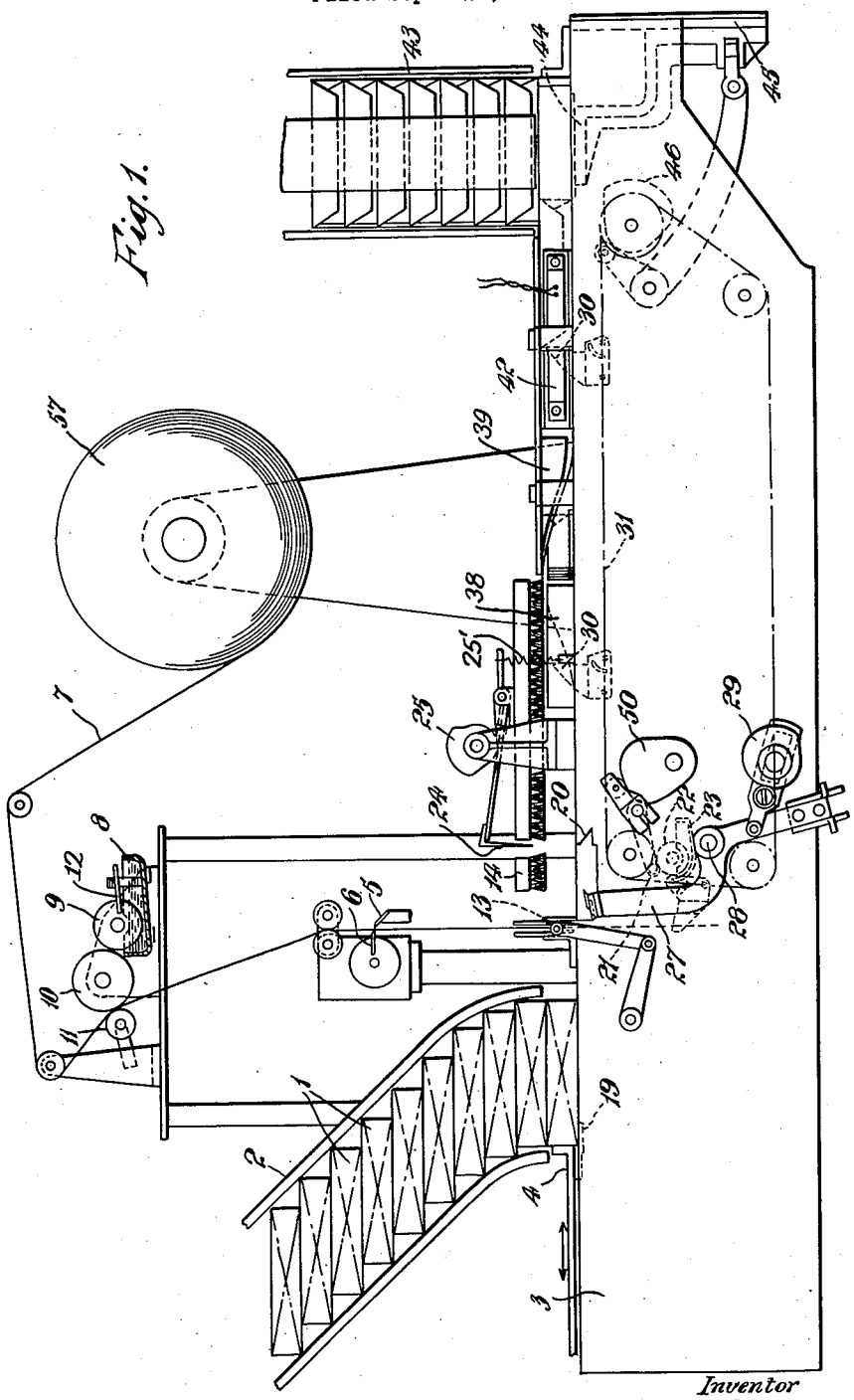
Nov. 9, 1937. T. G. JACKSON 2,098,245

WRAPPING MACHINE

Filed Sept. 27, 1935 4 Sheets-Sheet 1

Fig. 1.



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By Watson, Coit, Moore & Grindle

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Nov. 9, 1937. T. G. JACKSON 2,098,245

WRAPPING MACHINE

Filed Sept. 27, 1935 4 Sheets-Sheet 2

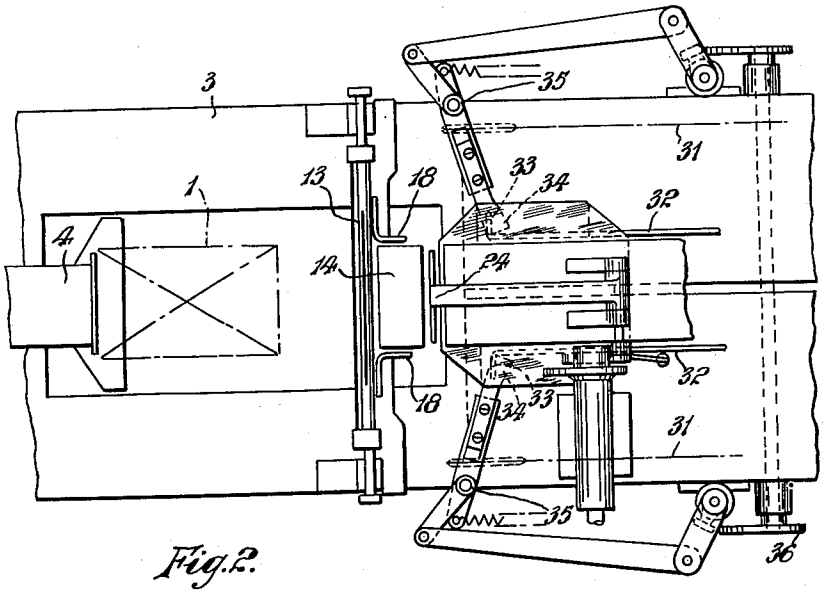


Fig. 2.

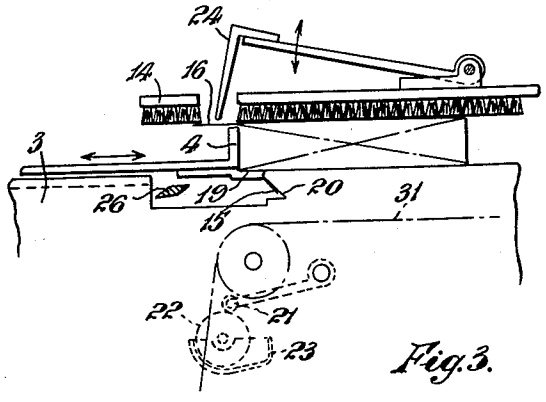


Fig. 3.

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Nov. 9, 1937. T. G. JACKSON 2,098,245

WRAPPING MACHINE

Filed Sept. 27, 1935 4 Sheets-Sheet 3

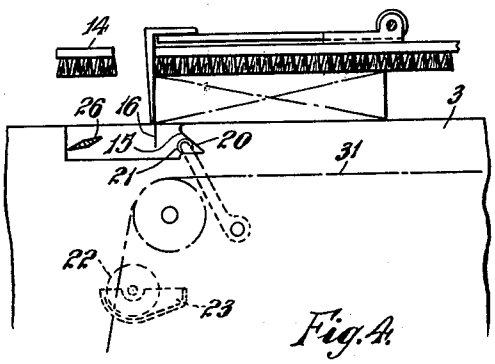


Fig. 4.

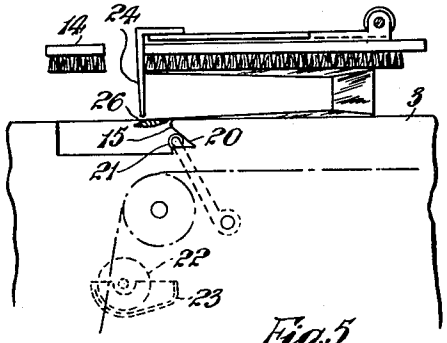


Fig. 5.

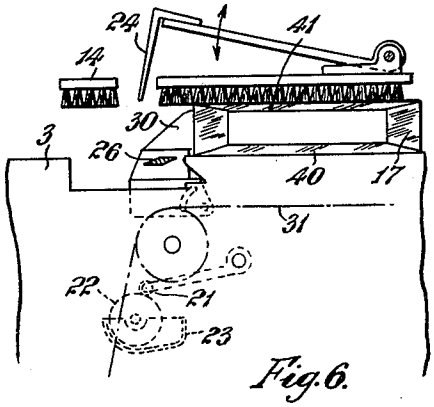


Fig. 6.

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WRAPPING MACHINE

Filed Sept. 27, 1935 4 Sheets-Sheet 4

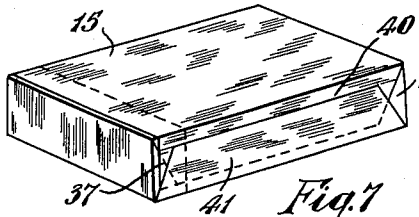


Fig.7

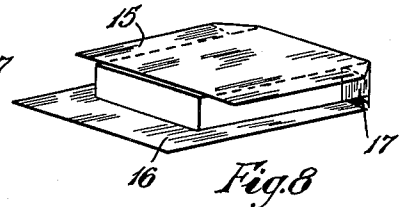


Fig.8

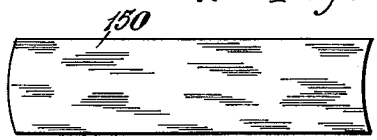


Fig.9.



Fig.10.

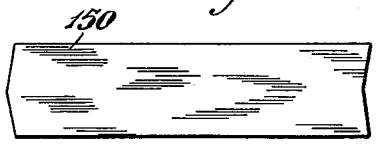


Fig.11.

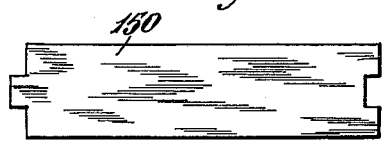


Fig.12.

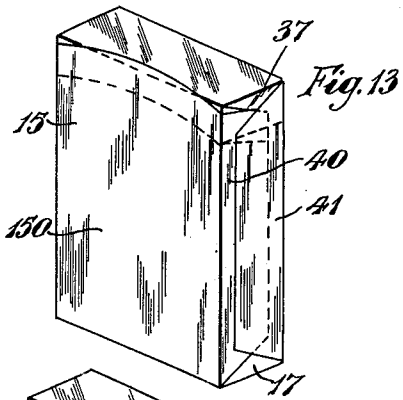


Fig.13

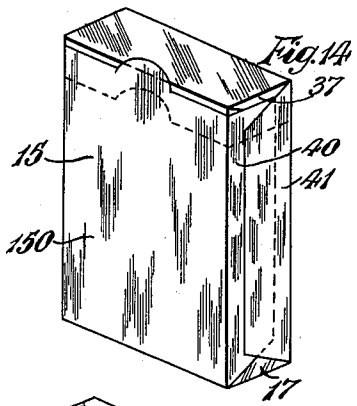


Fig.14

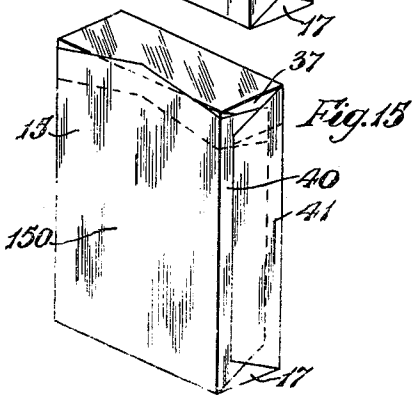


Fig.15

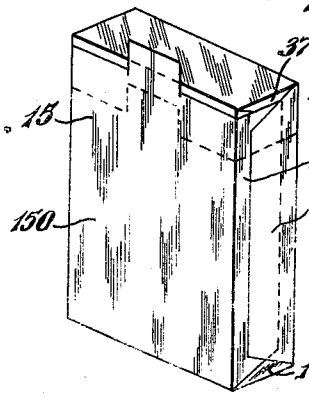


Fig.16.

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Patented Nov. 9, 1937 2,098,245

UNITED STATES PATENT OFFICE

2,098,245

WRAPPING MACHINE

Thomas Grayland Jackson, Deptford, London, England, assignor to Mölins Machine Company, Limited, London, England

Application September 27, 1935, Serial No. 42,521
In Great Britain October 19, 1934

12 Claims. (Cl. 93—2)

The present invention is for improvements in or relating to wrapping machines for making about an article a wrapper formed from a substantially rectangular and readily foldable blank having a length greater than the total peripheral length of the faces of the article to be wrapped, on the longitudinal section of the article, which blank when placed about the article to be wrapped extends continuously round the top, bottom and end faces of the article, the overlap of the wrapper ends being substantially at one end of the package at the top or bottom face thereof.

In United States Patent No. 1,291,984 there is shown such a wrapping, but in this prior patent the wrapper ends overlap with the shorter portion on one face above the longer portion on that face.

It is found in practice that this wrapping is objectionable, in that it offers considerable difficulty in forming the folds of the wrapper about the article by machinery.

According to one form of the present invention there is provided a method of forming a wrapper of the type described in which the article to be wrapped and a wrapper are brought into engagement with one another, forming the wrapper blank about the article so that at least one (top or bottom) face and one adjacent end face of the article is engaged thereby, completing the folding of the wrapper blank about the longitudinal section of the article in a manner such that against one face (that is, either the top or bottom face) of the article the end portions of the wrapper blank overlap, said portions being of different lengths, the shorter length being covered or partly covered by the longer length and the latter being of a length such that it covers or nearly covers the said face of the article, and completing the folding of the wrapper blank by forming the side folds of the wrapper. The longer length of the wrapper may extend beyond or be provided with an extension which extends beyond the said top or bottom face of the article.

The wrapper blank may be formed into a U about one end face of the article, one limb of the U being longer than the other, and the end portion of the longer limb of the U being overlapped against one face (i. e. either the top or bottom face) of the article by the end portion of the shorter limb, said shorter limb being of a length such that it covers or nearly covers the said face of the article. The longer limb may be overlapped by the shorter limb by holding or lifting the end portion of the shorter limb clear of the article whilst the end portion of the longer limb is folded against the face (i. e. either the top or bottom face) of the article, and by thereafter moving the end portion of the shorter limb into engagement with the folded end portion of the longer limb. Adhesive for securing the folds and overlapping portions of the wrapper blank may be applied to the wrapper blank before and/or during the folding of the blank about the article.

The lifted end portion of the shorter limb of the U may be provided with adhesive on the side thereof which is to face the article before the end portion of the shorter limb is placed over the end portion of the longer limb.

The wrapper may be an outer transparent wrapper for a batch of articles, or for a block-shaped article, such for example as a packet of cigarettes, and the term "article" where used herein and in the appended claims is intended to include any block-shaped article or a plurality of separate articles arranged in the shape of a block.

Further according to the present invention there is provided a machine for forming a wrapper of the type described comprising means to move an article into engagement with a wrapper blank, means to form the wrapper blank about the article so that at least one (i. e. top or bottom) face and one adjacent end face of the article is engaged thereby, means to complete the folding of the wrapper blank about the longitudinal section of the article so that against one face (i. e. either the top or bottom face) of the article the end portions of the wrapper blank overlap, said portions being of different lengths, the shorter length being covered or partly covered by the longer length, the latter being of a length such that it covers or nearly covers the said face of the article and means to complete the folding of the wrapper blank by forming the side folds of the wrapper.

Means may be provided to apply adhesive to the wrapper blank along the transverse edge of the short limb and on the side thereof facing the article.

The invention will be more particularly described by way of example with reference to the accompanying drawings in which:—

Figure 1 is a side elevation of a machine constructed in accordance with the invention.

Figure 2 is a plan of a part of the machine shown in Figure 1.

Figures 3 to 6 are views of a part of Figure 1 and show various elements in the positions which they occupy at different times during the operation of the machine.

Figures 7 and 8 respectively show a completely folded and a partly folded wrapper.

Figures 9 to 16 show modified forms of wrapper.

Like references refer to like parts throughout the specification and drawings.

Referring to the drawings, the articles which are to be wrapped are contained in a stacker 2 from which they are fed downwardly on to the bed 3 of the machine. When the lowermost article in the stacker rests on the bed of the machine it is moved forwardly by a conveyor 4 shown in the drawing as a reciprocating plunger. The article is moved by the conveyor 4 against a wrapper blank which has been severed by a fixed knife 5 and moving knife 6 from a continuous web 7, and fed into the path of the article.

The wrapper blank is, before being severed by the cutters 5 and 6, provided along its longitudinal edges with lines of adhesive which may be continuous or may be interrupted at the parts which lie laterally beyond the parts which are folded over the opposite ends of the article.

The adhesive is applied to the web 7 as it is fed from the roll 57, and the adhesive applying mechanism consists of an adhesive bath 8, a roller 9 and a roller 10 which is supplied with adhesive by the roller 9. The roller 10 applies the adhesive to the wrapping material and a further roller 11 supports the material whilst the adhesive is being applied thereto. A scraper 12 removes surplus adhesive from the roller 9.

The severed sheet of wrapping material is guided into position relatively to the path of the advancing article by a movable guide 13 of known construction and a part of the wrapper blank is arranged to protrude through a slot in the bed of the machine so that when the leading end face of the article is moved against the wrapper blank and the article and wrapper blank are moved between the bed 3 and a guide 14 shown as a brush, the wrapper blank is folded into a U about the leading end face of the article, with the limb 15 of the U which is against the bottom face of the article, the same length as or approximately the same length as or slightly shorter than the length of the bottom face of the article, whilst the other limb 16 of the U engages with the top face of the article and extends beyond the rear end face of the article.

The narrow end tucks 17 at the front end of the article are formed by fixed folders 18 (see Figure 2), whilst the wrapper blank is being formed into a U about the article.

The conveyor 4 which pushes the article endwise into the wrapping material is provided with two forwardly projecting prongs 19, which engage with the bottom face of the article and prevent the end of the short limb of the wrapper from being pressed against that face, and also causes the end portion of the limb 15 to be folded over a support 20 formed on the bed of the machine. When the conveyor 4 reaches the end of its stroke an oscillating adhesive applying roller 21 operated by a cam 50 is brought into engagement with the folded end portion of the short limb 15 of the wrapper blank and holds the folded end portion bent backwardly against the support 20 of the bed of the machine. The adhesive applying roller receives adhesive from a roller 22 rotatable in an adhesive bath 23 and applies a line of adhesive transversely across the short limb on that side of the wrapper which is adjacent the article. Whilst the adhesive applying roller 21 holds the wrapper blank bent backwardly clear of the article in the manner just described, an oscillating folder 24 moves downwardly and folds the long limb 16 of the U against the rear end face of the article as shown in Figure 4. The folder 24 is operated by a cam 25 driven from the main drive of the machine and is maintained in contact with the cam by means of a spring 25'.

When the folder 24 has completed its operation a further folder 26 engages the end of the long limb 16, which end is extending below the bottom face of the article (see Figure 4) and folds this end of the limb against that face of the article as shown in Figure 5. The folder 26 is carried by a lever 27 pivoted at 28 and operated by a cam 29.

After the wrapper blank has been folded about the rear end face of the article in the manner just described a pusher piece 30 mounted on an endless conveyor 31 engages the rear end face of the partly wrapped article. As the conveyor piece 30 engages the article, the gumming roller 21 releases that portion of the short limb 15 which is folded backwardly, and the article with the wrapper folded about it in the manner above described is then conveyed along the bed of the machine by the pusher piece 30. The movement of the article along the bed of the machine causes the short limb of the wrapper to lie over the end of the long limb which has been folded against the bottom face of the article.

The folder 26 remains substantially in the position shown in Figure 5 until the article and wrapper have been moved into the position shown in Figure 6, the reason for the folder 26 remaining in this position being to support that portion of the wrapper blank folded by the folder 26 until said portion is engaged by the bent over portion of the limb 15 and until the partly wrapped article is completely supported by the bed 3 of the machine. The folder 26 is, however, moved rearwardly for a distance sufficient to allow the bent over portion of the limb 15 to move freely into engagement with the folded longer limb 16.

As the pusher piece 30 moves along the bed of the machine the article and partly folded wrapper are moved between guides 32 and the narrow end tucks 17 are engaged by projections 33 (see Figure 2) which ensure the correct folding of the tucks 17.

A pair of folders 34 pivoted at 35 and operated by a cam 36 in synchronism with the pusher pieces 30, are arranged to engage with the wrapper blank and form the narrow end tucks 37 at the rear end of the article.

The pusher piece 30 then moves the article and partly folded wrapper through stationary folders 38 and 39 of well known construction, the folders 38 and 39 completing the folding of the wrapper blank about the article by forming the side folds 40 and 41 respectively about each side face of the article. The article is now completely wrapped as shown in Figure 7 but the wrapper shown in Figure 7 is shown in the reverse position from that in which it is formed in order more clearly to show the manner in which the folds of the wrapper are arranged.

After the folding of the wrapper is completed the wrapped article is passed between heating elements 42 which dry the adhesive between the folds of the wrapper and the wrapped article is then inserted into a stacker 43 by a plunger 44 moving in a slide 45 and operated by a cam 46.

It will be seen from the foregoing description

that all the folding and pressing upon the wrapper is done on the side and top and bottom faces of the article, so that when the end faces of the articles are soft or hollow the ends of the wrapper are less likely to become deformed than is the case when the wrappers are formed by previously known methods.

It will be understood that the cutting mechanism could be arranged to sever blanks 150 in the form shown in Figures 9, 10, 11 and 12, so that when the wrapper is passed through the mechanism according to the present invention, wrapped packages will be produced as shown in Figures 13, 14, 15 and 16, having projections which are arranged to extend beyond the edge of a face of the package to facilitate removal of the wrapping. If desired, tear starting slits may be provided in the exposed edge of the wrapper when tough material is used. Reinforcing tearing strips may also be provided extending lengthwise of the wrapping. These reinforcing strips, fed from a separate web feed by any suitable web feeding mechanism, may be secured to the inner face of the wrapper web before the latter is severed, or alternatively the reinforcing strip may be constituted by a box-pleat formed in any desired or known manner in the continuous web before the latter is severed, and the wrapping material may be provided with adhesive along those portions of the web which are folded together in order to provide a reinforcing strip. When the wrapping material is made of a cellulose derivative, suitable solvent is used instead of the adhesive.

It is to be understood that the article may be a rectangular parallelopiped or a cube, and that the invention is not limited to use with articles which are of the shape illustrated in the drawings.

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

1. In a wrapping machine, the combination with means to position a wrapper blank transversely of the path of an article, of a conveyor to move an article into engagement with the wrapper blank and to move the article and wrapper blank to mechanism for folding the wrapper blank about the article, said mechanism including means to fold the wrapper blank about the longitudinal section of the article so that the end portions of the wrapper blank are of different lengths and overlap, the shorter length being under the longer length, said longer length being folded into engagement with the article before the shorter length, and means to lift the end portion of the longer length clear of the article whilst the shorter length is being folded into position to be overlapped by the longer length.

2. In a wrapping machine, the combination with means to position a wrapper blank transversely of the path of an article, of a conveyor to move an article into engagement with the wrapper blank and to move the article and wrapper blank to mechanism for folding the wrapper blank about the article, said mechanism including means to fold the wrapper blank about the longitudinal section of the article so that the end portions of the wrapper blank are of different lengths and overlap, the shorter length being under the longer length, said longer length being folded into engagement with the article before the shorter length, and a projection movable in synchronism with the conveyor to lift the end portion of the longer length clear of the article whilst the shorter length is being folded into position to be overlapped by the longer length.

3. In a wrapping machine, the combination with means to position a wrapper blank transversely of the path of an article, of a conveyor to move an article into engagement with the wrapper blank and to move the article and wrapper blank to mechanism for folding the wrapper blank about the article, said mechanism including means to fold the wrapper blank about the longitudinal section of the article so that the end portions of the wrapper blank are of different lengths and overlap, the shorter length being under the longer length, said longer length being folded into engagement with the article before the shorter length, means to lift the end portion of the longer length clear of the article whilst the shorter length is being folded into position to be engaged by the longer length, and an adhesive applying device and a support against which the lifted end portion is held whilst adhesive is applied to the lifted portion on that side thereof which is to engage the shorter length.

4. In a wrapping machine the combination with means to position a wrapper blank transversely of the path of an article, of a conveyor to move an article into engagement with a wrapper blank and to move the article and wrapper blank to mechanism for folding the wrapper blank about the article, said mechanism including means to fold the wrapper blank into a U about one face of the article, one limb of the U being longer than the other limb. means to fold the end portion of the longer limb so that it is overlapped by the shorter limb, said shorter limb being folded into engagement with the article before the end portion of the longer limb, and means to lift the end portion of the shorter limb clear of the article whilst the end portion of the longer limb is being folded into position to be overlapped by the longer limb.

5. In a wrapping machine the combination with means to position a wrapper blank transversely of the path of an article, of a conveyor to move an article into engagement with a wrapper blank and to move the article and wrapper blank to mechanism for folding the wrapper blank about the article, said mechanism including means to fold the wrapper blank into a U about one face of the article, one limb of the U being longer than the other limb, means to fold the end portion of the longer limb so that it is overlapped by the shorter limb, said shorter limb being folded into engagement with the article before the end portion of the longer limb, and a projection movable in synchronism with the conveyor to lift the end portion of the shorter limb clear of the article whilst the end portion of the longer limb is being folded into position to be overlapped by the longer limb.

6. In a wrapping machine the combination with means to position a wrapper blank transversely of the path of an article, of a conveyor to move an article into engagement with a wrapper blank and to move the article and wrapper blank to mechanism for folding the wrapper blank about the article, said mechanism including means to fold the wrapper blank into a U about one face of the article, one limb of the U being longer than the other limb, means to fold the end portion of the longer limb so that it is overlapped by the shorter limb, a projection movable in synchronism with the conveyor to lift the end portion of the shorter limb clear of the

article whilst the end portion of the longer limb is being folded into position to be overlapped by the longer limb, and an adhesive applying device and a support against which the lifted end portion is held whilst adhesive is applied to the lifted portion on that side thereof which is to engage the shorter length.

7. In a wrapping machine the combination with means to position a wrapper blank transversely of the path of an article, of a conveyor to move an article into engagement with a wrapper blank and to move the article and wrapper blank to mechanism for folding the wrapper blank about the article, said mechanism including means to fold the wrapper blank into a U about one face of the article, one limb of the U being longer than the other limb, means to fold the end portion of the longer limb so that it is overlapped by the shorter limb, said last named means comprising a folding element to fold the longer limb against that face of the article which is opposite the face about which the U is formed, a further folding element to fold the end portion of the longer limb against that face of the article with which the shorter limb engages, and means to lift the end portion of the shorter limb clear of the article whilst the end portion of the longer limb is being folded into position to be overlapped by the longer limb.

8. In a wrapping machine the combination with means to position a wrapper blank transversely of the path of an article, of a conveyor to move an article into engagement with a wrapper blank and to move the article and wrapper blank to mechanism for folding the wrapper blank about the article, said mechanism including means to fold the wrapper blank into a U about one face of the article, one limb of the U being longer than the other limb, means to fold the end portion of the longer limb so that it is overlapped by the shorter limb, said last named means comprising a folding element to fold the longer limb against that face of the article which is opposite the face about which the U is formed, a further folding element to fold the end portion of the longer limb against that face of the article with which the shorter limb engages, a projection movable in synchronism with the conveyor to lift the end portion of the shorter limb clear of the article whilst the end portion of the longer limb is being folded into position to be overlapped by the longer limb, and an adhesive applying device and a support against which the lifted end portion is held whilst adhesive is applied to the lifted portion on that side thereof which is to engage the shorter length.

9. In a wrapper machine, the combination with means to position a wrapper blank transversely of the path of an article, of a plunger to move an article into engagement with a wrapper blank and to move the article and wrapper blank to mechanism to partly fold the wrapper blank about the article, folding devices to complete the folding of the wrapper blank about the article, and a pusher piece carried by an endless conveyor to engage the partly wrapped article and to move it to said folding devices, said mechanism for partly folding the wrapper blank about the article including means to fold the wrapper blank into a U about one face of the article, one limb of the U being longer than the other limb, means to fold the end portion of the longer limb so that it is overlapped by the shorter limb, said shorter limb being folded into engagement with the article before the end portion of the longer limb, and means to lift the end portion of the shorter limb clear of the article whilst the end portion of the longer limb is being folded into position to be overlapped by the longer limb.

10. In a wrapping machine, the combination with means to position a wrapper blank transversely of the path of an article, of a plunger to move an article into engagement with a wrapper blank and to move the article and wrapper blank to mechanism to partly fold the wrapper blank about the article, folding devices to complete the folding of the wrapper blank about the article, and a pusher piece carried by an endless conveyor to engage the partly wrapped article and to move it to said folding devices, said mechanism for partly folding the wrapper blank about the article including means to fold the wrapper blank into a U about one face of the article, one limb of the U being longer than the other limb, means to fold the end portion of the longer limb so that it is overlapped by the shorter limb, said shorter limb being folded into engagement with the article before the end portion of the longer limb, and a projection movable in synchronism with the plunger to lift the end portion of the shorter limb clear of the article whilst the end portion of the longer limb is being folded into position to be overlapped by the longer limb.

11. In a wrapping machine, the combination with means to position a wrapper blank transversely of the path of an article, of a plunger to move an article into engagement with a wrapper blank and to move the article and wrapper blank to mechanism to partly fold the wrapper blank about the article, folding devices to complete the folding of the wrapper blank about the article, and a pusher piece carried by an endless conveyor to engage the partly wrapped article, and to move it to said folding devices, said mechanism for partly folding the wrapper blank about the article including means to fold the wrapper blank into a U about one face of the article, one limb of the U being longer than the other limb, means to fold the end portion of the longer limb so that it is overlapped by the shorter limb, a projection movable in synchronism with the plunger to lift the end portion of the shorter limb clear of the article whilst the end portion of the longer limb is being folded into position to be overlapped by the longer limb, and an adhesive applying device and a support against which the lifted end portion is held whilst adhesive is applied to the lifted portion on that side thereof which is to engage the shorter length.

12. In a wrapping machine, the combination with means to position a wrapper blank transversely of the path of an article, of a plunger to move an article into engagement with a wrapper blank and to move the article and wrapper blank to mechanism to partly fold the wrapper blank about the article, folding devices to complete the folding of the wrapper blank about the article, and a pusher piece carried by an endless conveyor to engage the partly wrapped article and to move it to said folding devices, said mechanism for partly folding the wrapper blank about the article including means to fold the wrapper blank into a U about one face of the article, one limb of the U being longer than the other limb, means to fold the end portion of the longer limb so that it is overlapped by the shorter limb, said last named means comprising a folding element to fold the longer limb against that face of the article which is opposite the face about which the U is formed, a further

folding element to fold the end portion of the longer limb against that face of the article with which the shorter limb engages, a projection movable in synchronism with the plunger to lift the end portion of the shorter limb clear of the article whilst the end portion of the longer limb is being folded into position to be overlapped by the longer limb, and an adhesive applying device and a support against which the lifted end portion is held whilst adhesive is applied to the lifted portion on that side thereof which is to engage the shorter length.

THOMAS GRAYLAND JACKSON.