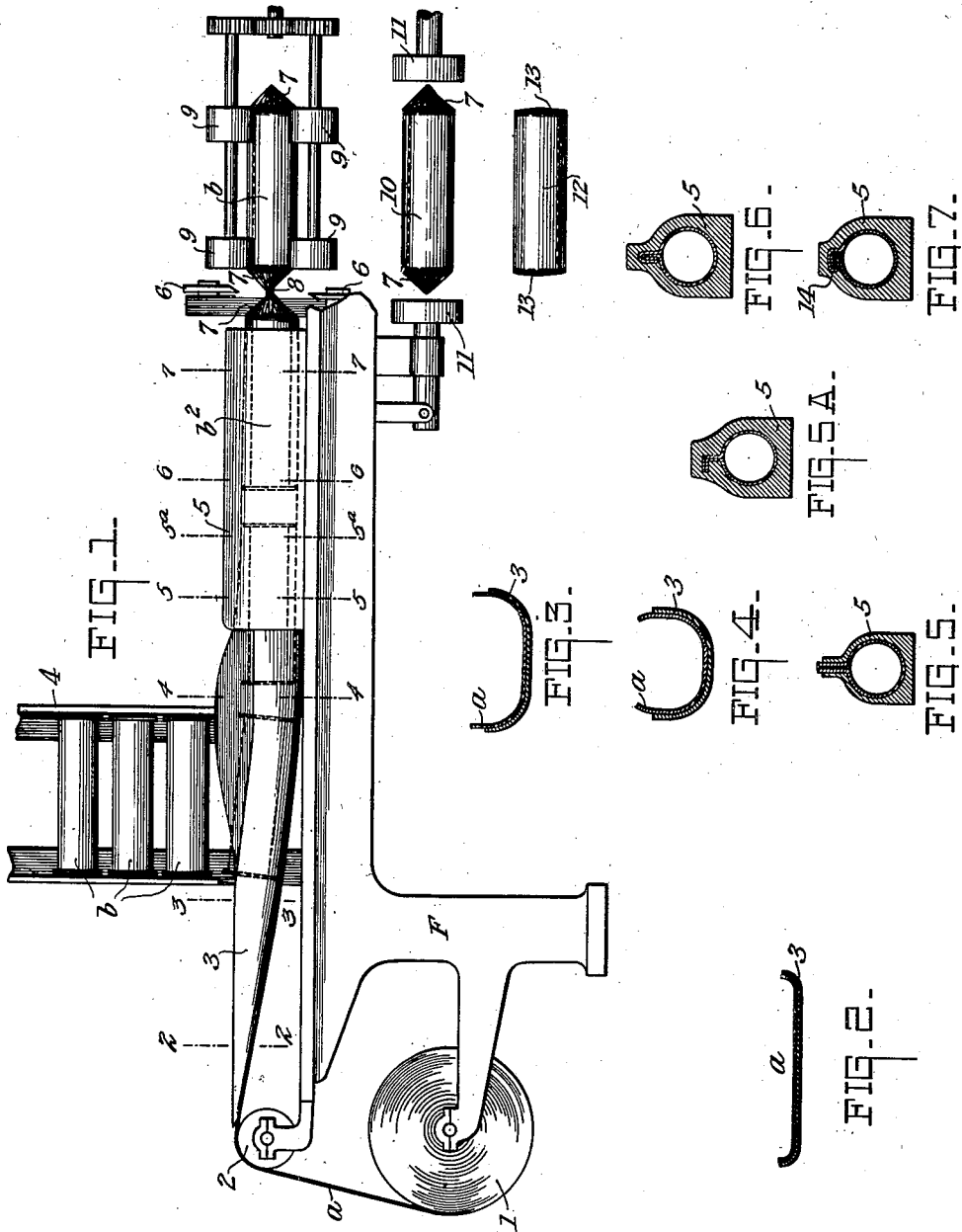


J. G. JONES.  
 WRAPPING PROCESS.  
 APPLICATION FILED APR. 16, 1917.

1,313,234.

Patented Aug. 12, 1919.



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## WRAPPING PROCESS.

1,313,234.

Specification of Letters Patent.

Patented Aug. 12, 1919.

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*To all whom it may concern:*

Be it known that I, JOHN G. JONES, a citizen of the United States of America, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Wrapping Processes; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

This invention relates to a wrapping process. More particularly it relates to the formation of individual, substantially tight, and moisture proof protective wrappings about objects to be preserved, such as spools having a sensitive photographic roll film wound thereon.

The principal objects of my invention are to provide process steps of such a nature and sequence that protective wrappings may be applied to articles rapidly, cheaply, and reliably, on a large scale; to provide a process which will not require complex or slow mechanism, if performed by automatic machinery, and yet may be easily performed by hand; to form a tube about a series of articles and to twist and sever the tube between the different articles, thus making a series of parcels having twisted ends which taper by substantially regular folds to tight apices, said ends being ultimately compressed so that they conform to the end surfaces of the inclosed article whereby the folds and apices are compacted into substantially moisture proof sheets completing the covering; to employ in the formation of the tube a seam which will not become loose or unlocked during twisting, severing, and compressing operations; to employ a shearing operation which compresses the material prior to severing it; to use wrapping materials particularly adapted to the operations of my process, said materials combining adequate tensile strength with the ability to maintain substantially unaltered the bends and folds formed therein during my process, and also being proof, when necessary, against moisture and emanations harmful to photographic emulsions; to manipulate the tube during the twisting and similar steps by grasping the walls thereof at points where they are supported by the flanges of the contained spools, so that danger of injuring

the unsupported portions of the tube walls is eliminated; and to compensate during the twisting operation for the material which enters into the twist by approaching the adjacent spools, thereby avoiding injurious stresses in the material of the tube. Another object of my invention is to produce a moisture proof covering for an article, said covering having a locked side seam and the ends thereof consisting of substantially regular folds which converge toward the center of the ends of the object and are compacted into a substantially impervious sheet. Other objects will hereinafter appear.

While my invention is of general applicability, it is especially useful for the wrapping of loaded film spools on a commercial scale. I shall, therefore, describe, as an example thereof, its application to that particular field.

In the accompanying drawing forming a part of this specification, in which like reference-numerals refer to corresponding parts throughout the several views:—

Figure 1 is a diagram showing the steps of my process and illustrating in side elevation one of the means which may be used in carrying them out.

Fig. 2 is a cross section taken on the line 2—2 of Fig. 1.

Fig. 3 is a section on the line 3—3 in Fig. 1.

Fig. 4 is a section taken on the line 4—4 in Fig. 1.

Fig. 5 is a section taken on the line 5—5 in Fig. 1.

Fig. 5<sup>A</sup> is a section taken on line 5<sup>A</sup>—5<sup>A</sup> in Fig. 1.

Fig. 6 is a section taken on the line 6—6 in Fig. 1.

Fig. 7 is a section taken on the line 7—7 in Fig. 1.

Fig. 8 is an end elevation of the product resulting from my process.

In the present example of my process the general sequence of operations is to first form a locked seam tube about a series of articles in spaced relation and then form a twist in the tube between the end object and the second object and sever the tube at the twist. Next a twist is formed in the tube between the second and third objects and the tube is severed at the second twist. By repeating the twisting and severing operations successively along the tube I separate and

individually wrap the articles, each being surrounded by a wrapping having a locked side seam and somewhat conical or tapering twisted ends. These twisted ends are then compacted closely against the ends of the inclosed articles.

Referring to Fig. 1, a strip or sheet of suitable wrapping material *a* which may be conveniently contained in a roll 1 is fed forwardly in a longitudinal direction intermittently over a suitable guiding means, such as roll 3. It then passes into a shaping trough 3 and under feed chute 4 from which spools *b* are fed under the strip intermittently, one spool being dropped on to the strip during each period of rest. This spool feeding operation may be done by any of the means well known in analogous arts or by hand. The trough 3 progressively bends upward the edges of the strip *a* into the forms indicated in Figs. 2, 3, and 4, thus starting the tube forming operation.

The periodic or intermittent movements of sheet *a* are of such a length that the spools *b* will be spaced thereon a predetermined distance apart and will preferably lie longitudinally thereon in axial alinement. The front part of the partially formed tube enters the die 5, which, by means of smoothly turning guideways, forms a tight locked seam 14, as indicated in Fig. 7, the intermediate steps of the seam formation being indicated in Figs. 5, 5<sup>A</sup> and 6. The seam is thus formed during the intermittent forward movements of the strip *a*, so as to complete a tube concentrically about the film spools. The movement of the strip and tube and spools is accomplished by grasping the tube near the foremost spool of the series and pulling it forwardly to the twisting position shown at the extreme right in Fig. 1. This may be done by hand, but in work on a large scale will preferably be done by automatic means (not shown).

When the end or first spool has been fed to a position where it can be acted upon by the rolls 9, 9 said rolls are operated to rotate the section of tube surrounding the first spool relative to the portion of tube surrounding the second spool. Any suitable number of rolls, say three or four, may be employed. This operation produces in the tube a double tapering portion, comprising the approximately conical ends 7 which meet at closely compacted twisted and joined apices 8. These apices are twisted sufficiently to be practically air tight or moisture proof.

The tube is now severed by shears 6, 6' between these apices 8, whereby there is produced a parcel 10 consisting of a film spool inclosed in a wrapper having a locked side seam and tapering ends, having substantially regular folds which converge toward the apices 8. Of course, when starting the

process there will be no tapering portion 7 at the outermost end of the tube, but thereafter, as long as strip *a* and spools *b* are supplied, there will always be one of the tapering constricted ends 7 upon the outermost end of the tube.

The ends 7 of the parcel 10 are next compressed against the ends of the contained film spool so as to conform to the shape thereof. In other words the folds lie flat in the form of a substantially impervious sheet, the pressure which may be applied by heads 11, being sufficient to compact the folds to make the package tight.

My process possesses triple assurance that the ends of the parcel shall be tight and impervious. The twisting operation makes the apices 8 tight, the shearing operation also compresses apices 8, and the final pressure applied by heads 11 tightly compresses the ends. While the action of heads 11 is the main compressing operation, the other operations supplement it so that an accidental impairment of one operation will be corrected by the other compressing operations, the product remaining uniformly tight.

The material out of which the strip *a* is made may, of course, be any suitable wrapping material, but for the wrapping of film spools by my process I find that superposed layers of waxed paper and metal foil are the best. The feeding operation, by means of a pull upon the forward spool, subjects the tube and strip to longitudinal stresses, and the paper, which has a greater tensile strength than the foil, aids the latter in resisting the tendency to tear. The metal foil is particularly useful, because it has a low elastic limit and thus maintains the form into which it is folded. It thus maintains the locked seam in a tight condition, there being no tendency for the folds to spring out and open as would be the case with a more resilient substance. Thus the paper and foil supplement each other.

During the twisting operation, the material of the tube that enters into the twist tends to occupy a shorter length. Each twist calls for a longitudinal contraction. Consequently, if the spools were held at a constant distance apart during the twisting, very severe stresses would be set up in the twisted material and a rupture thereof would be possible. To avoid this, the sections of tube surrounding the two outermost spools are pushed toward each other either prior to or during the twisting operation, thereby compensating for the material which enters the twist. This approaching of the tube sections (and contained film spools) is most conveniently done by giving the second spool *b*<sup>2</sup> of the series a slight additional feeding movement toward the first spool *b*, such additional movement being performed by an additional motion of the feeding means

which, as before mentioned, may be any of the well known feeding mechanisms employed in analogous arts, or may be the operator's hand. In Fig. 1, after the tube has been pulled to bring the outermost contained spool between rolls 9, the feeding means may return and grip the tube at a point outside spool  $b^2$ , or preferably outside the forward end of said spool. Spool  $b^2$  and the surrounding tube may then be given the described additional movement to compensate for the twist. After the twisting and severing operations, spool  $b^2$  and the surrounding tube are in their turn fully fed between rolls 9, and so on.

While other severing means may sometimes be employed, the shears 6, 6' have the advantage that they tend to compact the folds of the constricted apices 8 prior to severing them, thus contributing toward the certainty of a tight joint in the finished product.

With some kinds of wrapping material, especially those which comprise metal foil, the tube must be carefully handled and manipulated during the advancing operation when the outermost spool is pulled forward, and during the twisting operation. I have found that this liability to injury to the wrapper or cover is avoided by grasping the tube and by applying turning forces to it at those points of the tube walls which are opposite the flanges of the contained spools. Thus in Fig. 1, it will be noted that the rollers 9 are opposite the flanges of the contained spool.

The product of this process is very uniform in quality and the wrappings thereof are particularly tight and impervious to moisture and harmful emanations. In the first place the locked side seam 14 is of such a nature that it does not become open or loose during the twisting operation and so reaches the final product in a perfectly tight condition, unlike an ordinary lap joint which easily becomes loose enough to admit moist air, even when it appears tight to the eye. Of course, any of the well known locked seams which are commonly employed in wrapping operations could be substituted for the seam shown in Fig. 7, the particular nature of the locked seam being immaterial so long as it particularly cooperates with the subsequent steps of my process. By a locked seam then, I mean one in which the parts are so securely joined that they will not become loose or pervious when the tube is twisted. In cases where the articles to be wrapped would not be injured by the temperature it is within the province of my invention to employ soldering, welding, or sticking, of the metal foil edges by pressing and heating means which are known in the art. Of course the cross sectional shape of the tube will depend upon the shape of the

objects to be wrapped and is not necessarily circular.

While I have illustrated my invention as applied to the wrapping of cylindrical flanged spools containing roll film, it is obvious that it could be applied to objects of other shapes and sizes within the scope of the appended claims. Instead of placing one article in a parcel, groups of articles may be wrapped, such, for example, as two alined film spools in one wrapper. Furthermore, it is noted that the several steps of my process may be carried out by hand or partly by hand and partly by mechanism where automatic machinery is not available, spaced operators being placed at the station where the spools are fed on to the strip, where the tube is formed around the spools, where the locked seam is formed, where the feeding and twisting takes place, where the shearing is performed, and where the compressing is done. Ordinarily and preferably, however, my process is carried out by machinery.

I claim:

1. The process of forming wrappings about objects, which comprises assembling a sheet of flexible wrapping material with the objects to be wrapped in spaced relation thereon, forming a tube from said material about said objects, said tube having a locked seam, twisting the portion of the tube around one object relative to the tube which surrounds an adjacent object, severing the tube at the twisted portion and finally compressing a severed end.

2. The process of wrapping objects which comprises assembling a sheet of flexible wrapping material with the objects to be wrapped in spaced relation thereon, forming said sheet into a lock-seamed tube around said objects, twisting one portion of the tube with the object contained therein relative to the next adjacent portion of the tube containing an object, so as to form a twisted double tapering constricted portion between the objects, severing the tube at the constricted portion and finally compressing a severed end to substantially conform to the shape of the wrapped object.

3. The process of wrapping cylindrical objects, which comprises assembling a strip of flexible wrapping material with a series of said cylindrical objects located thereon in spaced relation longitudinally and in axial alinement, forming a tube around said objects with a locked seam, twisting the tube surrounding one object relative to the tube surrounding the next adjacent object, severing the tube at the twisted portion and finally compressing a severed end onto the end of a contained object.

4. The process of wrapping objects, which comprises assembling with a sheet of flexible wrapping material a series of objects in spaced relation, forming a locked seam tube

from said sheet around said objects, forming a twist in the tube between the end object and the second object, severing the tube at the twist, forming a twist in the tube between the second and third objects and severing the tube at the twist, and repeating the twist-forming and severing operations successively throughout the series, the twisted ends of the tube portion surrounding each object being finally compressed onto said object.

5. The process of wrapping a series of cylindrical objects which comprises assembling a strip of flexible wrapping material with a series of cylindrical objects spaced longitudinally of said strip and in axial alinement thereon, forming a locked seam tube from said strip about said objects, forming a twist in the tube between the first and second objects of the series, severing the tube at the twist, forming a twist in the tube between the second and third objects, severing at the twist, and repeating the twisting and severing operations successively throughout the series, the twisted ends of the tube portion surrounding each object being finally compressed onto the ends of the object.

6. The process of wrapping a series of objects, which comprises assembling with a flexible wrapping strip comprising metal foil a series of objects to be wrapped in spaced relation, forming a locked seam tube around said objects from said strip, twisting the tube surrounding one object relative to the tube surrounding an adjacent object to form a twisted double tapering constricted portion, severing at the constricted portion and finally compressing a severed end to conform to the end surface of a contained object.

7. The process of wrapping objects, which comprises assembling with a wrapping strip, which comprises metal foil, a series of objects in spaced relation thereon, forming a locked seam tube from said foil around said objects, twisting the tube surrounding one object relative to the tube surrounding an adjacent object, shearing the twisted tube between said objects to both compress and sever it, and finally compressing a severed end to conform to an end surface of the contained object.

8. The process of wrapping film spools, which comprises feeding longitudinally a flexible strip of impervious wrapping material, placing thereon in spaced relation successively a series of film spools, forming said strip into a locked seam tube during the feeding thereof, forming a twist in the tube between the first and second spool of the series, severing the tube at the twist, forming a twist in the tube between the second and third spool, severing the tube at the twist, and repeating the twist forming and severing operations successively throughout the

series, the severed ends being compressed onto the ends of the spools.

9. The process of wrapping flanged spools which comprises assembling a sheet of flexible wrapping material with the spools to be wrapped in spaced relation and in alinement thereon, forming said sheet into a tight seamed tube around said spools and substantially concentric therewith, turning the portion of tube containing one spool relative to the portion of tube containing the next adjacent spool to form a closely twisted constricted portion, the tube being grasped during such operations at points where the tube walls are supported by the spool flanges, and severing the tube at the constricted portion.

10. The process of wrapping flanged spools which includes the steps of assembling a sheet of wrapping material, which comprises metal foil, with a series of spools to be wrapped in spaced relation and in alinement thereon, forming said sheet into a locked seam tube around said spools and substantially concentric therewith, turning the portion of tube containing an end spool of the series relative to the portion of tube surrounding the next adjacent spool to form a closely twisted constricted portion, severing the tube at the constricted portion, repeating the turning and severing operations throughout the successive portions of tube surrounding the spools of the series, the tube being grasped during the turning operation at points where the tube walls are supported by the spool flanges.

11. The process of wrapping articles, which comprises pulling longitudinally a strip of combined paper and metal foil, placing thereon successively in spaced relation a series of objects, forming a locked-seam tube from said strip about the spaced objects, twisting the tube surrounding the outermost object relative to the tube surrounding the rest of the series, so as to form a closely twisted portion in the tube, severing the tube at the twisted portion, repeating the twisting and severing operation successively throughout the portions of tube surrounding the series of objects, the strip and tube being advanced by pulling during such operations, and finally compressing the severed ends.

12. The process of forming individual packages for a series of objects contained in a tight tube of flexible material, which comprises twisting the portion of tube surrounding one object relative to the portion of tube around an adjacent object so as to form a twisted double tapering constricted portion, severing the tube at the constricted portion and finally compressing a severed end to conform to an end surface of a contained object.

13. The process of forming individual wrappings for a series of film spools contained in spaced relation in a metal foil locked seam tube, which comprises turning the tube surrounding the end spool of the series relative to the tube surrounding the second spool so as to form a twisted double tapering constricted portion therebetween, severing the tube at the constricted portion, repeating the turning and severing operations successively throughout the tube and series of spools, and finally compressing the severed ends against the ends of the spools.

14. The process of wrapping film spools which comprises, advancing step by step a strip of paper and metal foil longitudinally, feeding a series of film spools thereon transversely and intermittently, one spool being fed during each period of rest of said strip, forming a locked seam tube from said strip about said spools progressively during each period of advance of said strip, tightly twisting the portion of tube between the first and second spools, severing the tube at the twist, advancing the tube, tightly twisting the portion of tube between the second and third spools, severing the tube at the twist, re-

peating the advancing twisting and severing operations throughout the tube and series of spools to form a series of separated spools each having an individual wrapping with twisted ends, and compressing said twisted ends onto the ends of each spool.

15. The process of wrapping objects, which comprises assembling with a sheet of flexible wrapping material a series of objects in spaced relation, forming a locked seam tube from said sheet around said objects, forming a twist in the tube between the first and second objects of the series, said first and second objects being relatively approached to compensate for the twist, severing at the twist, repeating the twisting, approaching, and severing steps throughout the series.

In testimony whereof, I have signed this specification in the presence of two witnesses this 4th day of April, 1917, at Rochester, N. Y.

JOHN G. JONES.

Witnesses:

GEORGE COURTNEY COOKE,  
C. E. MARTIN.