

Jan. 17, 1956

P. H. CLARK  
APPARATUS FOR MAKING AND SEPARATING  
ENVELOPES AND OTHER CONTAINERS

2,730,852

Filed June 26, 1952

3 Sheets-Sheet 1

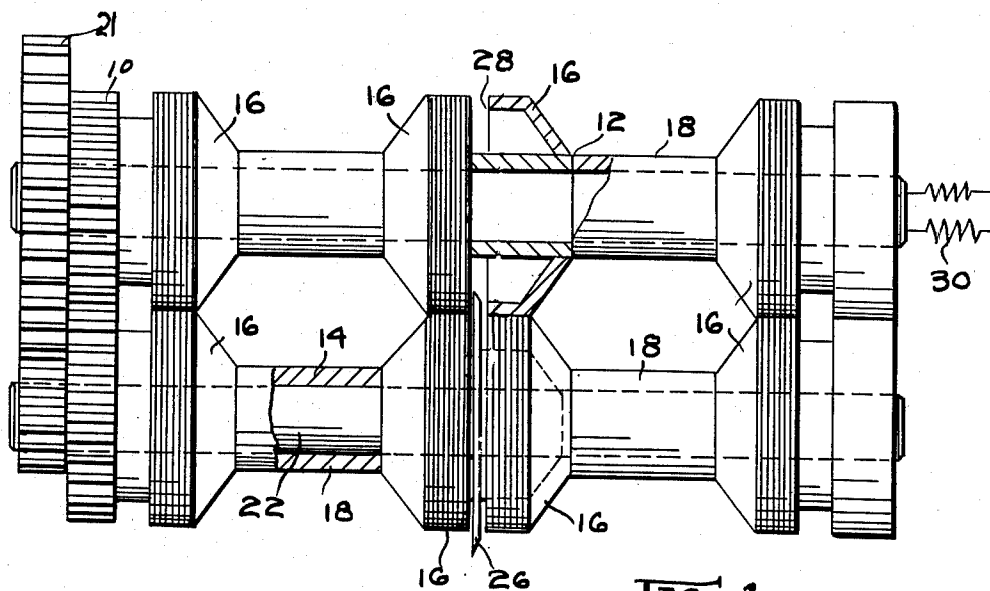


FIG. 1

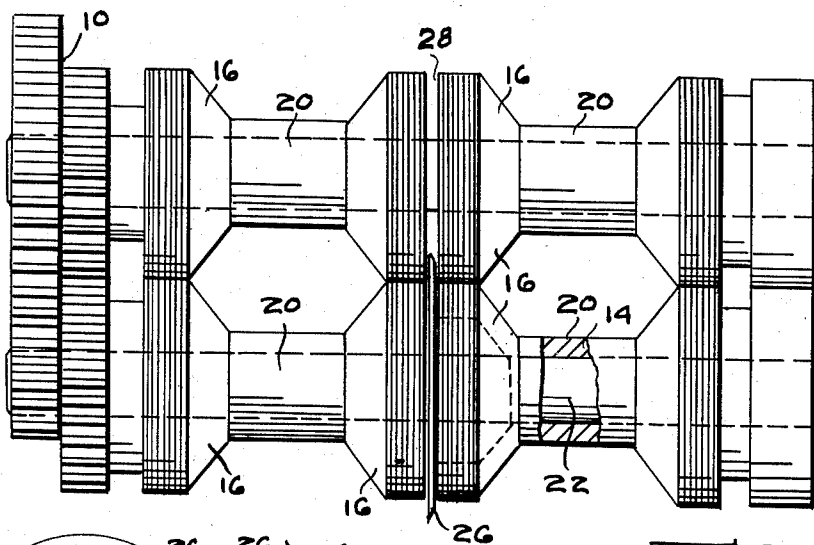


FIG. 2

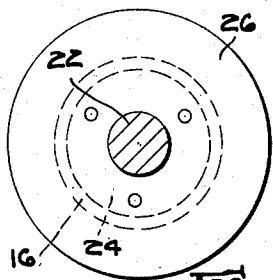


FIG. 3

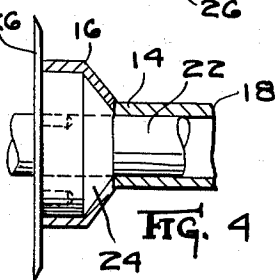


FIG. 4

INVENTOR.  
PETER H. CLARK  
BY  
*Charles R. Jung,*  
ATTORNEY

Jan. 17, 1956

P. H. CLARK  
APPARATUS FOR MAKING AND SEPARATING  
ENVELOPES AND OTHER CONTAINERS

2,730,852

Filed June 26, 1952

3 Sheets-Sheet 2

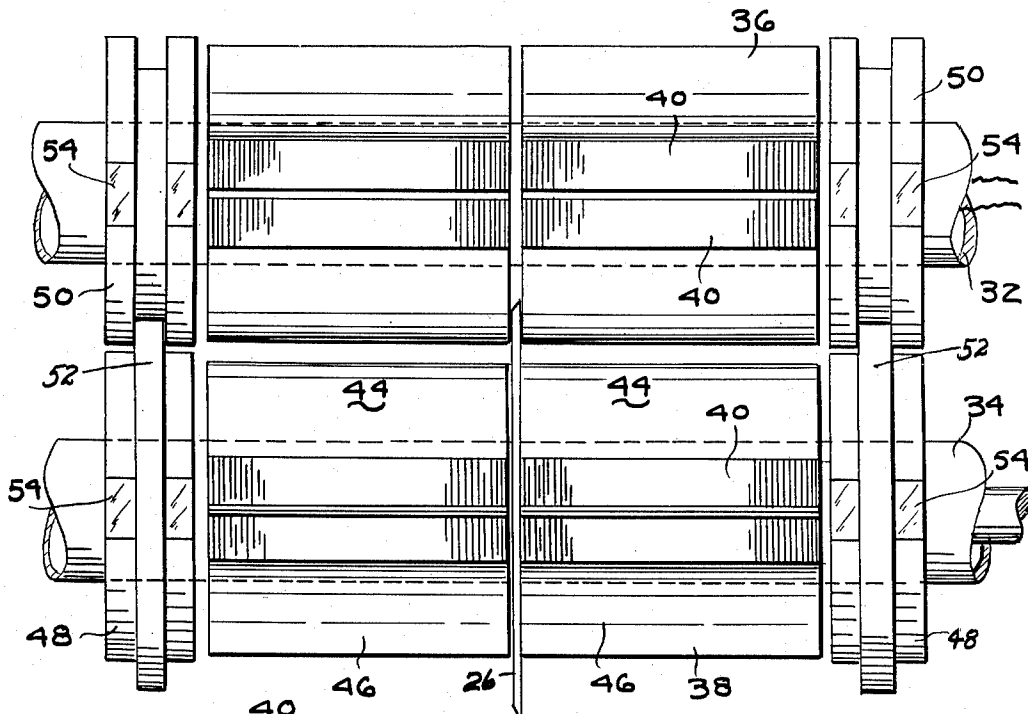


FIG. 5

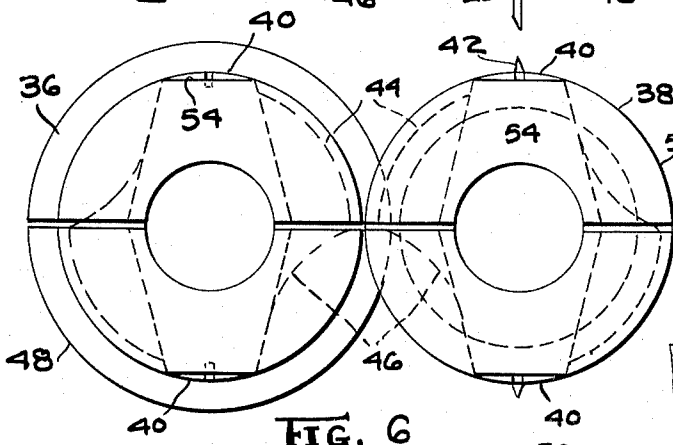


FIG. 6

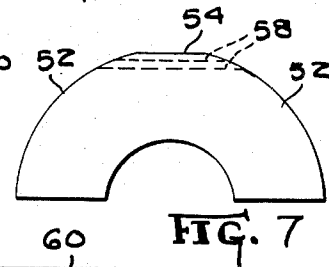


FIG. 7

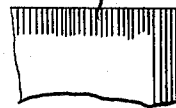


FIG. 8

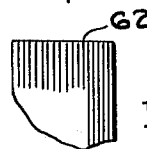


FIG. 9

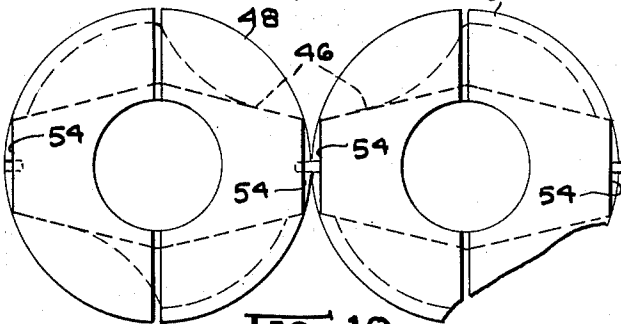


FIG. 10

INVENTOR.  
PETER H. CLARK  
BY *Charles R. Fay*  
ATTORNEY

Jan. 17, 1956

P. H. CLARK  
APPARATUS FOR MAKING AND SEPARATING  
ENVELOPES AND OTHER CONTAINERS

2,730,852

Filed June 26, 1952

3 Sheets-Sheet 3

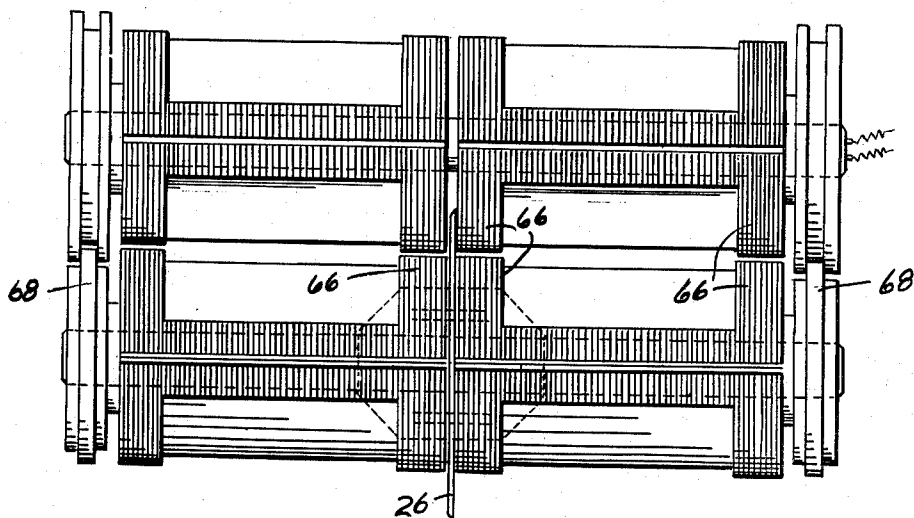


FIG. 11

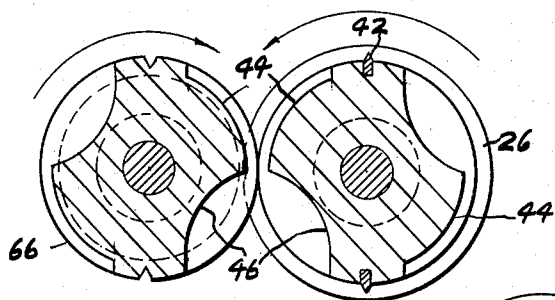


FIG. 12

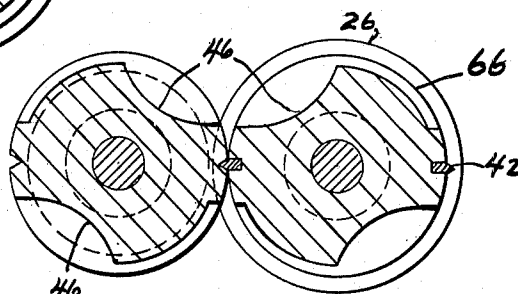


FIG. 13

INVENTOR.  
PETER H. CLARK  
BY *Charles P. Fay*  
ATTORNEY

1

2,730,852

## APPARATUS FOR MAKING AND SEPARATING ENVELOPES AND OTHER CONTAINERS

Peter H. Clark, Worcester, Mass.

Application June 26, 1952, Serial No. 295,639

19 Claims. (Cl. 53—84)

This invention relates to new and improved machines for making containers such as envelopes or bags, etc., and one of the principal objects of the invention resides in providing adjustable crimping rollers for making containers of different sizes from advancing sheets or straps, a knife blade for dividing a plurality of connected lines of containers into separate lines of containers, and means to rotate the knife at a speed different from the advancing containers to cut the same uniformly and cleanly.

Other objects of the invention reside in the provision of horizontal crimping rollers having longitudinal crimping areas parallel to the axes thereof for co-action to form the bottoms and tops of the containers, in combination with wheels having circumferential edges bearing on each other and maintaining the rollers at the exact relation required, said wheels having relieved areas or "flats" in the regions of the crimping areas to allow the latter to co-act to carry out their crimping function at the nip of the roller pair without clashing or bumping, said wheels being replaceable with like wheels having different lengths of flats so that the widths of crimp are adjustable without making any change at all in the crimping rollers; and the provision of rollers and wheels as above described including container forming recesses in the rollers and circular areas for expressing air from the filled or partly filled containers prior to top sealing, the wheels having circular portions exactly spacing the rollers for the air expressing action.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a top plan view, partly in section, of a set of vertical crimping rollers, and showing the position of the knife;

Fig. 2 is a similar view showing an adjustment of the crimpers;

Fig. 3 is a view in elevation of the knife;

Fig. 4 is a section through a crimper, shaft and knife support;

Fig. 5 is a plan view of a set of horizontal crimping rollers; with a rotary knife in position;

Fig. 6 is an end view of the rollers of Fig. 5;

Fig. 7 is a view in elevation of a washer half;

Figs. 8 and 9 illustrate the variation of crimp due to different washers;

Fig. 10 is a view like Fig. 6 but illustrating a different point in the rotation of the crimpers;

Fig. 11 is a view similar to Fig. 1 but showing solid crimping rollers and a slitting knife; and

Figs. 12 and 13 are sections therethrough showing the action thereof.

Referring to Fig. 1 there is shown a set of gearing of any convenient design, but which is preferably arranged according to that shown in my previous applications, Serial No. 194,659, filed November 8, 1950, and Serial No. 210,141, filed February 9, 1951. These gears rotate a pair of parallel hollow sleeves 12 and 14 in unison and in opposite directions. Each hollow sleeve may be pro-

2

vided with crimping wheels or rollers generally indicated at 16 and these may be adjustably spaced by sleeves 18 or made integral with the latter, depending upon the type of work to be done or the machine to be used. These rollers are endwise slidable to be removed and replaced.

The central rollers 16 are spaced as shown and it is clear that the arrangement in Fig. 1 will provide 2 lines of tubes made from one folded sheet or two separate sheets heat sealed longitudinally of the direction of feed and at the edges thereof, these tubes later being finished by the horizontal crimpers illustrated. Clearly, only the two outer crimpers 16 have to be adjusted inwardly on the sleeves to provide tubes of different widths. As the rotation of the horizontal crimper may vary in speed in comparison with the vertical sealers or crimper, this in turn will vary the lengths of the tubes or containers.

Sleeve 14 contains a shaft 22 drive by gearing 21 at a higher rate of speed than the sleeves 12 and 14. The shaft 22 may be journaled as desired in sleeve 14 and centrally thereof it is provided with a collar 24 to which is secured a rotary knife blade 26. This knife blade extends into space 28 between the central crimpers 16 on hollow shaft 12 and it would be seen that the knife blade 26 rotating at a relatively high speed will easily and smoothly slit or separate the sheet material going to make up the two or more tubes described above. It is to be understood that any number of these tubes may be made and any number of knives 26 therefor may be utilized for the purpose described. Also, hollow shaft 12 may be provided with heating elements 30 for heating the crimpers 16 thereon, the crimpers on shaft 14 being cold in most instances.

Referring now to Fig. 5 et seq., there are seen to be a pair of sleeves 32 and 34 which are rotated by gearing as described and upon which are mounted a pair of forming and crimping rolls 36 and 38. These rolls are provided with horizontal crimps, areas 40 divided longitudinally by knives or cooperating slots 42 for cutting off or slitting as clearly described in my application above referred to. These rollers are also provided with cylindrical areas 44 and concave areas 46, the latter forming the bag or envelope while it is being filled and the former expressing air or gas in the filled container out through the still remaining opening therein prior to the closure thereof by the crimping areas 40. There are no vertical crimping areas, as this operation has been accomplished by the rolls previously described.

These sleeves 32 and 34 are provided with wheels or washers 48 and 50 which are preferably arranged in a tongue and grooved fashion (see Fig. 5) to prevent relative longitudinal motion of the rolls. These wheels or washers are fast to the respective shafts and bear upon each other at the central portions thereof 52 to exactly and properly space the forming areas 46 and the expressing areas 44 of the crimping rollers 36 and 38. It is clear that by this means the filled cavity in the envelope or bag may be made very exactly and the gas or air expressed may be done with a minimum of air and with a maximum of exactness.

The wheels 52 are provided with flats 54 which coincide in general with the angular positions of the crimping areas 40 so that these areas although cylindrical will come together properly for the crimping operation in a smooth manner. Without the flats 54, the washers would prevent sufficient pressure being impressed at the nip to cause the heat sealing function. If the wheels 52 are not used at all there would be an actual blow struck by the two crimping areas just as they come together ripping or tearing paper or fabric material going to make up the envelopes or bags. The flats allow proper crimping or heat sealing and the wheels themselves provide for exactness in spacing of the crimping rollers.

## 3

The wheels 52 are made in two parts so that they are diametrically spaced and are secured to each other by chordal fasteners or by axially arranged fasteners, both of these fasteners being well known in the art and taking the form of set or cap screws.

The wheels or washers 48 and 50 are easily interchanged, and by interchanging these wheels with others exactly alike but having a variation of sizes of flats, as at 58, Fig. 7, the widths of the crimps 60 and 62 (Figs. 8 and 9) are adjusted very quickly and easily without the necessity of taking the crimping rollers off the sleeves and replacing them by others as would otherwise be necessary. The wheels may be slid off their shafts endwise and other wheels slid on to take their places. It is to be noted that in Fig. 5 the flats 54 are much shorter than the total widths of the crimpers and the parts thus arranged will provide crimps which are only slightly larger than one-half of the crimping areas 40 illustrated. By removing the wheels and replacing them with light wheels having larger flats, more of the widths of the crimping areas 40 can be utilized and this crimping area will be considerably enlarged to a degree desired as illustrated in Fig. 9.

Figs. 11, 12, and 13 illustrate a non-adjustable roller set for making the bottom, sides, and closure crimp. In this case, the flats 54 may not be used, as the crimp areas 66 provide a somewhat similar function. However, under some circumstances the flats are used, to a smaller extent, to allow the horizontal crimping areas to bear in a little deeper than the vertical crimping areas 66. However, the washers or wheels 68 provide against longitudinal shifting and also define the exact roller pressure desired for best sealing or crimping results.

This invention provides a maximum of adjustability in the bag making or container filling art, as by the sleeves of Fig. 1, the interchangeable wheels or washers, etc., and since the horizontal crimping rollers of Fig. 5 can be driven at speeds different from that of the vertical crimpers of Fig. 1, an endless variety of size of tubes, envelopes, bags, etc., is easily obtainable.

I claim:

1. Apparatus of the class described comprising a pair of spaced parallel hollow sleeves, means to rotate the hollow sleeves, a shaft in one hollow sleeve, means to rotate the shaft at a speed different from the sleeves, forming and crimping rollers on the sleeves cooperating to seal sheets of material passing therebetween, and a circular knife blade on the shaft and rotated thereby, said blade extending into the plane of the sheets between the rollers.

2. Apparatus of the class described comprising a pair of spaced parallel hollow sleeves, means to rotate the hollow sleeves, a shaft in one hollow sleeve, means to rotate the shaft at a speed different from the sleeves, forming and crimping rollers on the sleeves cooperating to seal sheets of material passing therebetween, and a circular knife blade on the shaft and rotated thereby, said blade extending into the plane of the sheets between the rollers, and a second set of crimping rollers in spaced relation to the first-named crimping rollers.

3. Apparatus of the class described comprising a pair of spaced parallel hollow sleeves, means to rotate the sleeves in unison, axially aligned pairs of crimping rollers on the respective sleeves, each roller of each aligned pair of rollers being slightly spaced axially from the other roller of its pair, a shaft in one sleeve, means to rotate the shaft faster than the sleeves, a knife on the shaft between the aligned pair of rollers on the one sleeve, said knife extending into the space between the aligned rollers on the other sleeve to slit material passing through the nip of the rollers on the pair of sleeves.

4. The apparatus of claim 3 wherein the rollers are removable and replaceable.

5. Apparatus of the class described comprising a pair of driven shafts, rollers on the shafts, mutual crimping

## 4

areas on the rollers, said areas being elongated and generally parallel to the axes of the respective rollers and located at the peripheries of the rollers, the remainder of the rollers being relieved, wheels on each shaft, said wheels bearing on each other for a major portion of the circumferences thereof, and relieved areas on the wheels in generally axially aligned relation to the crimping areas, said wheels maintaining a predetermined roller spacing and providing for crimping area contact thereof.

6. Apparatus of claim 5 wherein the relieved areas of the wheels substantially equal the circumferential width of the crimping areas of the rollers.

7. Apparatus of claim 5 wherein the relieved areas of the wheels are less in peripheral extent than the crimping areas of the rollers.

8. Apparatus of the class described comprising a pair of rollers, cooperating elongated crimping areas on said rollers arranged generally parallel to the axes of the rollers, relieved areas on each roller between the crimping areas, and areas of less relief on the rollers, said first-named relieved areas forming a package in a tube or the like passing the roller nip, the relieved areas of less relief co-acting to express air from the package, and the crimping areas closing and sealing the tube to finish the package, in combination with a substantially circular wheel associated with each roller, said wheels circumferentially interengaging each other and maintaining the relieved roller areas in substantially exact spaced relation, said wheels being relieved in the region of the crimping areas to allow the latter to approach and crimp the tube.

9. The apparatus of claim 8 wherein the wheel reliefs are circumferentially substantially equal to the widths of the roller crimping areas.

10. The apparatus of claim 8 wherein the wheel reliefs are less in circumferential length than the widths of the roller crimping areas.

11. Apparatus of the class described comprising a pair of rollers, elongated longitudinally arranged cooperating crimping areas on said rollers parallel to the axis thereof, relieved fitting areas between the crimping areas, and other areas of less relief on the rollers, said fitting areas forming a package in a tube or the like passing the roller nip, and the crimping areas closing and sealing the tube to finish the package, in combination with a substantially circular wheel associated with each roller, said wheels circumferentially engaging each other and maintaining the relieved roller areas in substantially exact spaced relation, said wheels being relieved in the region of the crimping areas to allow the latter to approach and crimp the tube.

12. The apparatus of claim 11 wherein the wheel reliefs are circumferential substantially equal to the widths of the roller crimping areas.

13. The apparatus of claim 11 wherein the wheel reliefs are less in circumferential length than the widths of the roller crimping areas.

14. Container making apparatus comprising a pair of driven shafts, crimping rollers on each shaft in coacting relation to crimp material passing therebetween, a knife on one shaft to slit the material in the direction of travel of the material, a second pair of shafts, crimping rollers thereon to crimp the previously crimped and slit material in a different direction from the previously crimped areas, and a knife on the second-named rollers to slit the material in a direction at right angles to the first slit.

15. Apparatus of the class described comprising a pair of spaced parallel hollow sleeves, means to rotate the hollow sleeves, a shaft in one hollow sleeve, means to rotate the shaft at a speed different from the sleeves, forming and crimping rollers on the sleeves cooperating to seal sheets of material passing therebetween, and a circular knife blade on the shaft and rotated thereby, said blade extending into the plane of the sheets between the rollers, said means comprising a set of gears for driving the sleeves, said gears being interchangeable to vary the sleeve speeds to change the size of the articles crimped.

5

16. Container making apparatus comprising a pair of driven shafts, crimping rollers on each shaft in coaxing relation to crimp material passing therebetween, a knife on one shaft to slit the material in the direction of travel of the material, a second pair of shafts, crimping rollers thereon to crimp the previously crimped and slit material in a different direction from the previously crimped areas, and a knife on the second-named rollers to slit the material in a direction at right angles to the first slit, and interchangeable gearing to drive the shafts at different selected speeds.

17. Apparatus of the class described comprising a pair of rollers, elongated longitudinally arranged cooperating crimping areas on said rollers parallel to the axis thereof, relieved fitting areas between the crimping areas, and other areas of less relief on the rollers, said fitting areas forming a package in a tube or the like passing the roller nip, and the crimping areas closing and sealing the tube to finish the package, in combination with a substantially circular wheel associated with each roller, said wheels circumferentially engaging each other and maintaining the relieved roller areas in substantially exact spaced relation, said wheels being relieved in the region of the crimping areas to allow the latter to approach and crimp the tube and interchangeable gearing for driving the rollers at different speeds to change the sizes of the packages.

18. Apparatus of the class described comprising a pair of shafts, a crimping roller on each shaft for mutual

6

crimping co-action, longitudinal crimping areas on the rollers, and a pair of axially spaced wheels on each shaft, the wheels on one shaft bearing on the corresponding wheels of the other shaft at the peripheries thereof, said wheels being peripherally relieved in general alignment with the crimping areas to fail to bear on each other at said areas.

19. Apparatus of the class described comprising a pair of shafts, a crimping roller on each shaft for mutual crimping co-action, coaxing longitudinal crimping areas on the rollers, and a pair of wheels on each shaft, the wheels on one shaft bearing on the corresponding wheels of the other shaft at the peripheries thereof, said wheels being relieved peripherally in general alignment with the crimping areas to fail to bear on each other at said areas, said wheels being removable and replaceable with wheels having relieved areas of different length to vary the width of the crimp without changing or adjusting the crimpers.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

|           |             |               |
|-----------|-------------|---------------|
| 1,273,318 | Bircher     | July 23, 1918 |
| 2,037,825 | Salfisberg  | Apr. 21, 1936 |
| 2,066,466 | Gray et al. | Jan. 5, 1937  |
| 2,083,617 | Salfisberg  | June 15, 1937 |
| 2,141,318 | Salfisberg  | Dec. 27, 1938 |
| 2,603,928 | Clark       | July 27, 1952 |