

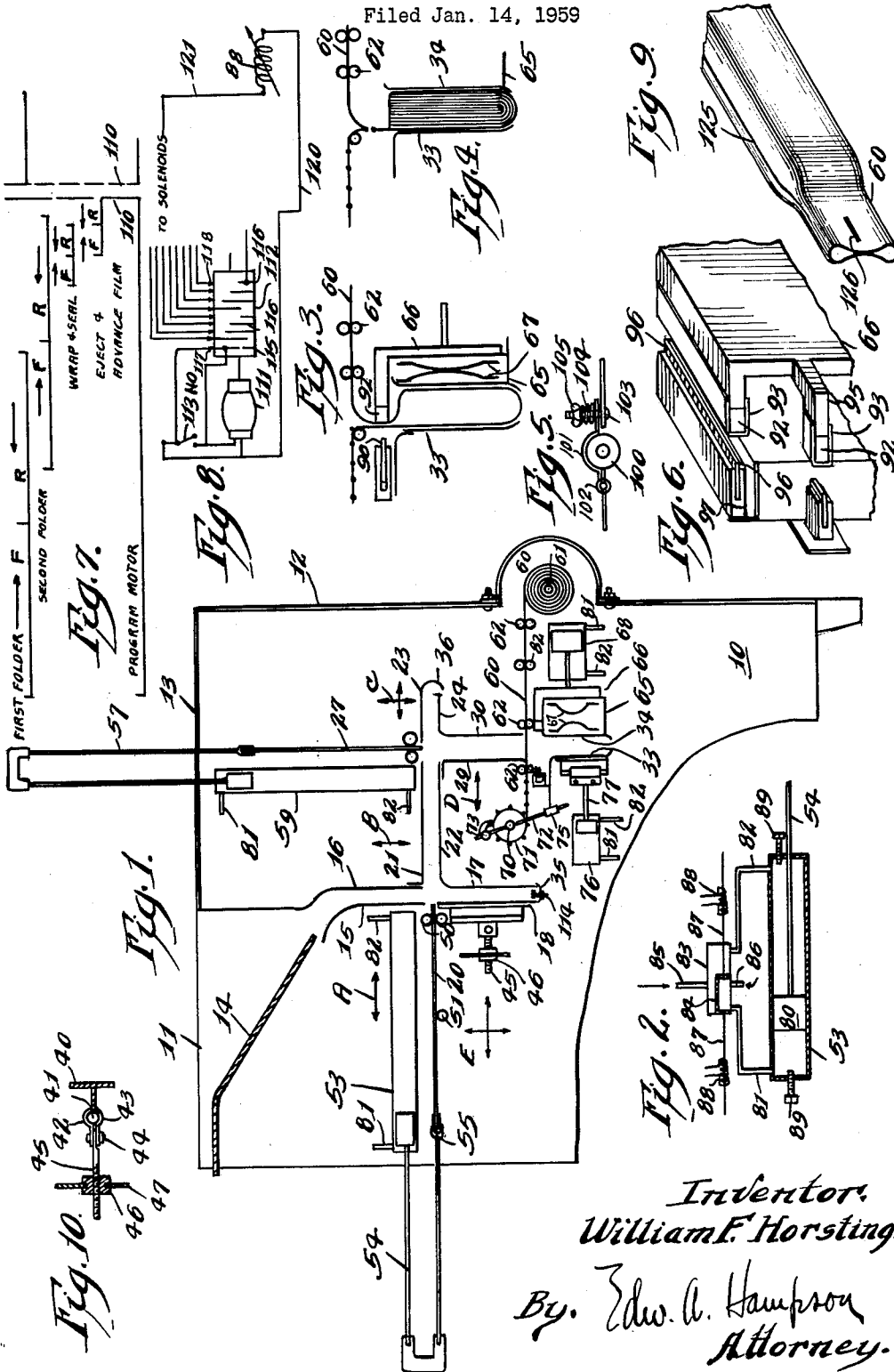
Oct. 30, 1962

W. F. HORSTING

3,060,658

WRAPPING

Filed Jan. 14, 1959



Inventor:
William F. Horsting.

By: Edw. A. Hampson
Attorney.

1

3,060,658

WRAPPING

William F. Horsting, Wilmette, Ill., assignor of sixty percent to Louise H. Horsting, fifteen percent to Edward S. Hampson, and twenty-five percent to William F. Horsting, as trustee

Filed Jan. 14, 1959, Ser. No. 786,738

7 Claims. (Cl. 53-120)

This invention relates to the wrapping of a periodical or the like, in particular to the provision of a protective wrapping for protecting a newspaper for delivery so that it may be received in a dry and unsoiled condition.

The invention also comprehends an apparatus for folding the periodical and enveloping it in the protective wrapper.

While the inventions hereof were conceived primarily for the purpose of providing a protective wrapper for a newspaper, it will be readily understood that if for any reason desirable, the inventions hereof might be availed of in connection with providing a protective wrapper for mailed newspapers or other periodical material in the nature of a magazine or the like.

It is further conceived that the apparatus hereof, with suitable modification, might be utilized for applying a protective wrapping to various articles as, for example, a book or the like, or other articles of the same general form. In such case the folder portion of the apparatus would not be utilized and the enveloping or wrapping portion would, of course, have to be modified in its proportions so that it would properly apply the wrapper to the article.

Specifically, the disclosure hereof is with respect to a preferred form of the invention wherein the apparatus disclosed is one for folding a newspaper and enveloping it in a sealed plastic film wrapper, and there is, of course, included the end product, that is, the protectively enveloped newspaper.

By the utilization of the invention hereof it is possible to provide a newspaper with a relatively cheap protective envelopment which will protect the contents of the package from the effects of rain or snow and prevent it from being soiled in connection with the delivery of the newspaper to the customer.

The principal object of the invention hereof is that of providing a protective wrapping for a newspaper or other article of regular form and to provide an apparatus for preparing a newspaper for envelopment in the wrapper together with the requisite devices for securing the article in the wrapper.

An additional object of the invention is that of providing a protective wrapping, as of a thin plastic film, whereby the cost of the wrapping is extremely small, the such film preferably being a transparent film which, if desired, may have printed thereon advertising or publicity material printed on the inside surface of the wrapping, whereby such material, while protected from the elements is readily visible through the wrapping.

Other and further objects of the inventions hereof will become apparent upon reading the following specification when considered in connection with the accompanying drawings.

In the accompanying drawings, FIG. 1 is a diagrammatic view in the nature of a cross section and discloses an apparatus for folding a newspaper and enveloping the newspaper in a film-type wrapper.

FIG. 2 is a schematic showing of the power cylinders utilized in the apparatus of FIG. 1;

FIG. 3 is a somewhat enlarged diagrammatic view of that portion of the apparatus in which the wrapping is secured about the article being wrapped;

2

FIG. 4 is a similar view illustrative of the actual step of securing the wrapper about the article being wrapped;

FIG. 5 is a detail view showing a brake which in the apparatus is applied to restrain the roll of wrapping material;

FIG. 6 is a detail of the sealing elements of the device, the showing being in perspective;

FIG. 7 is a line diagram of the sequence of the operation of the apparatus;

FIG. 8 is a line diagram of the sequencing control;

FIG. 9 is a perspective view of the wrapped article; and

FIG. 10 is an enlarged view of an adjustment device for adjusting the position of a wall of a slot or pocket.

Since, as above referred to, the specific disclosure hereof is based on a preferred form of the invention, that is, a protectively wrapped newspaper, and the apparatus therefor, it of course follows that the following description will be that for providing a protectively wrapped newspaper. Further, in accordance with the foregoing, it will be understood by those skilled in the art that the principles which will be disclosed can be adapted to the wrapping of various periodicals and articles of regular form, and that the apparatus specifically disclosed may be readily adapted to handle articles other than newspapers.

Here, in referring to the provision of a protective wrapper for a newspaper, it is to be clearly understood that the description of the disclosure is based on the wrapping of a newspaper as such is ordinarily available to the public. The starting point for the wrapping of a newspaper is the newspaper in its form as ordinarily available, that is, for the so-called full size newspaper with one fold, that is, folded to one-half of a full page size. With reference to the wrapping of the so-called tabloid papers, which are initially of a size substantially half the page size of a full size newspaper, such is the initial starting point of the wrapping procedure.

In the procedure for enveloping the newspaper in a protective wrapper it is first folded along a line parallel to the mid-fold of the standard paper or parallel to the back fold of the tabloid size paper. This first step is followed by a second folding parallel to the first fold so that in each case the paper is folded twice, whereupon it is ready for wrapping. The various specific steps of the general procedure just described, of course, will be described hereinafter in detail in connection with the construction of the apparatus and its operation, and in connection therewith various details of such operation not above referred to will be brought out in detail.

The device is housed and mounted in a generally cabinet-like structure 10 which comprises basically a pair of parallel-spaced side walls 11 between which the operative parts of the apparatus are mounted. It will be understood that only one of the side walls 11 is shown in the drawing, that is, back wall 11, looking at FIG. 1, the front wall 11, of course, not being shown since the figure is essentially a section taken more or less centrally between spaced side walls 11. The various slot-forming walls which will be described, it will be understood, extend transversely with respect to side walls 11 and are mounted thereto. To provide rigidity of the cabinet and to enclose the operating mechanisms, a wall such as front wall 12 and top wall 13 may be provided, which walls 12 and 13, of course, also extend transversely of the spaced side walls and are suitably mounted thereto. The construction of the cabinet 10 being actually of no particular importance, constituting merely support for and providing for enclosure of the operating mechanisms, such will not be further described.

A feed table 14 is provided for entering a newspaper to be folded into the first folder slot which is formed by

spaced walls 15, 16, 17 and 18. It will be noted that the slot formed between 15 and 16 and between 17 and 18 are of the same length so that a standard newspaper will be positioned therein and will be centrally located with respect to first folder 20. The walls of the first folder slot are so constructed and mounted that wall 15 may be moved slightly with respect to wall 16 so that the space between these walls may be slightly varied so as to accommodate newspapers of different thicknesses. The adjustable mounting of wall 15 is indicated by the arrow A to indicate that a suitable adjusting means such as is shown in FIG. 10 and shown as connected to wall 18 may likewise be provided for adjusting wall 15 toward or away from wall 16. It will be understood, of course, that the slot-forming walls above described and those which will be subsequently described extend across the width of the device and at their ends are suitably mounted or supported from spaced side walls 11, or, in the case of the adjustable slot-forming walls, are suitably supported by the means permitting their adjustment, which adjusting means is in turn suitably mounted to or supported by the spaced side walls 11.

Extending at right angles from mid-height of the first folder slot comprising walls 15 to 18 there is provided first transfer slot formed by walls 21 and 22, of which wall 21 is adjustable as indicated by arrow B indicating that wall 21 may be moved to a limited extent toward or away from wall 22.

As what might be termed a continuation of the first transfer slot, and in line therewith, there are walls 23 and 24 which form a pocket to receive the forward end or portion of a newspaper which has been once-folded and advanced through the first transfer slot formed between walls 21 and 22. The pocket between walls 23 and 24 is of such depth that it accommodates the once-folded newspaper so that it is centrally positioned with respect to a second folder 27.

Extending at right angles to the first transfer slot and in line with second folder 27 there is a second transfer slot which is formed by spaced walls 29 and 30. As a continuation of the second transfer slot formed by walls 29 and 30 there is a final pocket which is formed between spaced walls 33 and 34. In connection with the foregoing description of the structure formed by the various walls, it is to be noted that wall 23 is indicated by arrows C as adjustable in two directions with respect to wall 24, that is, it is mounted to be adjustable to vary the spacing of the walls and also adjustable for varying the depth of the pocket formed between the walls. Wall 29 is indicated by arrow D as adjustable toward or away from wall 30 so as to vary the width of the transfer slot formed therebetween. The purpose of providing for varying the width between the walls comprising the various slots and pockets is that of providing adjustability for newspapers of various thicknesses. For a paper of relatively few pages, the walls will be adjusted to be relatively close together, whereas, for a thicker paper, the walls will be separated so that the folded paper may pass therethrough. The longitudinal or length adjustment provided for walls 18 and 23 is to provide for the folding of an extremely thick newspaper such as a Sunday paper.

Where a very thick paper is to be folded, wall 18 will be adjusted downwardly with respect to wall 17 so that two-thirds of the paper will be received between walls 17 and 18, whereby first folder 20 will provide for a one-third fold instead of a one-half fold, so that such paper, when propelled by the first folder 20 as it passes through first transfer slot between walls 21 and 22 will be folded so that the one part of the folded paper will be twice the length of the other portion. In such case wall 23 is adjusted relative to wall 24 so that the double-folded portion of the thick newspaper is received therein, whereby second folder 27, when it advances, will fold the longer leg of the paper midway and the paper, as it moves into the second transfer slot between walls 29 and 30 will be

folded as three folded portions instead of four folded portions, as is a thinner paper.

It will be noted that the outer ends of the adjustable pocket forming 18 and 23 are curved, as at 35 and 36, and that the curvature is such as to slightly overlap the respective stationary walls 17 and 24 so that the walls 18 and 23 may be suitably adjusted lengthwise and still, in conjunction with their respective stationary walls 17 and 24, form pockets for receiving the newspaper as has been described. Walls 33 and 34 are shown as very slightly curved at their lower ends but such is not essential, as will be apparent as a description of the apparatus proceeds.

The means providing for adjustment of wall 18, which is adjustable in two directions, one at right angles to the other, as indicated by the arrows E, is illustrated in more detail in enlarged FIG. 10. A member of T-form, identified by numeral 40 is suitably secured to wall 18. The stem of the member 40 has a bead or bulb 41 formed thereon which is embraced by a split socket member comprised of portions 42 and 43. These two parts, 42 and 43, are clamped by means of a bolt 44 which, when loosened, allows the bulb 41 to be slid through the clamp to adjust the wall 18 longitudinally. When wall 18 is thus properly positioned, bolt 44 is tightened and the clamping socket portions 42 and 43 secure the wall 18 in adjusted position. An adjusting screw 45 is also mounted on bolt 44 with its threaded end extended through nut 46 which is mounted to a fixed portion 47 of cabinet 10, or to an angle or other member which is mounted to the structure of cabinet 10. It will be apparent that on rotation of nut 46, threaded adjusting screw 45 is moved forward or backward, depending upon the direction of rotation of the nut, and accordingly, since the T-form member 40 is mounted to wall 18, wall 18 accordingly will be moved toward or away from wall 17 to widen or narrow the pocket formed between the walls 17 and 18.

Cooperating with the slot and pocket formed between walls 15—16 and 17—18, there is provided first folder 20 previously referred to. This folder member 20 is a plate-like element which operates through a suitable slit provided between the ends of walls 15 and 18 and which is directly opposite the center of the height of the first transfer slot formed by walls 21 and 22. It will be readily understood that as this first folder 20 is advanced, assuming a newspaper is positioned in the slot and pocket just above referred to, it will, pushing on the paper midway of the height thereof, fold it in half as it pushes the paper into the first transfer slot between walls 21 and 22. Guide rollers 50 may be suitably positioned for guiding the folder 20, and such supporting rollers 51 as may be desired may also be utilized for assisting in suitably supporting and guiding folder plate 20 as it is advanced and retracted.

For operating or reciprocating folder plate 20 there is provided an air cylinder 53, the piston rod 54 of which is retroverted and is connected to plate 20 at 55. The details of the air cylinder 53 are not shown in FIG. 1, but a diagrammatic showing of the air cylinder and its controls is illustrated in FIG. 2, and since such is common to each of the four cylinders shown in FIG. 1, such will be described specifically but once, but, however, such being applicable with respect to each of the four air cylinders shown in FIG. 1.

Similarly to first folder 20 there is provided a second folder 27 which is positioned opposite the second transfer slot formed by walls 29 and 30. This second folder operates through a suitable slit provided between walls 21 and 23 and positioned opposite the second transfer slot. This folder plate 27 is a plate-like member similar to first folder 20 and it is operated by a retroverted piston rod 57 which is connected to a piston in cylinder 59. It will be understood that as second folder 27 is advanced by operation of air cylinder 59, a newspaper positioned in the forward end of slot formed by walls 21 and 22, and pocket formed by walls 23 and 24, will be folded

5

and advanced into the second transfer slot formed by walls 29 and 30, and as the folder plate advances toward the end of its stroke this folded newspaper will be advanced into the pocket formed by walls 33 and 34.

Positioned just below the bottom end of the second transfer slot formed between walls 29 and 30 there is a plastic film, preferably a thermoplastic resin film such as the polyethylene film readily available on the market. This film 60 feeds from a roll which may be mounted on a spindle 61 and is guided by suitable guide rollers 62 so that the film may extend across the bottom of the transfer slot formed between walls 29 and 30. With the film so positioned across the bottom of the second transfer slot, it follows that as a newspaper is advanced through such transfer slot by second folder 27, the film will be pushed ahead of the advancing newspaper as such is advanced into the pocket formed by walls 33 and 34, so that it will result that at the end of the second folding operation the double-folded newspaper will be positioned in the pocket, in effect suspended in a U-formed loop of the film material, this being substantially and more clearly shown in FIG. 3, in which, however, for the sake of clarity, the folded newspaper positioned within the loop of the plastic is not illustrated.

For tautening the U-formed loop of plastic about the folded newspaper, wall 34 is mounted to or forms part of what might be termed a collapsible, box-form element which is comprised of two L-shaped portions reversely positioned whereby each of the L-shaped portions may in effect advance over the other L-shaped portions to provide a box-like member of variable height as these members are slide or moved one with respect to the other. The L-shaped portions, of which pocket wall 34 comprises a portion, are designated by numerals 65 and 66. Positioned between these two L-shaped portions 65 and 66 there are provided special leaf springs 67 which tend to keep the parts 65—66 separated and when forward movement of part 65 is resisted, still allows part 66 to advance as pressure is applied by piston rod of cylinder 68, the piston rod of which is connected to the L-form member 66. Here again the details of the air cylinder 68 are those of the diagrammatic showing of FIG. 2.

To maintain film 60 in a relatively taut condition across the lower end of the second transfer slot formed by walls 29 and 30, and to suitably advance the sheet by a small increment, for purposes which will subsequently be disclosed there is provided a ratchet or detent mechanism which is mounted to a shaft 70 and on which the otherwise free end of film 60 is wrapped. On this shaft there is secured a toothed wheel 71 and pivoting thereon a lever 72. On lever 72 there is pivotally mounted detent 73 which cooperates with the teeth of wheel 71. Mounted on the lower end of lever 72 there is provided a loose collar 75 adapted to slide thereon, which collar is mounted to an extended portion of wall 33, one of the walls forming the pocket defined by walls 33 and 34. It is believed that it will be obvious that as wall 33 may be reciprocated, that through collar 75 lever 72 will be caused to make an arcuate movement which, through detent 73, will advance toothed wheel 71 step by step to accordingly wrap film 60 about the shaft 70 or a core which may be suitably mounted thereon.

Wall 33 of the final or third pocket is mounted to the piston rod of an air cylinder so that the wall 33 may be moved away from the opposite wall 34 of the pocket to release the wrapped newspaper and allow it to freely discharge from the apparatus. The air cylinder provided for imparting reciprocation to wall 33 is identified by numeral 76, its piston rod connecting to the structure of wall 33 being identified by the numeral 77.

The typical air cylinder, heretofore referred to, for operating the various elements of the apparatus as described is diagrammatically illustrated in FIG. 2. The construction of these cylinders being similar it is deemed that the following description of the diagrammatic showing in

6

FIG. 2 is a full disclosure with respect to each of the such air cylinders.

It will be assumed that this diagrammatic illustration is a description of air cylinder 53. Within the cylinder, of course, there is the usual piston 80 connected to piston rod 54 and that reciprocation of piston 80 results in reciprocation of the piston rod 54. At each end of cylinder 53 there is a conduit, one of which is identified by numeral 81 the other by 82. These conduits connect to a valve housing 83 in which there is positioned a D slide valve 84. Conduit 85 opening into valve housing 83 connects to a source of compressed air, and conduit 86 is the exhaust freely open to atmosphere. Connected to the D slide valve 84 and extending in opposite directions with respect thereto there are provided valve operating rods 87 with which are associated solenoids 88 which, when respectively energized through a suitable source of electric current, will shift the D valve 84 to connect one end or the other of cylinder 53 to the source of compressed air while at the same time connecting the other end of the cylinder to the exhaust conduit 86. Such an air cylinder is relatively conventional, and it is deemed that the foregoing description of the diagrammatic representative illustration of FIG. 2 is ample to acquaint those skilled in the art with the type of instrumentality which is utilized in the operation of the device hereof. For the purpose of adjustment, more particularly for limiting the piston stroke, if desired, adjusting screws 89 or the like may be provided at each end of the cylinder so that by the adjustment thereof the end of the stroke of the piston in either direction may be limited. If an adjusting screw 89 is screwed inwardly, the stroke of the piston is shortened accordingly, or, if the screw is turned outwardly or retracted, then the piston stroke is lengthened.

In FIG. 3 there is diagrammatically illustrated a showing of the stage in wrapping a newspaper where the newspaper has been advanced in its final folded condition into the last or third pocket between walls 33 and 34, being there substantially enveloped in a loop of the plastic film constituting the wrapper. As illustrated, the step for sealing the wrapper about the newspaper has proceeded to about its mid point, that is, air cylinder 68 has been activated and the piston therein has advanced to press wall 34 against the enveloped newspaper to firmly compress it and the resistance thereof having risen to a point where the springs are being compressed, the angle member 66 has advanced to a point where it is pushing one leg of the film toward the other leg to sealing position. It will be understood that as the piston advances further, the forward end of the horizontal portion of L-form member 66 will eventually bring the two legs of the enveloping film together and finally will press them against the heated sealing element, which will be subsequently referred to more in detail.

In FIG. 4, which is a diagrammatic illustration quite similar to FIG. 3, there is shown the effect of the operation just previously referred to. As the angle portion of L-shape member 66 presses the contacting legs of the film against the heated sealing strip 96, a seal is effected and at the same time the weld or seal is severed so that there results in effect two welds, one of which seals the severed portion of the film about the enveloped newspaper, whereas the other seal or weld re-connects the film at the point of severance so that the result is that in effect the continuity of the film wrapper is continuous despite the fact that a portion of the film, that is, that portion in which the newspaper is enveloped, has been severed.

In FIG. 6 the structure of the sealing portion of the apparatus is illustrated on a larger scale. The L-shape member 66, at the forward end of its horizontal portion, is provided with an anvil strip 92 of resilient silicone rubber which, in turn, is covered by a relatively thin strip 93 of Teflon, a tetrafluoroethylene synthetic resin film product available on the market. The strip of resilient silicone rubber 92 and the covering film 93 may be suitably se-

cured to member 66 in any desired manner, being shown, however, as cemented in place by suitable heat-resistant cement.

About midway of the height of the vertical portion of L-form member 66 there is provided an outwardly extending portion 95 which, at its outer end, is likewise provided with a silicone rubber strip 92 and a Teflon resin covering film 93 to provide a secondary anvil in connection with spot-welding overhanging ends of the film wrapper in which the newspaper is enveloped.

The heated sealing member which is mounted to a portion of wall 33 of the final or third pocket, which heated member is identified by numeral 96, is mounted in suitable insulation, such as asbestos insulation 97. It will be seen that the heated strip 96 is mounted directly opposite the anvil strip 92 so that on completion of the advance of angle member 66, to which anvil strip 92 is mounted, the legs of the enveloping film will be pressed into contact with the heated sealing strip 96 to seal and sever the film, as more particularly referred to in connection with the description of FIG. 4.

Also mounted on the extension of the end portion of wall member 33 of the third pocket there is provided a similar separate short length of heating strip which, coacting with the extension on angle member 66, will spot-weld the overhanging end portions of the film wrapper. It will be understood, of course, that these spot-welding elements, as just described that is, the anvil member and heated member, are provided at each end of the respective angle member 66 and wall member 33, so that each overhanging end of the film may be spot-sealed. While it has not been previously referred to, it is desirable that the film in which the newspaper is wrapped be of three to four inches wider than the length of the folded newspaper being wrapped so as to provide protection through the provision of the overhanging end portions of the enveloping film. The spot-welding members, which have just previously been described, press together the overhanging end portions of the film and spot-seal these overhanging ends at the same time that the film is sealed around the folded newspaper. The heater strips 96, which are commercially available units, are, of course, connected to a source of electric current and are maintained at about 300 F.

Some means should be provided for preventing free spooling of the roll 60 of film material in which the article is being wrapped, and for such purpose, assuming that the roll 60 of film material is frictionally secured to shaft 61 on which it is mounted, there may be provided an adjustable brake for preventing free spooling, such being illustrated in FIG. 5. In FIG. 5 there is shown a disc or the like 100 mounted on shaft 61 and associated therewith there is provided a hinged member having an arcuate portion partly enveloping the periphery of the disc 100. This hinged brake member 101 is suitably hinged at 102, and at its other end is provided with means for adjusting the pressure of the arcuate portion thereof against disc 100. The means for adjusting the friction or for varying the friction effect of the hinged brake member 101 against disc 100 is shown as comprising a bolt or stud 103 and on which there is mounted spring 104 and nut 105 which, as the nut is screwed down or up, will respectively increase or decrease the pressure of the friction member 101 against disc 100.

The sequence of operation of the various elements of the apparatus is shown in the line drawing of FIG. 7. This drawing, it is believed, is fully self-explanatory in view of the legends and arrows appearing thereon. The letter F appearing on this drawing indicates the forward or folding stroke, the letter R denoting the reverse or withdrawing stroke. Additionally, the arrows are associated with the letters F and R denoting the direction of the stroke.

In connection with the operation "wrap and seal," this is with respect to the operation of the cylinder 68 and as-

sociated devices, that is, it is with reference to the compression of the package being wrapped by the advance of wall 34 of the third or final pocket, including the advance of the anvil member 92 associated therewith.

In connection with the operation "eject and advance film," this is with reference to the operation of cylinder 76 and its associated devices and in connection with which the forward stroke is the stroke from the position of the piston of this cylinder, as illustrated in FIG. 1, that is, the stroke opening the pocket, whereas the reverse or retraction stroke is the operation of closing the pocket or advancing the piston of cylinder 76 to the position illustrated in FIG. 1.

The line at the bottom of FIG. 7 graphically denotes the operation of the "program motor" which is in operation throughout the complete cycle beginning with the forward stroke of the first folder and terminating with the retracting stroke of the ejecting step. It will be noted that at the end of a cycle, as illustrated, there is provided a slight dwell, as indicated by the space between the dotted lines 110, whereupon, as indicated, the recycling of the apparatus is initiated.

FIG. 8 is a schematic illustration of the actuator for carrying out the programming, as diagrammatically illustrated in FIG. 7. The elements of the programming apparatus comprise motor 111 suitably connected to a programming cylinder 112. The motor is connected to a suitable source of electric current, and it will be seen that in one side of the line there is provided a switch 113 which is a normally open micro-switch.

It will be noted that in FIG. 1 at the bottom of the first pocket of the apparatus, mounted in wall 18 thereof, there is provided a plunger member 114. Micro-switch 113 is mounted so as to be actuated by plunger 114 which obviously will be depressed when a newspaper is fed into the device and rests thereon. The micro-switch 113 being a normally open switch, it is obvious that unless a newspaper has been fed into the apparatus to depress plunger 114 the circuit is open, and that when the newspaper is in place and depresses plunger 114 that normally open switch 113 will be closed to complete the circuit to start motor 111.

The program cylinder 112 is basically a standard item carrying on its surface conducting strips of proper length and placement to complete an electric circuit and maintain it for a desired period beginning and ending according to the lengths of such strips and placement thereof on the cylinder. These strips are connected to one side of an electrical circuit so that when they come under suitably positioned external contacts an electrical circuit will be completed and maintained so long as a strip on the rotating cylinder is in contact with the external contact member.

The live strips on cylinder 112 are identified, one by numeral 115 and the remainder generally by numeral 116. The external contacts are identified, one by numeral 117, the remainder being identified generally by numeral 118. A line 120, which is connected to one side of the current supply, goes directly to one end of one terminal of a solenoid 88, one of the solenoids for actuating D slide valve 84. From the other side of solenoid 88 a line 121 goes to the appropriate external contact 118 for operating the particular solenoid which is controlled by the particular external contact.

In connection with the programming control above described, it will be seen that contact strip 115, when the circuit is completed, constitutes a shunt around the normally open micro-switch 113.

In FIG. 7 it will be seen that this contact strip 115 substantially encircles the cylinder 112 except for a small gap at the end of the cycle and represented by the spacing of lines 110. The result of this construction is that when plunger 114 is depressed to close switch 113, a circuit is established which starts the motor to revolve program cylinder 112. As soon as the cylinder begins to

revolve contact 117 will establish a circuit through strip 115 so that the motor will continue to revolve cylinder 112 for substantially a complete revolution, despite the fact that the newspaper which originally depressed plunger 114 has been moved out of contact with the plunger and allows micro-switch 113 to return to the normally open position. It is obvious that this particular construction provides for a single cycle operation of the apparatus, each cycle being initiated by a newspaper properly positioned so that plunger 114 is depressed. The remaining live strips on the cylinder 112, and indicated generally by numeral 116, are not shown properly positioned accurately on the cylinder surface nor are they necessarily of the proper length to carry out the cycle of operations as programmed in FIG. 7. These strips are shown merely to illustrate that they are positioned, spaced lengthwise of the cylinder so as to contact their respective external contacts generally identified by numeral 118. Those manufacturing programming cylinders will readily understand from FIG. 7 the proper arcuate positioning of the live strips 116 and the proper lengths thereof.

With the motor 111 operating and rotating programming cylinder 112, it is obvious, as the live strips 116 contact their respective external contacts 118, that the various lines connected thereto will complete circuits to the respective solenoids 88 so that the programming of the apparatus as illustrated in FIG. 7 will result.

The over-all operation of the device hereof will be as follows: A newspaper or like object, for example, a magazine, is entered into the apparatus over table 14 and is positioned between walls 15 and 16 resting in the pocket formed by walls 17 and 18. As the object bottoms in the pocket formed by walls 17 and 18, plunger 114 is depressed to establish a circuit to the programming motor 111 which revolves programming cylinder 112 attached thereto. The programming cylinder being rotated, the various live strips 116 thereon will program the operation of the apparatus to make a forward stroke of the first folder 20, which will fold the object and advance it through the first transfer slot to be positioned medially with respect to the second folder 27. As the object is bottomed in the second pocket formed by walls 23 and 24, the first folder 20 will begin its retracting or reverse stroke, and as the forward end of folder 20 clears second folder 27 the forward stroke of the second folder 27 will be initiated. The forward stroke of folder 27 will again fold the object and passing it through second transfer slot between walls 29 and 30 will, on further advancement thereof, force the folded object embraced in a loop of the film into the third or final pocket between walls 33 and 34. Second folder 27 then retracts and as it clears the third or final pocket, cylinder 68 is actuated on its forward stroke to compress the object in the pocket and to advance the angle member 66 carrying anvil strip 92. This action brings together the depending leg portions of the loop of film in which the object is embraced, tautens the loop of film about the article and at the extreme end of the stroke presses the pressed together strips of film against the heated sealing or welding strip 96. The reverse stroke of cylinder 68 is then initiated, and at the same time the forward stroke of cylinder 76 is initiated, this being an ejecting and film advancing stroke. This stroke of the piston of cylinder 76 moves wall 33 of the third pocket away from wall 34 to open the pocket and allow the wrapped object to drop from the pocket. As the wall 33 is being retracted, the extension thereof to which collar 75 is connected will actuate the detent lever 72 and through detent 73 will draw the film ahead slightly as is clearly apparent in the drawing.

Immediately, as the piston of cylinder 76 reaches the end of its forward stroke, the reverse stroke is initiated, and as this reverse stroke is completed to return wall 33 to its initial position, the programming cylinder will have substantially completed a revolution, so that the break in the live strip 115 will break the circuit through ex-

ternal contact 117 and cause the motor 111 to stop unless, in the interim, another newspaper or like has been introduced into the apparatus and bottomed in the first pocket to again depress plunger 114 and close the normally open switch 113.

It will be noted that in the typical air cylinder, as illustrated in FIG. 2, limiting adjusting screws 89 are provided at each end of cylinder 53. It is believed obvious, in connection with each of the cylinders of the apparatus, that by screwing the adjusting screws 89 either forward or back the extreme limit of the travel of the piston in the cylinder can be adjusted, so that, for example, in connection with cylinder 76, which is connected to wall 33 of the final or third pocket, by advancing adjusting screw 89 in that end of the cylinder adjacent to wall 33, the return of wall 33 on the reverse stroke of this cylinder can be limited so that this third pocket will be slightly wider than is shown in the illustration. This feature is availed of, for example, when a thick newspaper is being wrapped, in which case it may be necessary that the pocket be wider than indicated in order that the folded newspaper may be accommodated.

FIG. 9 is an attempt to illustrate a newspaper wrapped in the plastic film, as has been described, the film 60 having been drawn therearound and sealed or welded, as at 125, with the overhanging ends of the film brought together and tack-welded, as at 126.

With respect to the inventions hereof, such have been described in detail and a general resumé has been given of the operation of the apparatus.

As previously referred to, the disclosure hereof is of a diagrammatic nature since, to one at all skilled in the art to which the inventions pertain, the drawings substantially speak for themselves. As previously mentioned, the disclosure has been described and discussed particularly with reference to providing a protective wrapper for a newspaper and with reference to apparatus particularly adapted for the application of a protective wrapper about a folded newspaper. It is to be understood that the applied protective wrapper is one primarily for protecting the contents therein from the elements, that is, while the protective wrapper contains the article, overhanging ends of the wrapper are merely brought together and tack-fastened with no attempt to nor provision for completing the closing of the wrapper at the ends of the article.

Whereas a polyethylene resin film has been particularly referred to as the wrapper for enveloping the article, it is to be understood that other suitable thermoplastic or thermosealing resin film may alternatively be employed. For providing merely a wrapper for protecting a folded newspaper from the elements in connection with its delivery to subscribers, a very thin film is ample, and film of three-fourths mil thickness has been found very satisfactory. An even thinner film, that is, of one-half mil thickness, has been used, but presently available film of this thickness is sufficiently variable in thickness that at times there is difficulty in obtaining an even seal unless the proper temperature of the heated sealing element can be accurately maintained.

Of course, those skilled in the art will readily recognize that articles other than newspapers may be wrapped in accordance with the disclosure hereof. For example, a pack comprised of a number of sheets of any kind of paper or cloth, or even a pre-folded sheet of paper or cloth which has been folded to more or less newspaper size, may readily be packaged utilizing the apparatus as disclosed. It also should be readily apparent to those skilled in the art that by making provision for feeding, a box-form object can be entered directly into the transfer slot between walls 29 and 30 and advanced by folder 27 into the film enveloping portion of the apparatus. Of course, in such case it will be necessary to provide for a shortened stroke of folder member 27 so that it merely comprises a pushing member for pushing the article to be wrapped

11

into the third or final pocket between walls 33 and 34. Also, rather than so protectively wrapping a box-form article, a roll-form article such as a roll of tissue paper or wallpaper or the like can similarly be entered directly into a transfer slot between walls 29 and 30 and protectively wrapped in the plastic film, following the same procedure as that of protectively wrapping the folded newspaper, as described in detail.

In protectively wrapping a newspaper it is preferable that the roll of thermoplastic material which comprises the protective wrapper be about three to four inches wider than the length of the folded newspaper. Consequently the ends overhang by one and one-half to two inches so that these ends alone can serve as protection against the elements or, preferably, these overhanging ends of the film wrapper are merely pinched together and spot or tack-welded which serves two purposes, that is, it assures that the enveloped article cannot slide out of the wrapper as well as providing somewhat better protection than would the mere loose overhanging end of the wrapper material.

In the foregoing disclosure and description of the preferred form of the inventions hereof, such has been illustrated and described as operated by air cylinders. It is to be understood, of course, that the air cylinders constitute but one means for carrying out the operations of the apparatus, and that alternatively the operations may be effected through the use of individual reversible motors with suitably interconnected switches and relays for programming the operation, or that the apparatus may be operated mechanically, that is, by the use of properly designed cams, levers, and cranks. It is to be understood that the specific disclosure of the application is but a specific exemplification and that various modifications thereof based on such disclosure will be readily apparent to those skilled in the art, and it is contemplated that all such variations and modifications of this specific apparatus as covered by the appended claims shall be deemed as within the disclosure and concept thereof.

The inventions hereof having been described in detail, I claim:

1. Apparatus for packaging a newspaper in a plastic film wrap comprising a system of spaced walls forming slots serially opening one into the other intermediate the length of a slot, a folding plunger mounted for movement across the width of the first slot and into the second slot, a second folding plunger mounted for movement across the width of the second slot and into the third slot, a slot form pocket axially aligned with and spaced from the third slot and means positioned for supporting a strip of film transversely across the entrance from the third slot to the slot form pocket axially aligned therewith.

2. In an apparatus for enveloping an article in a protective thermoplastic film, the combination comprising a pair of spaced walls, means positioned to one side of the spaced walls for revolubly mounting a roll of the plastic film thereto, means positioned on the other side of the spaced walls for revolubly mounting a spool means to which the plastic film is spooled, whereby to position the film over and across the opening defined by the spaced walls, means forming a longitudinal length of the run of the supported plastic film as a loop, a pressing member pressing one leg of the loop against the other leg along a line displaced a finite distance from the base of the loop, a heated member for welding together the pressed together portions of the loop and concomitantly severing the welded together portion of the plastic film along a line substantially centrally of the weld whereby the looped portion of the film is severed while maintaining continuity of the film and means advancing the heated member toward the pressing member for compressing the pressed together legs of the loop against the pressing member.

3. In the apparatus of claim 2, in combination there-

12

with, means imparting step by step rotation to the spool means to which the free end of the plastic film is spooled.

4. An apparatus for enveloping a folded periodical in a protective plastic film, comprising in combination spaced, substantially parallel walls, means mounting one of the walls for movement toward and away from the other wall, means for moving the movable wall toward and away from the other wall, means entering a folded periodical between the walls while enveloping the folded periodical in a loop of protective plastic film, means actuating the means moving the movable wall and pressing together the folded and enveloped periodical, a heatable sealing member, means for pressing together portions of the legs of the loop of the plastic film and tautening the enveloping film about the folded and pressed together periodical and constituting an anvil whereby the pressed together legs of the loop of the plastic film are compressively sealed and severed between the heatable sealing member and the anvil.

5. In an apparatus for folding a periodical comprising in combination pairs of spaced walls forming channels and pockets and reciprocating folding plungers, a first pair of spaced walls comprising a periodical receiving and guiding channel, spaced therefrom but aligned therewith spaced walls forming a first pocket, one of the walls of the pocket curved at its outer end toward the other wall, means mounting this wall adjustably in two directions at right angles one to the other whereby the pocket may be varied in width and depth, a second pair of walls positioned at right angles with reference to the first pair of walls and forming a channel at one end aligned with the space between the first pair of walls and their aligned pocket, the second pair of spaced walls and channel formed thereby in length at least the maximum adjusted depth of the first pocket, means adjusting one of the second pair of walls and varying the spacing of these walls, one from the other, spaced from but aligned with the second pair of walls, spaced walls forming a second pocket, one of the walls of the second pocket curved at its outer end toward the other wall, means mounting this wall adjustably in two directions at right angles one to the other whereby the pocket may be varied in width and depth, a third pair of walls positioned at right angles with reference to the second pair of walls and forming a channel at one end aligned with the space between the second pair of walls and their aligned pocket, means adjusting one of the third pair of walls and varying the spacing of these walls, spaced from but aligned with the third pair of walls, spaced walls forming a third pocket, means adjusting one of the walls of the third pocket and varying the spacing of these walls, one from the other, a folding plunger mounted for reciprocation across the end of the channel formed between the first pair of walls, through the channel formed between the second pair of walls and into the second pocket, a second folding plunger mounted for reciprocation across the end of the channel formed between the second pair of walls, through the channel formed between the third pair of walls and into the third pocket and means imparting reciprocating motion to the said plungers.

6. In a packaging apparatus for enveloping a folded periodical in a thermoplastic film, the combination comprising means for supplying a continuous length of thermoplastic film of ribbon form, a plunger member for advancing a folded periodical against a face of the thermoplastic film in a path perpendicular to a face thereof and into a compression element whereby the folded periodical is supported in the compression element in a loop of thermoplastic film, the compression element comprising spaced parallel walls, means advancing a wall of the compression element toward the other wall thereof whereby compression is exerted, an anvil member concomitantly advanced across one of the walls of the compression element to substantially the plane of the other wall thereof whereby the legs of the loop of thermoplastic film positioned between the walls of the compression element are

forced together, a heatable sealing member and means advancing the heatable sealing member toward and into compressive relation to the anvil member.

7. Apparatus for banding a stack of substantially planar sheet material, comprising means for supplying a length of thermoplastic film having a planar section, means for supporting a supplied length of thermoplastic film having a planar section, a plunger for advancing a stack of objects against said supplied and supported length of thermoplastic film having a planar section and in a path perpendicular to the plane thereof, spaced walls receiving therebetween the stack of substantially planar sheet material and portion of thermoplastic film against which the stack of substantially planar sheet material was advanced by the plunger, means advancing one of said walls toward the other said wall, clamping means movable through a path parallel to the plane of said planar section of the thermoplastic film into abutting relationship so as to complete encirclement of the stack of sheet material with plastic film after advancement by said plunger, said clamping

means including an anvil member and a heatable welding and severing member and means advancing an element of said clamping means toward the other element thereof and applying compression thereagainst.

References Cited in the file of this patent

UNITED STATES PATENTS

1,071,853	Young	Sept. 2, 1913
1,152,794	Cox	Sept. 7, 1915
1,161,785	Moore	Nov. 23, 1915
2,003,682	Enock	June 4, 1935
2,340,678	Milmoe	Feb. 1, 1944
2,506,021	Holmberg	May 2, 1950
2,545,243	Rumsey	Mar. 13, 1951
2,563,316	De Sylva	Aug. 7, 1951
2,712,208	Campbell	July 5, 1955
2,728,178	Kern	Dec. 27, 1955
2,741,885	Allison	Apr. 17, 1956
2,825,194	Page	Mar. 4, 1958