May 10, 1932. C. J. DOWNING 1,858,189

APPARATUS FOR WRAPPING ARTICLES

Filed Jan. 8, 1931 3 Sheets-Sheet 1

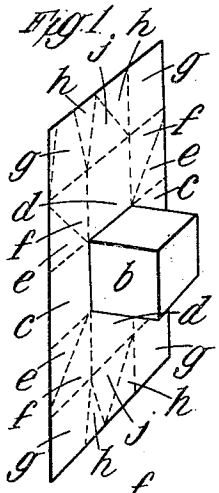


Fig. 1.

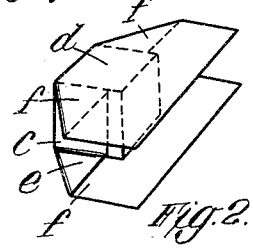


Fig. 2.

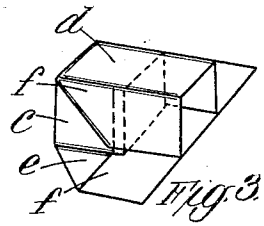


Fig. 3.

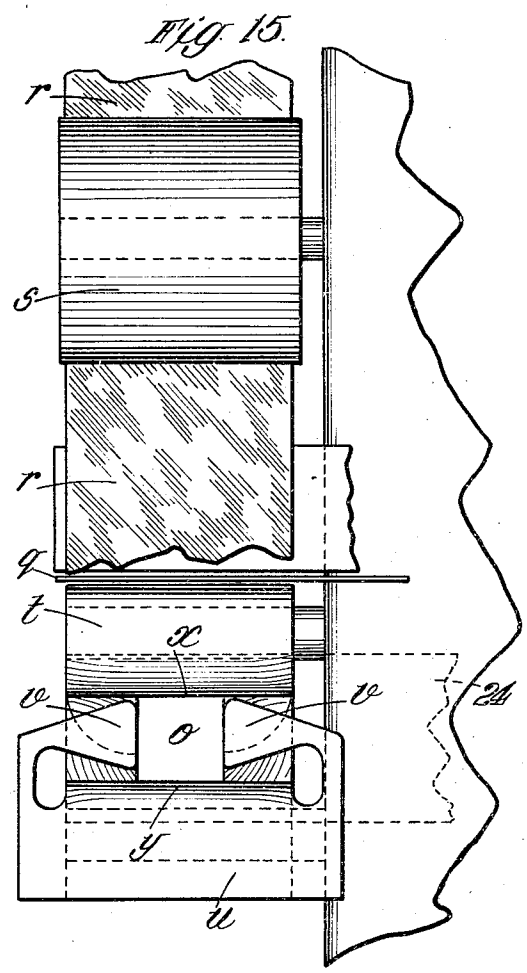


Fig. 15.

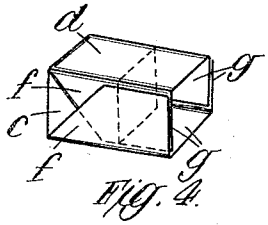


Fig. 4.

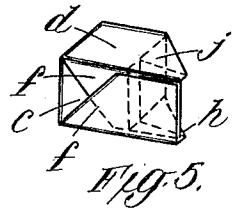


Fig. 5.

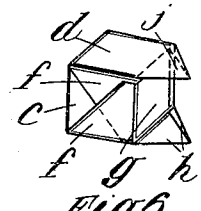


Fig. 6.

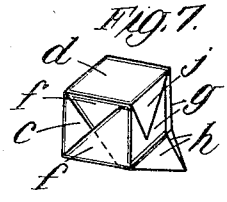


Fig. 7.

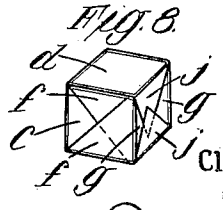


Fig. 8.

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Fig. 9.

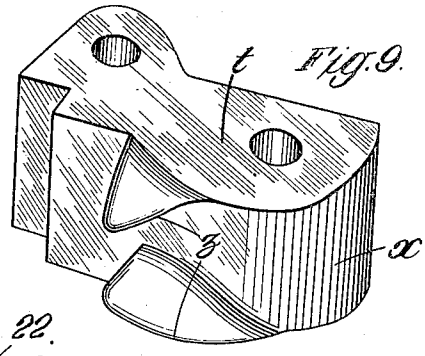


Fig. 10.

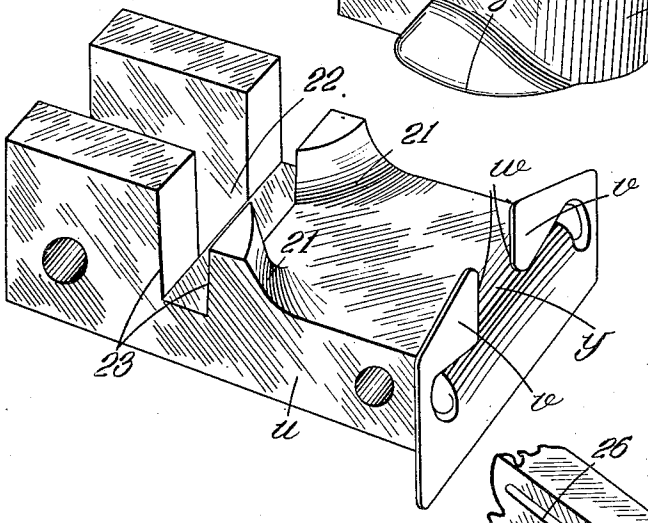


Fig. 12.

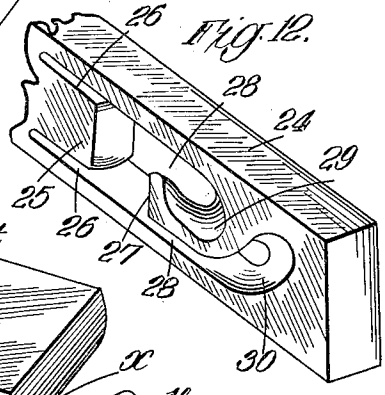
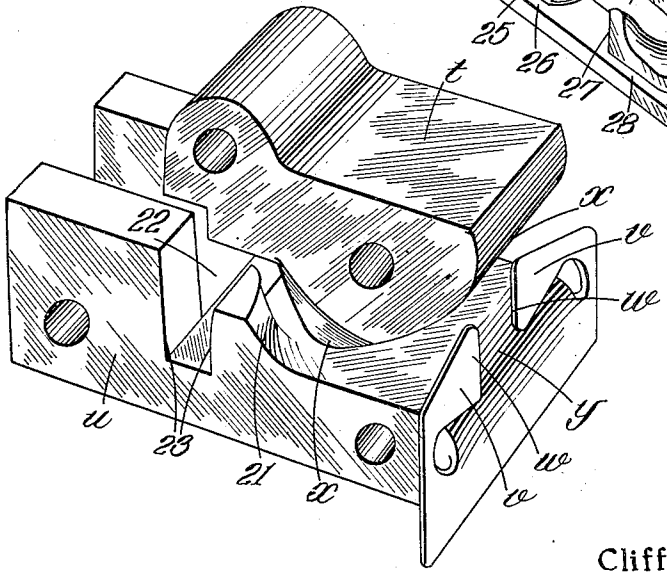


Fig. 11.



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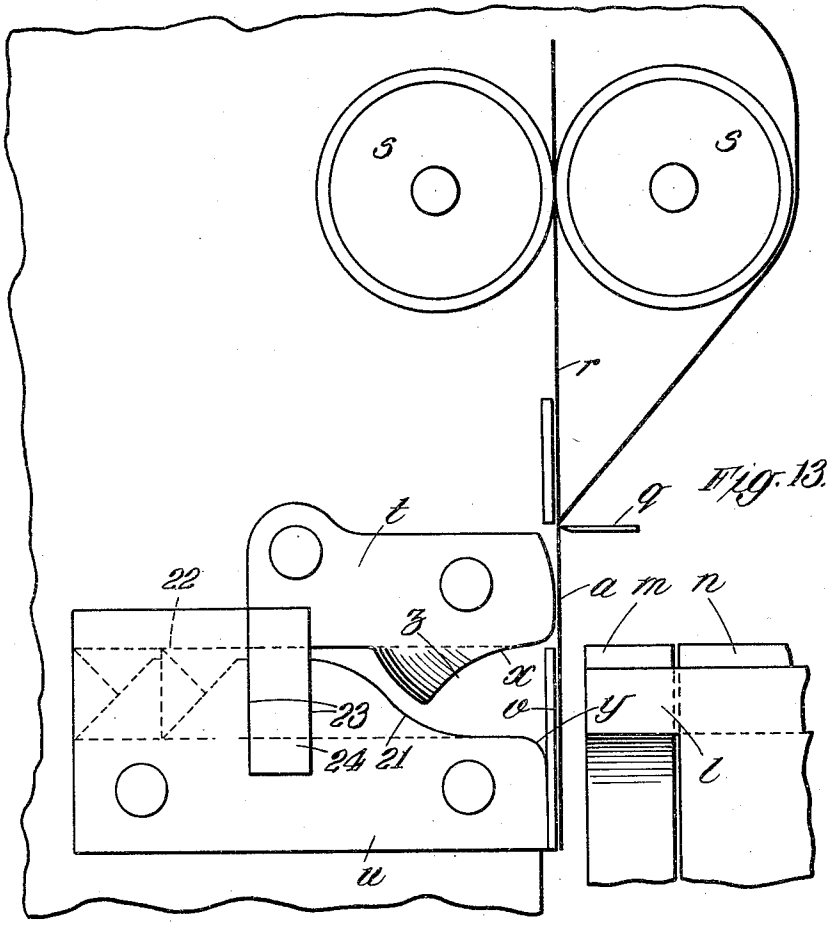


Fig. 13.

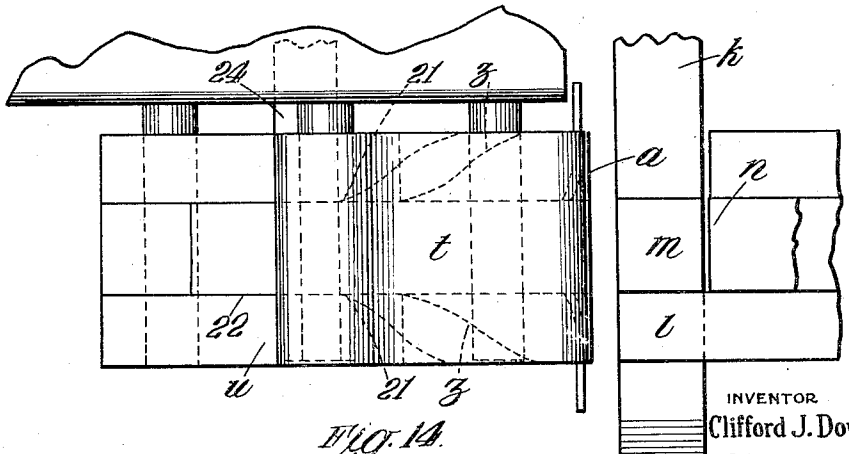


Fig. 14.

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Patented May 10, 1932 1,858,189

UNITED STATES PATENT OFFICE

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APPARATUS FOR WRAPPING ARTICLES

Application filed January 8, 1931, Serial No. 507,475, and in Great Britain February 13, 1930.

This invention relates to the wrapping of articles such as meat extract cubes, sweetmeats, packets of cigarettes, boxes or bottles of pills, and similar articles.

According to a known method, the article to be wrapped is fed to a starting position in front of a die, a piece of wrapping material cut to the required size is fed into position between the article and the die, so that it is disposed symmetricaly with respect to the article, relative movement between the article and the die is then effected so that opposite faces of the die cause opposite parts of the wrapping material to be folded over the article, adjacent projecting parts of said material being folded on to one another, curved parts within the die then act upon said projecting parts to fold them successively against the article, leaving the wrapping material projecting from the trailing end of the article, movement of a movable jaw relatively to the article is then effected in a direction transversely of the former movement, so that said movable jaw acts upon the projecting portion of the wrapping material to fold a part thereof against the trailing end of the article, whilst adjacent projecting parts of said wrapping material are folded one on to another, similar movement of a second jaw in the opposite direction produces the same result on the other side of the article, and finally two oppositely movable jaws fold over the projecting tongues which are left after the above steps have been taken.

The object of the present invention is to increase the output of such apparatus by reducing the number of parts, and the number of individual reciprocal movements thereof, required for the folding of the wrapping material projecting from the trailing end of the article, with consequent saving of time in wrapping each article.

In accordance with the present invention the folding in of the wrapping material projecting from the trailing end of the article is effected by a transversely reciprocal element which, as it moves in one direction, acts upon the projecting portion of the wrapping material to fold a part thereof against the trailing end of the article, adjacent projecting parts of said wrapping material being folded one on to another, whilst reversal of said movement then causes one or more curved parts of said reciprocal element to act upon the projecting portion of the wrapping material to fold a part thereof against the trailing end of the article, adjacent projecting parts of said wrapping material being folded one on to another leaving projecting tongues which in turn may be folded against the article by the last mentioned curved parts or by one of them in conjunction with relative movement between the article and the die in another direction.

For this purpose the transversely reciprocal element may be formed with a projecting tongue with slots on opposite sides thereof, and a second oppositely disposed tongue with slots on opposite sides thereof one or both of said slots leading to one or more curved surfaces which change along their length from one plane to another.

For the sake of convenience one form of the invention will be described with reference to the accompanying drawings which illustrate the successive stages of wrapping a meat extract cube in waxed paper, and means therefor, the cube being moved relatively to the first part of the die, and the second part of the die being moved relatively to the cube, but it is to be understood that the invention is applicable to the wrapping of articles of other shapes and that the relative movement of the die and articles may be effected in other ways.

In the accompanying drawings Figure 1 is a perspective view of a meat extract cube with a piece of waxed wrapping paper in the initial position; Figures 2, 3, 4, 5, 6, 7 and 8 are perspective views showing the successive folds of the waxed wrapping paper on to the cube; Figures 9 and 10 are perspective views of two parts of the die respectively, whilst Figure 11 is a similar view showing said parts in the relative positions they occupy when in the apparatus; Figure 12 is a perspective view of the folding elements of the reciprocatory folding slide; Figure 13 is a side elevation and Figure 14 a plan of the pertinent parts of the apparatus, whilst

Figure 15 is a front elevation (as viewed from the right, Figure 13, parts being omitted for the sake of clearness.

In order to facilitate comprehension of the dies and associated parts, the successive folds of the waxed wrapping paper will first be described with reference to Figures 1 to 8, which do not show the dies or other parts of the apparatus. Figure 1 shows a piece of waxed wrapping paper *a*, which has been cut to the required size, disposed symmetrically with respect to a meat extract cube *b*, the sections or parts into which, ultimately said paper is folded being indicated by dotted lines. The first movement of the paper *a* and cube *b* through the die causes opposite parts, such as *c*, *d* of the paper *a* to be folded respectively, against the two sides and the top and bottom of the cube *b*, adjacent projecting parts, such as *e f* of said paper being folded on to one another. The upper parts *e f* are then folded downwards against the sides of the cube *a*, as indicated in Figure 3, and the lower parts *e f* are then folded upwards in a similar manner, as shown in Figure 4, leaving paper projecting from the trailing ends of the cube *a*. The parts *g g* at one side of said projecting paper are then folded in against the trailing end of the cube *b*, whilst adjacent projecting parts *h j* are folded one on to another, as shown in Figure 5; the parts *g g* at the other side are then folded in a similar manner so that triangular tongues are left projecting rearwardly from the top and bottom, as shown in Figure 6; the top tongue is then folded down against the trailing end of the cube, as shown in Figure 7 and finally the lower tongue is folded up against said end, as shown in Figure 8.

Referring now to Figures 13, 14 and 15, the cubes are fed in succession by a belt conveyor *k* to the bed *l* of the apparatus where the leading cube encounters a stop *m* whereby it is positioned between a reciprocatory plunger *n* and a die and opening *o* (Figure 15) in which is adapted to give passage to the cube and the plunger. Before the forward stroke of the plunger *n* takes place, a piece of waxed paper *a* of predetermined size is fed into position between the cube and the die so that said paper is centrally disposed relatively to the leading face of the cube, as shown in Figures 1, 13 and 14.

As indicated in Figures 13 and 15, the piece of paper *a* may be cut by a knife *q* from a strip *r* fed to the required position by rollers *s s* from a source of supply (not shown). When the plunger *n* is advanced the cube is pushed into the opening *o* in the die, said opening being presented between a die element *t* disposed above another *u*, the latter being formed, at its front end, with inwardly directed tongues *v v* having edges *w w* at their inner ends. When the elements *t u* are mounted in their relative positions, as shown in Figures 11, 13, 14 and 15 the tongues *v*, *v* are spaced from the surfaces *x y* (which constitute the upper and lower edges of the opening *o*) of the elements *t u* so as to leave slots which extend laterally in line with the upper and lower edges of the opening *o*, into which they debouch, so that when the plunger *n* forces the cube against the paper *a* and advances them into the die the upper and lower edges *x y* of the opening *o* cause the upper and lower parts *d d*, *f f* of the paper *a* to be folded downwards and upwards, respectively on to the top and bottom faces of the cube, whilst the lateral edges *w w* of said opening *o* act in a similar manner against the lateral parts *c c* of the paper *a*, those parts *e* . . . of the lateral margins of the paper *a*, which, originally, were above and below the slots, respectively, are brought substantially into the horizontal planes of the upper and lower parts *f f* and are retroverted or tucked in beneath and above said parts *f f* respectively, thus leaving wings which project laterally from the top and bottom of the cube as shown in Figure 2. Behind the tongues *v v* of the die element *u*, the surface of the element *t* at each side of the general square-section passage through the die, corresponding with the square opening *o*, generally changes its plane from horizontal to vertical, as indicated at *z* in Figures 9, 11, 13 and 14, so that when the upper pair of wings pass through the upper pair of slots in the front of the die they are acted upon by said surfaces *z* and are gradually folded downwards and against the sides of the cube, as shown in Figure 3. Similarly, and a little further along the passage, the surface of the die element *u*, at each side of said passage, changes gradually from a horizontal to a vertical plane, as indicated at 21 in Figures 10, 11, 13 and 14, so that the lower pair of wings pass through the lower pair of slots in the front of the die and (the upper pair of wings having been folded down as above described) are acted upon by said surfaces 21 and are folded upwards against the side of the cube, as shown in Figure 4. This brings the wrapping operation to the stage when the paper is in contact with, and lies flat against, five faces of the cube, leaving a part of the paper projecting rearwardly beyond the trailing face of the cube. The cube is then advanced by the plunger *n* until it lies in a recess 22, Figures 10, 11, 13 and 14 in the die element *u*, with the rearwardly projecting part of the paper extending across a slot 23 in said die element *u*. The plunger *n* is then retracted and, when it is clear of the slot 23, a third die element 24 is moved first forwardly and then back again in a direction transversely of the direction of movement of the plunger *n*. At one side the die element 24 has a projection 25, Figure 12 above and below which slots 26, 26 are

formed. This projection 25 engages one side *g g* (double thickness) of the projecting part of the paper and folds it over against the trailing face of the cube retroverting or tucking in portions *h h* of the upper and lower parts of the paper, beneath and above parts *j j*, respectively, as shown in Figure 5, the folded parts *h j* passing into the slots 26, 26. At its other side the die element 24 is formed with a projection 27 adapted to act in a similar manner on the other side of the projecting part of the paper, the folding and retroversion of which, leaves two tongues projecting from the top and bottom of the trailing face of the wrapped cube, as shown in Figure 6. The slots 28, 28 at this other side of the die element 24 lead to curved surfaces 29 and 30, the planes of which change gradually from horizontal to vertical downwardly and upwardly, respectively so that during the second stage of the return movement of the die element 24, the upper tongue is folded down against the trailing face of the wrapped cube, as shown in Figure 7, and the lower tongue is then folded up against said trailing face, as shown in Figure 8. It is to be understood that as the return movement of the die element 24 comprises three active stages and the forward movement has only one active stage the first part of said forward movement is idle.

It is desirable that the leading edges of the surfaces *x y* of the die elements *t u* should be curved slightly in the transverse direction as indicated in Figure 15. After being so wrapper, each cube is advanced in and out of the recess 22 by its successor, and may be passed into a passage where it may be heated, sufficiently to soften the wax of the wrapper and cause the folds thereof to become sealed together.

In some cases only one of the slots 28 may lead to a curved surface in which event a vertically movable plunger may move the wrapped cube through a suitably formed passage (in which passage said cube may be heated as above mentioned) thus causing the last tongue to be folded against the cube. As the die elements *t*, *u* and 24 are each a unitary structure and can be removed easily from the apparatus, it follows that they may be removed and cleansed with facility and rapidity, thus obviating the necessity of keeping the apparatus idle for a long time, whilst that operation is being performed.

In some cases the curved surfaces of the die elements *t u* may be mounted so that they may be caused to approach, and recede from one another at predetermined times, e. g. when the leading part of the article to be wrapped is larger than the following part.

It is to be understood that the movement of the plunger *n* and reciprocatory die element 24 should be effected in coordination for suitable driving means, so that successive articles may be wrapped with great rapidity and certainty.

Inasmuch as the final wrapping operations indicated in Figures 5, 6, 7 and 8 are effected by a single reciprocatory die element (or in conjunction with a final expulsion plunger) it follows that the time occupied in effecting these folds is considerably less than would be taken if those folds were effected by the in and out movement of separate jaws for each fold, consequently the output of the improved device is higher than that of previously known apparatus.

I claim:—

1. In an apparatus for wrapping articles comprising a die, means for feeding the article to be wrapped in front of the die, means for feeding a sheet of wrapping material between the article and the die, means for causing relative movement between the die and the article so that the faces of the die fold opposite parts of the wrapping material over the article leaving projecting portions, and curved means within the die to fold said projecting portions against the article, leaving a portion of the wrapping material rectangular in cross section projecting from the trailing end of the article, that improvement which comprises a reciprocable element having means to fold down one of the sides of the projecting portion when moved in one direction and having means when moved in the other direction to fold down the opposite side and then successively the two remaining sides of the projecting portion.

2. In an apparatus for wrapping articles comprising a die, means for feeding the article to be wrapped in front of the die, means for feeding a sheet of wrapping material between the article and the die, means for causing relative movement between the die and the article so that the faces of the die fold opposite parts of the wrapping material over the article leaving projecting portions, and curved means within the die to fold said projecting portions against the article, leaving a portion of the wrapping material rectangular in cross section projecting from the trailing end of the article, that improvement which comprises a reciprocable element having a shoulder thereon which engages one side of the projecting portion as the element moves in one direction to fold down said side, a second shoulder which engages the opposite side when the element moves in the opposite direction to fold down said last side, and a curved surface engaging one of the remaining sides to fold the same when the element moves in the second direction after the second side has been folded.

3. In an apparatus for wrapping articles comprising a die, means for feeding the article to be wrapped in front of the die, means for feeding a sheet of wrapping material between the article and the die, means for causing

relative movement between the die and the article so that the faces of the die fold opposite parts of the wrapping material over the article leaving projecting portions, and curved means within the die to fold said projecting portions against the article, leaving a portion of the wrapping material rectangular in cross section projecting from the trailing end of the article, that improvement which comprises a reciprocable element having a shoulder thereon which engages one side of the projecting portion as the element moves in one direction to fold down said side, a second shoulder which engages the opposite side when the element moves in the opposite direction to fold down said last side, and a pair of curved surfaces engaging the remaining sides successively to fold them down when the element moves in the second direction after the second side has been folded.

4. In an apparatus for wrapping articles comprising a die, means for feeding the articles to be wrapped in front of the die, means for feeding a sheet of wrapping material between the article and the die, means for causing relative movement between the die and the article so that the faces of the die fold opposite parts of the wrapping material over the article leaving projecting portions and curved means within the die to fold said projecting portions against the article, leaving a portion of the wrapping material rectangular in cross section projecting from the trailing end of the article, that improvement which comprises a reciprocable element having at one side an inwardly directed projection, slots above and below said projection, and at the other side a second inwardly directed projection, slots above and below said second projection, one of said last named slots having a curved surface the plane of which changes through substantially a right angle.

5. In an apparatus for wrapping articles comprising a die, means for feeding the article to be wrapped in front of the die, means for feeding a sheet of wrapping material between the article and the die, means for causing relative movement between the die and the article so that the faces of the die fold opposite parts of the wrapping material over the article leaving projecting portions and curved means within the die to fold said projecting portions against the article, leaving a portion of the wrappping material rectangular in cross section projecting from the trailing end of the article, that improvement which comprises a reciprocable element having at one side an inwardly directed projection, slots above and below said projection, and at the other side a second inwardly directed projection, slots above and below said second projection, said last named slots having curved surfaces the planes of which change through substantially right angles.

6. In an apparatus for wrapping articles, means for folding a projecting portion of wrapping material rectangular in cross section at the trailing end of the article, said means comprising a reciprocable element having means to fold down one of the sides of the projecting portion when moved in one direction and having means when moved in the other direction to fold down the opposite side and then successively the two remaining sides of the projecting portion.

7. In an apparatus for wrapping articles, means for folding a projecting portion of wrapping material rectangular in cross section at the trailing end of the article, means comprising a reciprocable element having a shoulder thereon which engages one side of the projecting portion as the element moves in one direction to fold down said side, a second shoulder which engages the opposite side when the element moves in the opposite direction to fold down said last side, and a curved surface engaging one of the remaining sides to fold the same when the element moves in the second direction after the second side has been folded.

8. In an apparatus for wrapping articles, a reciprocable folding element having a pair of inwardly facing shoulders one or either side thereof, and slots above and below said shoulders.

9. In an apparatus for wrapping articles, a reciprocable folding element having a pair of inwardly facing shoulders one or either side thereof, and slots above and below said shoulders, some of said slots having surfaces curved through substantially right angles.

10. In an apparatus for wrapping articles, a reciprocable folding element having a pair of inwardly facing shoulders one or either side thereof, and slots above and below said shoulders, the slots above the shoulders and the slots below the shoulders being in horizontal alignment.

11. In an apparatus for wrapping articles, a reciprocable folding element having a pair of inwardly facing shoulders one on either side thereof, and slots above and below said shoulders, the slots above the shoulders and the slots below the shoulders being in horizontal alignment, some of said slots having surfaces curved through substantially right angles.

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