatically to indicate any conventional book supply device. A pusher or extracting device **36** is arranged to force the lowermost book B from the hopper, where it is caught between initial feed rolls **38** and thrust rightwardly to start its travel through the machine. A book feeding belt **39** is shown passing around the roll **38** and carrying pushers **40** at proper intervals for the advancing of a succession of books, the belt passing also around a pulley on the driving shaft **57** to be described and a pulley **41** at substantially the same level as the pulley **38**. By this means each book is thrust advancingly to the right to where it is engaged and conveyed by the succeeding conveying means to be described, after traversing a fixed plate **42** bridging the space from the feed rolls **38** to the main conveyor, and supporting the book being thrust rightward by the pushers **40**.

The wrapping feed hopper **43** is only diagrammatically shown. It may have a separator and an extractor of the usual kind (not shown) to draw the lowermost sheet from the hopper and place it upon a conveying means or belt **47** having a series of spaced pushers **48** to cause the successive wrappers to travel at an upslant to where they meet the successive books. In referring to a belt it is intended to include chains, and in fact there should here be a plurality of chains **47** to ensure correct conveying and accurate timing. The belt or chains **47** are shown as traveling around a pulley or pulleys **49** adjacent to the hopper and a pulley or pulleys **50** adjacent to the book path, the book and wrapper meeting at or beyond this point and advancing rightwardly to the subsequent conveying means.

The set of conveying belts or chains **47**, traveling at each side of the center, is shown as extended rightwardly through the folding mechanism and thence over pulleys **51** and downwardly over pulleys **52** and thence leftwardly to idler pulleys **53** and thence back to the initial pulleys **49**. This system may be driven by a drive chain **54** extending from a sprocket on shaft **59** to be described, to a sprocket 54^a on a cross shaft 54^b, the shafts 54^b carrying a gear **55** meshing a gear 55^a on the shaft **56** which carries the pulley **49**. The gears afford the necessary reversal for the correct direction of drive of the chains **47** by the pulley **49**.

On top of the left column **21**, or an upward extension thereof, is shown a drive shaft **57** from which the drive of the belts or chains **39** is taken. The shaft **57** may carry a sprocket wheel driven by a chain **58** from a similar sprocket wheel on a cross shaft **59** mounted in a bearing block **60** at the base of the machine, the shaft **59** carrying a worm wheel **61** driven by a worm **62** on the main shaft **30**.

The assembled books and wrappers when passing through the folding mechanism are subjected to the descent and pressure of vertical folding members or plates which come down longitudinally upon the middle part of the books and thrust them downwardly, thus folding the book sides against the folding plate, as will be described. Where the combined book and wrapper travel advancingly under the folding plate they are supported by spaced conveying devices or chains **65**, one at each side of the vertical center line of the machine, and each composed of a series of links articulated to each other, each link carrying an upstanding block or projection **66**, and these carrying rollers **67**, the rollers being the parts that take the actual thrust as the books are forced downwardly between them in the folding operation. The conveyor chains **65** are shown as traveling around sprocket wheels **68**, these being set at an incline, as best seen in Fig. 8, so as to bring the supporting rolls **67** fairly close to the center line. The conveyor chains, including the rolls **67**, travel forwardly in unison with the book travel, so that there is no dragging of the book, and as each book is thrust downwardly in the folding operation the rollers **67** may turn, thus facilitating the folding action.

Each of the slanting sprocket wheels **68** is mounted on a shaft **69** turning in an inclined bearing **70**. Each of the shafts **69** carries a bevel gear **71**, and these bevel gears engage bevel gears **72** both mounted on a cross shaft **73** turning in bearings mounted on a special cross frame or bar **74**. The automatic drive of these parts is shown effected by a drive chain **75** extending from a sprocket on the shaft **59** to a sprocket on the shaft **73**.

As shown in Figs. 1 and 8, a pair of opposite side belts **78** is arranged below the folding position, and below the traveling rollers **67**, so that when the folding blade thrusts the book downwardly between the rollers the book will be accommodated between the side belts, and as these are traveling forward in unison with the other parts the book is securely advanced through and beyond the folding mechanism. As appears in

Figs. 2, 3, 9 to 13 the belts 78 are carried the entire length of the machine. The belts pass around pulleys 79 at their left ends and pulleys 80 at their right ends, arranged adjacent to the book path. The pulleys 80 are mounted on vertical shafts 81 each carrying at its lower end a worm wheel 82 driven by a worm 83 on a worm shaft 84. For driving these parts and the side belts there is shown a pair of chains 85 passing from sprockets on the main shaft 30 to sprockets on the respective shafts 84.

As shown in Figs. 1–3 and 9–13 there is also provided an under belt 88, traveling above the frame parts or tables 22 and 23, directly beneath the belts 78, so that the under belt may take the weight of the book. The under belt 88 passes around a left pulley 89 and a right pulley 90, the latter turning with a horizontal shaft 91. A belt tightening pulley 92 is shown mounted on an arm 93 pulled by a spring 94 so as to deflect and tighten the belt 88.

For driving these parts there is shown a chain 96 extending from a sprocket on a shaft 97 to a sprocket on the shaft 91. The shaft 97 is a cross shaft turning in a bearing block 98 on the base of the machine. The shaft carries a worm wheel 99 engaged and driven by a worm 100 on a longitudinal shaft 101 also turning in the block 98. A gear 102 on the shaft 101 is driven by a gear 103 on the main shaft 30. Thereby the described connections and the under belt are driven in unison with the book travel through the machine.

Beyond the folding mechanism it is desirable that the side conveying belts 78 be held up snugly to the traveling books. For this purpose a series of pressure pulleys 106 is shown along the front side of the front belt, each pulley or roll turning loosely on a vertical axle on a bracket 107 mounted on the table 23. Similarly, behind the rear belt 78 is a series of pressure pulleys 108 mounted on brackets 109. In this case preferably the brackets 109 are slidable, and are shown pressed forwardly by springs 110, so that the rollers and belts are held forcibly against the sides of the folded book, near its lower part, thus tending to render the fold more permanent and hold the parts of the book and wrapper snugly against displacement during the various operations thereon.

In the modification shown in Fig. 14 the front pressure rolls or pulleys 106^a are mounted on a fixed carriage 106^b adjustable on the fixed bracket 107^a. The entire line of rear rolls 108^a is mounted on a single long carriage 109^a, fitted slidably to the bracket 111^a and pressed frontwardly by springs 110^a surrounding bolts 112^a connected to the bracket 111^a. The carriage 106^b may be adjustable laterally frontward or rearward to accommodate the conveyor to books of differing thickness; and generally speaking each unit of the machine may be similarly made adjustable in obvious ways for variations for book thickness and for book and wrapper width variations.

Coming now to the book or pamphlet folding mechanism shown in Figs. 1 and 4–9 this mechanism is shown mounted on a pair of opposite overhead frames 114, the front one of which is omitted from Fig. 4. In order to permit vertical adjustment sliding dovetail mountings 115 are shown by which vertically sliding brackets 116 are supported on the overhead frames 114, as best seen in Figs. 5 and 6.

The active instruments of the folding mechanism are a series of vertical folding plates 120, four of them being a convenient number, although there might be more or less, and conceivably a single plate might serve although restricting output. The several folding plates are arranged to travel in succession around a local vertical circuit, one after the other, each serving for the folding of one book, moving progressively downward for that purpose while traveling forward at a speed equal to the travel of the book, each plate thereafter rising progressively from the folded book, and thereafter traveling reversely for repetition of action on a later book. As best seen in Figs. 4 and 7 each of the folding plates 120 is beveled at its upper right corner so as to make clearance with the preceding plate. Each plate is shown attached to and depending from a carrier or link 121, and this system or series of links is arranged to travel around the local orbit, each link remaining horizontal throughout its travel, so that the motion of each plate is a motion of translation, each plate however passing through the orbit described, indicated generally by the four positions shown in Figs. 1 and 4. As the travel of the books is from left to right the parts of the folding mechanism will be described in that aspect. The folding plate carrier 121 is shown as having a left pin 122 which projects at the rear side and a right pin 123 which projects at the front side. Adjacent to the link or carrier 121 is a left roller 124 turning on the pin 122 and similarly on the pin 123 is a right roller 125, these rollers taking part in the guidance of the carrier and plate. This construction of plate and carrier permits the several plates and carriers to be moved around the local orbit by means of a pair of parallel chains 127 at the left and 128 at the right, the left chain 127 being somewhat to the rear of the path of book travel and the right chain 128 somewhat in front of it, as seen in Fig. 6. The mounting of each of the four carriers 121 on the chains, to travel with parallel movement around the local orbit, may be effected by the provision on each of the chains of four special links provided with sleeves. Thus on the left chain 127 are four sleeves 129 engaged by the pins 122 of the carriers and on the right chain 128 are four sleeves 130 engaged by the right pins 123 of the carriers. The two chains are slanted downwardly to the right, as seen in Figs. 1 and 4, so that the motion of each of the carriers and folding plates is a descending motion during forward travel, followed by a semicircular motion from the low point to an elevated point, thence followed by a left or retracting motion at an upslant to the highest point of travel, and thence by a semicircular motion downwardly to the initial point.

The critical part of the travel of each of the folding plates 120 is the inclined downward-forward travel during which each plate is forced to descend and thrust the advancing book downwardly between the traveling rolls 67 and the traveling belts 78, as best shown by comparison of the diagrams Figs. 8 and 9. In order to back up the plates in this folding movement or downward-forward travel, there is provided above the path of the left roller 124 of each carrier a left track 131 and below the right roller 125 a right track 132, these being fixed tracks beneath which the rollers travel, the tracks being supported by fixed brackets 133 mounted on the vertical sliding brackets 116 as seen in Figs. 5 and 6.

The left and right chains 127 and 128 are preferably sprocket chains mounted at their left and right ends to travel around sprockets or wheels 135 and 136 respectively. These sprockets

are shown mounted on shafts 137 and in each case one of these shafts contains a driven sprocket wheel 138 engaged by a chain 139 actuated from a driving sprocket 140 on the shaft 57 already mentioned.

Following the folding operation the combined and folded book and wrapper are subjected to a tucking-in operation by means of a tucking tool or instrument 145 shown in Figs. 2, 3 and 10 and mounted upon a bracket 146 attached on top of one of the brackets 107. The operation of the tucking in means is to turn over and fold down between the two portions of the book the front flap W^2 of the wrapper, so that in the final wrapped and sealed product the wrapper will be interlocked with the book, this operation occurring during the continuous advancing travel of the book and wrapper. The tucking-in means or instrument 145 is shown as consisting of a fixed blade or plate of special contour arranged in the path of the advancing book and wrapper so that the folding over and tucking down into the book take place progressively by reason of the advancing travel of the book. The tucking plate 145 for example may be of an inverted U-shape, the outer leg attached to the bracket 146 and the inner or down turned leg being shaped progressively, somewhat in the manner of a tucking instrument on a sewing machine. The left hand part of the tucking blade stands up above the wrapper flap and its tucking surface slopes gradually downward to the right, this thereby serving also to enter between the two parts of the book and spread them open for the reception of the wrapper flap.

Following the tucking-in of the front wrapper flap W^2 the product is subjected to the applying of adhesive for example by a gluing disk 149 arranged to lay a stripe of glue in such position that when the rear flap W' is folded over and down against the front flap W^2 the glue will effect a sealing of the flaps to each other. As before the adhesive applying means operates during the advancing travel of the product. Preferably the glue stripe is applied to the interior side of the upstanding rear flap W' of the wrapper. The glue disk 149 is shown as of the proper elevation for this purpose, see Figs. 2, 3 and 11. Opposite to the glue disk 149 is shown an opposing roll 150 compelling the wrapper flap to receive the adhesive from the disk, the roll 150 being mounted on a fixed bracket 151. The glue disk 149 runs partly in a glue vessel 152, mounted on bracket 148, and projects laterally therefrom into gluing position. The disk is mounted at the lower end of a shaft 153, the upper end of which is connected by helical gearing with a cross shaft 154, the rear end of which carries a sprocket connected by chain 155 with a sprocket on the shaft 97. By this arrangement the glue roll is driven in unison with the book travel and each wrapper receives a stripe or line of sealing glue as described.

Preferably the next operation consists of the overfolding of the rear wrapper flap W' by means of an instrument 158 as shown in Figs. 2, 3 and 12, so as to bend the wrapper snugly down over the book and flatly against the front surface of the already tucked in front wrapper W^2. The overfolding tool 158 is in the nature of a tucking instrument, of fixed character, mounted on brackets 159. The first or left end of the folding plate 158 is engaged by the advancing wrapper flap, the latter being thereby gradually bent over and turned down as described, the right end of the instrument being substantially inverted U-shaped.

Finally, before the delivery the assembled and folded book and wrapper are subjected to sealing or squeezing pressure by means of opposite members or belts 163 as shown in Figs. 2, 3 and 13. Each of the sealing belts 163 travels around a left pulley 164 and a right pulley 165, these pulleys being mounted on special fixed brackets 166. The shafts 167 of the opposite pulleys 164 are shown extended downwardly to where they are revolved for the continuous operation of the belts in unison with the travel of the books. Each of the opposite shafts 167 is mounted on a bracket 168, the shaft at its lower end carrying a bevel gear 169 meshing with a bevel gear 170 on a longitudinal shaft 171 connected by suitable gearing with the shaft 97. The timing of these operating connections, as in the case of the several other mechanisms, is such that the advancing motion is in all cases equal to that of the conveyor belts 78 and 88, so that the books and wrappers travel continuously through the machine from right to left, and, after the folding operation, advance in a straight horizontal line.

The present invention may be summed up as a machine for folding and wrapping books or the like comprising the following cooperative elements or novel subcombinations thereof. Conveying means for causing travel through the machine of a procession of books, preferably edgewise, each book passing through the successive stations of the machine, preferably without pausing. Means for feeding a procession of wrappers and assembling them flatwise with the successive books during travel so that each book is positioned upon the middle part of its wrapper. Means for folding each book and wrapper together, namely by thrusting the middle thereof downwardly, folding the combined components into a pocket or recess, between traveling parts, for example, the described traveling abutment means which causes the sides of the book and wrapper to fold upwardly into edgewise position, the components being thus squarely folded, with the wrapper snugly enclosing the fold, and the top edge or edges or flaps of the wrapper standing up above the top edge of the book. Means thereafter overfolding one wrapper flap and tucking it down between the two parts of the book. Means thereafter applying adhesive to one of the wrapper flaps along a longitudinal sealing line. Means thereafter folding over and down the second wrapper flap and applying it against the first flap for sealing by the adhesive. Finally the means for applying during travel a sealing pressure upon the second wrapper flap along the sealing line.

There has thus been described a wrapping machine embodying the present invention and attaining the objects and advantages recited. Since, however many matters of operation, combination, mechanism and construction may be variously modified without departing from the principles of the invention it is not intended to limit the invention to such matters except so far as set forth in the appended claims.

I claim:

1. A machine for folding and wrapping books or like articles comprising conveying means for causing continuous travel through the machine of a procession of books, means for feeding a procession of wrappers and assembling them flatwise with the successive books during advancing travel so that each book is positioned upon the middle part of the corresponding wrapper, means

operating during travel and advancing with the book and wrapper for folding each book and wrapper by thrusting the middle thereof downward, and traveling abutment means advancing with the book and wrapper and between which the book is so thrust down, causing the sides of the book and wrapper to fold upwardly into edgewise position, with the side flaps of each wrapper standing flatly against the side faces of the folded book and with the top edges of the flaps above the top edge of the book, means for thereafter during travel folding over one wrapper flap and tucking it down between the two parts of the book, means for thereafter during travel applying adhesive to one wrapper flap along a longitudinal sealing line, means for thereafter during travel folding over and down the second wrapper flap and applying it to the first flap for sealing by such adhesive, and means for applying during travel sealing pressure upon the second wrapper flap at the sealing line.

2. A machine for folding and wrapping books or like articles comprising conveying means for causing travel through the machine of a procession of books, means for feeding a procession of wrappers and assembling them flatwise with the successive books during travel so that each book is positioned upon the middle part of the corresponding wrapper, means operating during advancing travel for folding each book and wrapper by thrusting the middle thereof downward, and abutment means comprising opposite endless members one portion of each of which advances longitudinally with the book and wrapper and between which the book is so thrust down, causing the sides of the book and wrapper to fold upwardly into edgewise position, with the side flaps of each wrapper standing flatly against the side faces of the folded book and with the top edge of at least one of the flaps projecting above the top edge of the book, and means for thereafter during travel folding over and down the projecting wrapper flap.

3. A machine for folding and wrapping books or like articles comprising conveying means for causing travel through the machine of a procession of books assembled flatwise with wrappers with each book positioned upon the middle part of the corresponding wrapper, means operating during travel for folding each book and wrapper by thrusting the middle thereof downward, and traveling abutment means between which the book is so thrust down, causing the sides of the book and wrapper to fold upwardly into edgewise position, with the side flaps of each wrapper standing flatly against the side faces of the folded book and with the top edge of at least one of the flaps projecting above the top edge of the book, said traveling abutment means comprising an endless member, one portion of which travels longitudinally with the book advance, and having a series of abutment rollers on longitudinal axes adapted to be turned during the folding, and means operating after such folding for folding over and down the projecting wrapper flap.

4. A machine for folding and wrapping books or like articles comprising conveying means for feeding into the machine a procession of books, means for feeding a procession of wrappers and assembling them flatwise with the successive books so that each book is positioned flatwise upon the corresponding wrapper, folding means advancing with book travel for folding each book and wrapper comprising a folder operated to thrust the middle thereof downward and opposite abutment means between which the book is so thrust down, causing the sides of the traveling book and wrapper to turn upwardly into edgewise position with the side flaps of each wrapper standing flatly against the outside faces of the folded book and with the top edge of one or both of the flaps above the top edge of the book, means for therebeyond conveying edgewise from the folding means the combined and folded book and wrapper, and means operating during travel for folding over one wrapper flap and sealing it to the other flap.

5. A machine as in claim 4 and wherein the advancing folding abutment means comprises opposite rollers between which the book rolls as its middle is thrust downward.

6. A machine for folding and wrapping books or like articles comprising a folder blade having means for advancing it with book travel and lowering it for folding each book and wrapper by thrusting the middle thereof downward, opposite abutment means advancing with book travel and between which the book is so thrust down by said blade, thereby causing the sides of the traveling book and wrapper to turn upwardly into edgewise position, and means for therebeyond conveying edgewise from the folding means the folded book and wrapper.

7. A machine as in claim 6 and wherein is a plurality of folder blades, arranged in endless series, with means actuating them to descend while advancing with the books, for the folding operations, and causing each blade thence to ascend and return reversely for repetition of action.

8. A machine as in claim 6 and wherein the abutment means comprises a plurality of successive abutments arranged in endless series and caused to advance in unison with the advancing movement of the folder blade.

9. A machine as in claim 6 and wherein is a plurality of folder blades, arranged in endless series, with means actuating them to descend while advancing with the books, for the folding operations, and causing each blade thence to ascend and return reversely for repetition of action, and the abutment means comprises an endless series of abutments and means causing the same to advance in unison with the books and folder blades.

10. A machine for folding and wrapping books or like articles comprising conveying means for feeding into the machine a procession of books, means for feeding a procession of wrappers and assembling them flatwise with the successive books so that each book is positioned flatwise upon the corresponding wrapper, a circulating series of folding blades advancing with book travel and means for causing each blade to fold a book and wrapper by thrusting the middle thereof downward, and opposite traveling abutment means between which the book is so thrust down.

11. A machine as in claim 10 and wherein the series of folding blades is mounted on endless means to travel a local circuit in a vertical plane with the operative part of the travel at a descending-advancing incline.

12. A machine as in claim 10 and wherein the series of folding blades is mounted on endless means to travel a local circuit in a vertical plane with the operative part of the travel at a descending-advancing incline, such endless means comprising parallel chains, each blade mounted on both chains to control its posture during travel.

13. A machine as in claim 10 and wherein the means for causing folding blade operation comprises a pair of parallel chains, means driving them in unison, and a system of carriers, each carrying a blade and each having one end connected to one chain and the other end to the other chain, whereby the blades travel a local circuit, and each blade remains parallel throughout its movement.

14. A machine as in claim 10 and wherein the series of folding blades is mounted on endless means to travel a local circuit in a vertical plane with the operative part of the travel at a descending-advancing incline; and with fixed inclined tracks beneath which the blades travel and which take the upward thrust during folding.

PAUL E. KLEINEBERG.