C. H. CROWELL.

THREAD REINFORCED PAPER GUMMED TAPE.

APPLICATION FILED DEC. 1, 1916.

1,351,374. Patented Aug. 31, 1920.

Fig. 1,

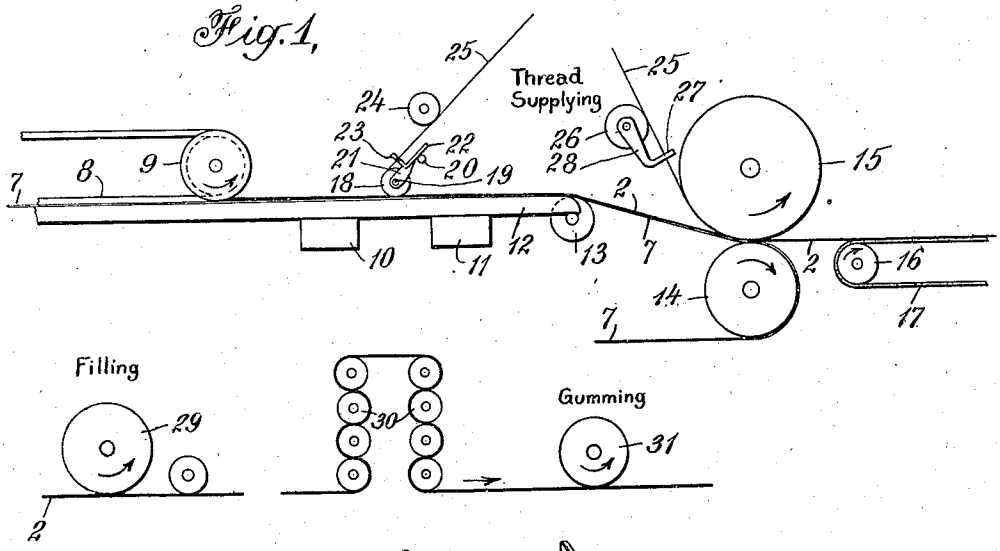


Fig. 2,

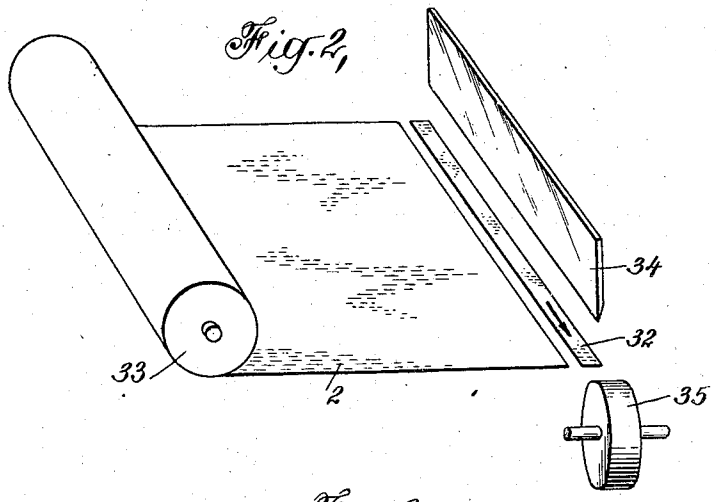
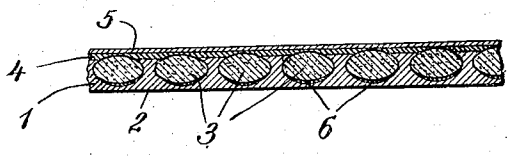


Fig. 3,



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THREAD-REINFORCED-PAPER GUMMED TAPE.

1,351,374. Specification of Letters Patent. Patented Aug. 31, 1920.

Application filed December 1, 1916. Serial No. 134,349.

To all whom it may concern:

Be it known that I, CHARLES H. CROWELL, a citizen of the United States, and resident of the borough of Brooklyn, county of Kings, city and State of New York, have made a certain new and useful Invention Relating to Thread-Reinforced-Paper Gummed Tape, of which the following is a specfication, taken in connection with the accompanying drawing, which forms part of the same.

This invention relates especially to gummed tape adapted to be used for sealing cartons, paper boxes or other packages or making the same or other articles, and in which a series of reinforcing or strengthening threads are incorporated and preferably more or less embedded during manufacture in the paper forming the body of this gummed tape. These reinforcing threads are preferably located adjacent one face or side of the tape and may be more or less exposed in the paper sheet originally manufactured. This reinforced face of the paper may be coated with a filling or size coating which is preferably more or less scraped away from the exposed surface of the reinforcing threads and then the gummed or other adhesive coating of any suitable character may be applied to this reinforced side of the paper so as to form gummed paper or tape of specially strong desirable character. When cutting this gummed sheet up into strips for use it is desirable to sever the same so that the reinforcing threads are located more or less transversely to the length of the strip or gummed tape in case a longitudinal seam is to be adhesively closed or secured, since in this way the reinforcing threads run transversely across the same and still further strengthen the gummed tape.

In the accompanying somewhat diagrammatic drawings,

Figure 1 is a diagram showing the process of manufacturing thread reinforced paper gummed tape.

Fig. 2 diagrammatically illustrates a method of severing the large sheets or rolls of this material into individual gummed strips for use; and

Fig. 3 is an enlarged diagrammatic section through a portion of one of these strips.

The reinforcing threads used in connection with this reinforced paper material may be of any suitable fibrous material, such as cotton, which is fairly cheap and strong so as to be suitable for the small diameter threads most desirable for incorporation in the ordinary thin reinforced paper gummed tape. These threads produced in any usual or suitable way may have a diameter of about three to six or eight thousandths of an inch, more or less, and are preferably arranged fairly closely together in the paper, although this depends on the degree of reinforcement of the paper material which is desired. By arranging such reinforcing threads so that they are spaced apart by distances as much as their normal diameter they may be incorporated in the forming paper material so that the paper fiber is more or less interlocked or felted together with the threads and protrudes between them more or less, so that a greater degree of adhesion is secured and the threads may under some conditions be practically completely embedded in the paper material. For this purpose it is desirable to incorporate the reinforcing threads in the paper before it has been completely laid or formed, that is, when part of the paper sheet at least is still in the form of wet and fluent pulp the fibers of which are subsequently more or less felted or interlocked with the reinforcing threads by these paper making methods. For continuously making such a thread reinforced paper sheet which is a desirable though not necessary method of producing the same, a Fourdrinier type of paper machine may be used, which is shown somewhat diagrammatically in Fig. 1, in which the wire 7 travels along the usual carriers beneath the deckel straps 8 and deckel roll 9 and over the suction boxes, such as 10, 11, supported as by the frame member 12. The dandy roll 18 may be located between the two suction boxes and the reinforcing threads 25 may be incorporated in the forming paper by leading them over the dandy roll, preferably after suitable size has been applied to the sides of these threads which are to contact with the inner portion of the paper sheet as by running these threads in contact with the size roll 24. It is desirable in order to promote the more uniform spacing of these reinforcing threads to run the threads through a suitable thread guide 23 spacing them apart at the desired intervals, and where the wire is given a transverse movement at this part of the machine to promote the laying or felting of the paper the threads should be moved in unison therewith and with the dandy roll which

may be effected by securing this thread guide 23 in the suitable guide brackets 21 coöperating with the shaft 19 of the dandy roll and having guide arms 22 supported as by slidingly engaging a guide rod 20 arranged transversely of the machine. In this way the reinforcing threads, which may of course be drawn from a warp beam or other combined supply or from separate spools in a creel frame, for instance, are, at the point where they are brought into contact with and embedded in the forming sheet of Kraft or other preferably strong paper, moved transversely in unison therewith, so that the wet or soft paper pulp may be more or less laid or compacted around or over them. Thus when the wire 7 and sheet of paper 2 upon it pass over the roll 13 and between the upper and lower couch rolls 14, 15, the paper has these reinforcing threads thoroughly embedded in it so that the combined sheet may be pressed, dried and calendered as usual in paper making to produce a firm and strong combined sheet. If desired, however, the reinforcing threads may be incorporated in the sheet of paper while it is in wet soft condition, but after it has been practically completely formed, laid or felted together, and for this purpose a series of reinforcing threads 25 may be forced into contact with the paper 2 as it passes under the upper couch roll 15. These threads may pass over a size roll 26 to apply suitable adhesive or size to the sides of the threads which are to engage the paper and the spacing of the threads may be controlled by passing them through a suitable thread guide 27 supported as by the brackets 29 coöperating with the shaft of the size roll or with its supporting devices. The pressure exerted by the upper couch roll or by a specially formed smooth or preferably somewhat corrugated metal roll at this point forces the threads into the soft and yielding paper sheet which has been formed, so that they are somewhat embedded therein and simultaneously flattened and rendered adherent thereto. This union between the threads and the paper strip which is of course promoted by the size used on the threads, is improved by the other usual paper making processes to which the combined sheet or strip 2 is subjected as it passes through the rest of the paper making machine, such as the felt 17 on the felt roll 16 and other coöperating parts and devices which simultaneously compress and finish the continuous reinforced sheet of paper.

The combined thread reinforced sheet or strip of paper may be filled on the thread side in any suitable way as by passing the sheet 2 in contact with a suitable filling roll 29 to which an adhesive filling or loading composition is supplied in regulated amounts so that the filling material is applied to the thread side of the paper and incorporated therewith, the surplus filling being preferably removed or scraped away above the threads themselves so as to leave them more or less exposed on this side of the paper while filling and rendering more impervious the rest of the fabric. After this filling operation the paper may be dried in any suitable way and then calendered to the desired extent as by passing the same through suitable calender rolls, such as 30, which are indicated diagrammatically and the thread reinforced paper strip may then be gummed in any suitable way as by passing it in contact with a gumming roll 31 which may be supplied with any suitable gum or other suitable adhesive composition which is preferably uniformly and smoothly applied to the thread side of the strip and dried by usual means. Thereafter the material may be cut or slit to the desired width and wound into rolls, such, for instance, as the supply roll 33 shown in Fig. 2, in which the reinforcing threads run substantially longitudinally; or if desired the sheet may be cut into separate pieces of any other shape and desired arrangement of threads. The sheet 2 of gummed thread reinforced paper is shown in Fig. 2 as partly unwound from this supply roll 31 so that this sheet, which may have a width corresponding to the length of the separate strips desired, may be cut into individual reinforced gummed strips by any suitable cutting mechanism, such for instance as the cutter 34 indicated diagrammatically as having severed a relatively narrow strip or tape 32 from the end of this sheet. If the reinforcing threads are as indicated by the dotted shade lines located on the lower side of this sheet 2 and running longitudinally thereof they will run more or less transversely or perpendicularly across the relatively narrow severed reinforced gummed tape 32, which may as indicated by the arrow be fed transversely over any suitable moistening device, such as the moistener roll 35 so as to render the gummed surface of this strip adhesive and allow it to be applied to a carton, box or other package or article. It will thus be evident that the reinforcing threads, which may run across this tape in a direction perpendicular to its length, may thus be arranged exactly or practically perpendicular to the seam to be closed or strengthened so that these threads thus exert a maximum reinforcing action, while at the same time they have been more readily and thoroughly incorporated in the paper sheet by being arranged longitudinally thereof. It is of course understood, however, that the reinforcing threads may be arranged in a perpendicular or other substantially transverse manner across the relatively narrow gummed strip or tape finally used, in any suitable way so as to secure substantially

the result shown in a somewhat exaggerated diagrammatic way in Fig. 3. The body 1 of the gummed tape 2 may be formed of Kraft or other paper preferably having a long and strong fiber and the embedded reinforcing threads 3 are of course somewhat flattened by the pressing and calendering operations to which the combined strip has been subjected. The filling or size coating which may be used in some cases, although it is not of course necessary for all purposes, may be present at the points 6 below the threads, if desired, and also may be used in somewhat greater thickness at the points 4 between the threads, while by the methods of application described it would be rubbed into the exposed upper surface of the thread and more or less incorporated therewith, although preferably allowing at least some of the thread fibers to protrude through this coating. In this way a still greater adhesion of the gum or other adhesive coating 5 is secured which is thus strongly and permanently adherent to the tape so that practically the entire strength of all the tape elements is utilized when the gummed strip or tape or other shaped piece of such gummed thread reinforced paper is applied in the forming or closing of a package or other device.

This invention has been described in connection with a number of illustrative embodiments, forms, proportions, materials, elements, steps, devices, machinery, and conditions to the details of which disclosure the invention is not of course to be limited, since what is claimed as new and what is desired to be secured by Letters Patent is set forth in the appended claims:

1. The process of forming thread reinforced adhesive paper which comprises forming a continuous sheet of paper, incorporating with said sheet a substantially parallel series of reinforcing threads sized on the sides which are brought in contact with the paper sheet and embedding and securing said threads in said sheet substantially parallel to its edges, compressing, finishing and drying said reinforced paper sheet, to leave portions of said threads exposed on the reinforced side of the sheet, and applying an adhesive gum coating to the thread reinforced side of the sheet.

2. The process of forming thread reinforced adhesive paper which comprises forming from pulp and laying a continuous sheet of paper, incorporating in said sheet when it is partially laid a substantially parallel series of reinforcing threads sized on the sides which are brought in contact with the paper sheet and embedding and securing said threads in said sheet by the subsequent laying and forming thereof, compressing, finishing and drying said reinforced paper sheet, filling the thread side of said sheet with a size filling composition to substantially fill the paper between the exposed reinforced threads and removing said filling material sufficiently from the protruding threads to leave portions of them exposed on the reinforced side of the sheet, and applying a gum coating to the thread reinforced side of the sheet to substantially smoothly cover the same and be strongly adherent to the reinforcing threads and paper body of the sheet.

3. The process of forming thread reinforced adhesive paper which comprises forming from pulp and laying a continuous sheet of paper, incorporating in said sheet when it is partially laid a substantially parallel series of reinforcing threads and embedding and securing said threads in said sheet by the subsequent laying and forming thereof, compressing, finishing and drying said reinforced paper sheet so that portions of the threads are exposed therein, and applying a gum coating to the thread reinforced side of the sheet to be adherent to the reinforcing threads and paper body of the sheet.

4. The process of forming thread reinforced adhesive paper which comprises forming a continuous sheet of paper, incorporating with said sheet a substantially parallel series of reinforcing cotton threads sized on the sides which are brought in contact with the paper sheet and spaced apart at distances about equal to the normal diameter of said threads and embedding and securing said threads in said sheet of paper by felting or interlocking with the paper fiber so as to be substantially parallel to its edges, compressing, finishing and drying said reinforced paper sheet, and applying an adhesive gum coating to the sheet.

5. The process of forming thread reinforced adhesive paper which comprises forming a continous sheet of paper, incorporating with said sheet a substantially parallel series of reinforcing cotton threads spaced apart at distances about equal to the normal diameter of said threads and embedding and securing said threads in said sheet of paper by felting or interlocking with the paper fiber so as to be substantially parallel to its edges, compressing, finishing and applying an adhesive gum coating to the sheet.

6. The process of forming thread reinforced adhesive paper which comprises forming a continuous sheet of paper, incorporating with said sheet a substantially parallel series of reinforcing threads sized on the sides which are brought in contact with the paper sheet and embedding and securing said threads in said sheet substantially parallel to its edges, compressing, finishing and drying said reinforced paper sheet, filling the thread side of said sheet

with a size filling composition to substantially fill the paper between the exposed reinforcing threads and removing said filling material sufficiently from the protruding threads to leave portions of them exposed on the reinforced side of the sheet, and applying an adhesive gum coating to the thread reinforced side of the sheet.

7. The process of forming thread reinforced adhesive paper which comprises forming a continuous sheet of paper, incorporating with said sheet a substantially parallel series of reinforcing cotton threads and embedding and securing said threads in said sheet of paper by felting or interlocking with the paper fiber so as to be substantially parallel to its edges so that portions of the threads extend through one side of the paper body, and applying an adhesive coating to the sheet.

8. The process of forming thread reinforced adhesive paper which comprises forming a continuous sheet of paper, incorporating with said sheet a series of reinforcing threads and embedding and securing said threads in said sheet of paper by felting or interlocking with the paper fiber and applying an adhesive coating to the sheet.

9. The reinforcing paper gummed tape comprising a body of paper in which a substantially parallel series of cotton reinforcing threads are spaced apart at distances about equal to their normal diameters and incorporated so as to extend perpendicularly across the tape and be substantially completely embedded and adherently secured in said body, a size filling coating extending more or less over the protruding portions of the threads and the intervening portions of the paper, portions of the threads extending through this filling coating on the reinforced side of the paper body and an adhesive gum coating on the thread sides of said reinforced tape to enable the same to be moistened and applied to paper or other articles.

10. The reinforcing paper gummed tape comprising a body of paper in which a substantially parallel series of cotton reinforcing threads are spaced apart at distances about equal to their normal diameters and incorporated so as to extend across the tape and be substantially completely embedded and adherently secured in said body, portions of the threads extending through the reinforced side of the paper body and an adhesive gum coating on the thread side of said reinforced tape to enable the same to be moistened and applied to paper or other articles.

11. The reinforcing paper gummed tape comprising a body of paper in which a substantially parallel series of cotton reinforcing threads are spaced apart at distances about equal to their normal diameters and incorporated so as to be substantially completely embedded and adherently secured in said body, portions of the threads extending through the reinforced side of the paper body and an adhesive coating on the thread side of said reinforced tape to enable the same to be moistened and applied to paper or other articles.

12. The reinforcing paper gummed tape comprising a body of paper in which a substantially parallel series of reinforcing threads are incorporated so as to be substantially completely embedded and adherently secured in said body, portions of the threads extending through the reinforced side of the paper body and an adhesive coating on the thread side of said reinforced tape to enable the same to be moistened and applied to paper or other articles.

13. The reinforcing paper gummed tape comprising a body of paper in which a substantially parallel series of separated reinforcing threads are incorporated so as to extend perpendicularly across the tape and be substantially completely embedded in said body, a size filling coating extending more or less over the protruding portions of the threads and the intervening portions of the paper, portions of the threads extending through this filling coating and a smooth adhesive gum coating on the thread side of said reinforced tape to enable the same to be moistened and applied to paper or other articles.

14. The thread reinforced paper tape comprising a body of paper in which a substantially parallel series of separated reinforcing threads are incorporated so as to be substantially completely embedded in said body, a size filling coating extending more or less over the protruding portions of the threads and the intervening portions of the paper, portions of the threads extending through this filling coating and an adhesive coating on the thread side of said reinforced tape to enable the same to be softened and applied to paper or other articles.

15. The thread reinforced paper tape comprising a body of paper in which a substantially parallel series of separated reinforcing threads are incorporated so as to be substantially completely embedded in said body, a size filling coating extending more or less over the protruding portions of the threads and the intervening portions of the paper, and an adhesive coating on the thread side of said reinforced tape to enable the same to be softened and applied to paper or other articles.

16. The thread reinforced paper gummed tape comprising a body of Kraft paper in which a substantially parallel series of separated reinforcing threads are incorporated so as to extend substantially transversely across the tape, a size filling coating extend-

ing more or less over the protruding portions of the threads and the intervening portions of the paper, and an adhesive gum attaching coating on the thread side of said reinforced tape to enable the same to be applied to paper or other articles.

17. The thread reinforced paper gummed tape comprising a body of paper with which a substantially parallel series of reinforcing threads are incorporated so as to extend substantially transversely across the tape and an adhesive gum attaching coating on the thread side of said reinforced tape and engaging fibrous portions of said threads to enable the same to be applied to paper or other articles.

18. The thread reinforced paper tape comprising a body of paper with which a substantially parallel series of reinforcing threads are incorporated so as to extend substantially transversely across the tape and an adhesive attaching coating on the thread side of said reinforced tape to enable the same to be applied to paper or other articles.

19. The thread reinforced adhesive paper comprising a body of paper with which a substantially parallel series of reinforcing threads are incorporated and an adhesive attaching coating on the thread side of said reinforced paper engaging portions of said threads, to enable the same to be applied to paper or other articles.

20. The thread reinforced adhesive paper gummed tape comprising a body of paper in which a substantially parallel series of separated reinforcing threads are incorporated so as to extend substantially transversely across the tape and substantially completely embedded in and secured to said body by size between the inmost portions of the threads and the paper, and an adhesive gum coating upon the thread side of said reinforced tape to enable the same to be applied to paper or other articles.

21. The thread reinforced adhesive paper gummed tape comprising a body of paper in which a substantially parallel series of reinforcing threads are incorporated so as to extend substantially transversely across the tape and secured to said body by size between the inmost portion of the threads and the paper, and an adhesive gum coating upon the thread side of said reinforced tape to enable the same to be applied to paper or other articles.

22. The thread reinforced adhesive paper gummed tape comprising a body of paper in which a substantially parallel series of reinforcing threads are incorporated and secured to said body by size between the inmost portion of the threads and the paper, and an adhesive coating upon the thread side of said reinforced tape to enable the same to be applied to paper or other articles.

23. The thread reinforced paper gummed tape comprising a body of paper with which a substantially parallel series of reinforcing threads are incorporated and partially embedded.

24. The thread reinforced paper comprising a body of paper in which a substantially parallel closely spaced series of separated reinforcing threads are incorporated so as to be felted together and interlocked with the paper fiber and substantially completely embedded in said body, a size filling coating extending more or less over the protruding portions of the threads and the intervening portions of the paper, portions of the threads extending through this filling coating and an adhesive gum coating on the thread side of said reinforced paper to enable the same to be softened and applied to articles.

25. The thread reinforced paper comprising a body of paper in which a substantially parallel closely spaced series of separated reinforcing threads are incorporated so as to be felted together and interlocked with the paper fiber and substantially completely embedded in said body and an adhesive gum coating on the thread side of said reinforced paper to enable the same to be softened and applied to articles.

26. The thread reinforced paper comprising a body of paper in which a substantially parallel closely spaced series of separated reinforcing threads are incorporated so as to be interlocked with the paper fiber and substantially completely embedded in said body, and an adhesive gum coating on said reinforced paper to enable the same to be softened and applied to articles.

27. The thread reinforced paper comprising a body of paper in which a substantially parallel series of separated reinforcing threads are incorporated so as to be interlocked with the paper fiber and substantially completely embedded in said body, and an adhesive coating on said reinforced paper to enable the same to be applied to articles.

28. The thread reinforced paper comprising a body of paper in which a series of reinforcing threads are incorporated so as to be interlocked with the paper fiber and embedded in said body so that portions of the threads extend through one side of the paper body, and an adhesive coating on said reinforced paper to enable the same to be applied to articles.

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Witnesses:
J. HEUTER,
LEON BERTRAM DOWNES.