

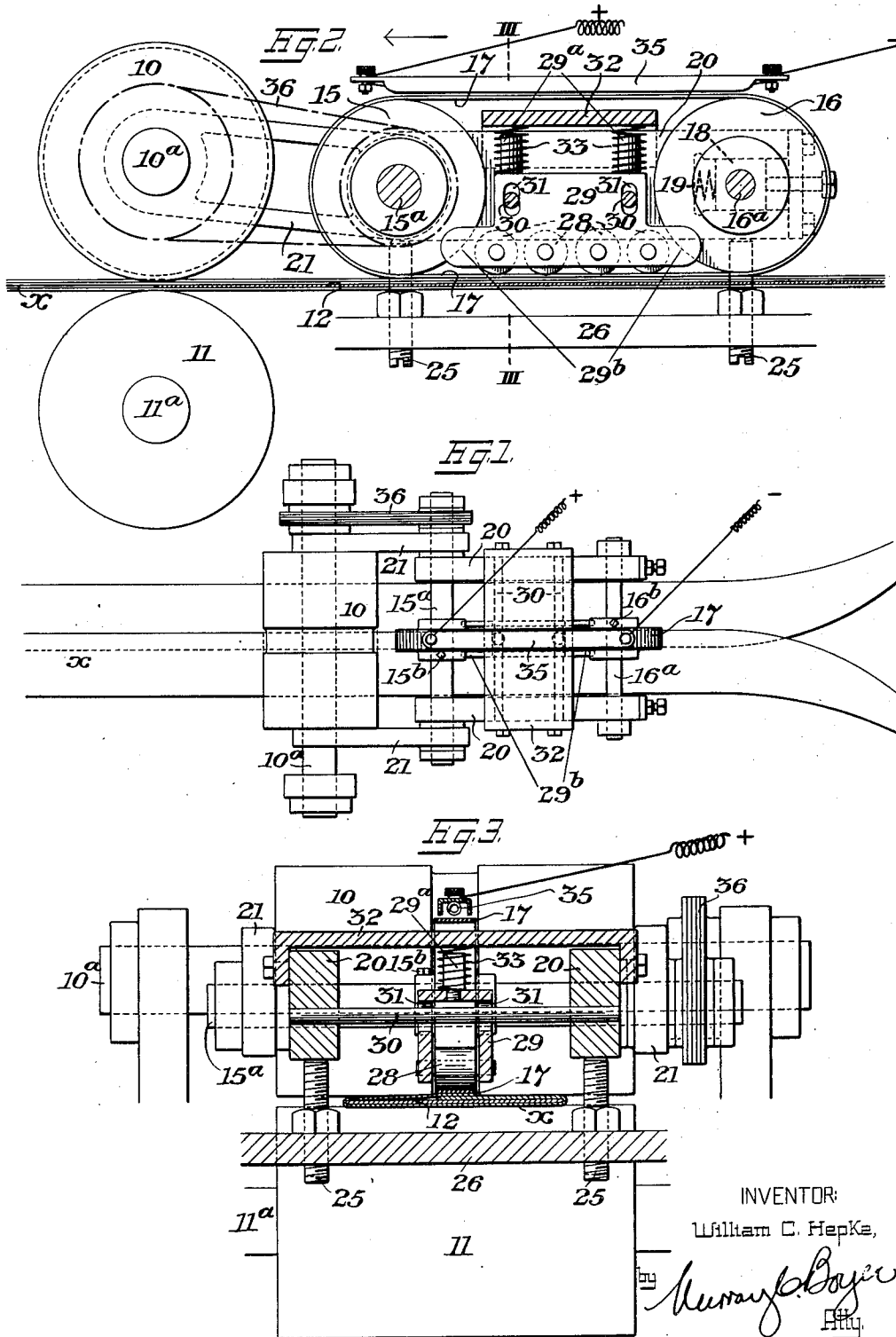
Feb. 1, 1938.

W. C. HEPKE

2,107,249

PAPER BAG MACHINE ATTACHMENT

Filed March 25, 1935



## UNITED STATES PATENT OFFICE

2,107,249

## PAPER-BAG-MACHINE ATTACHMENT

William C. Hepke, Philadelphia, Pa., assignor to  
Thomas M. Royal & Co., Philadelphia, Pa., a  
corporation of Pennsylvania

Application March 25, 1935, Serial No. 12,937

19 Claims. (Cl. 154—42)

This invention relates to paper-bag-making machines, and comprises means for uniting the seams of paper stock including various types of coated papers—waxed papers, coated Cellophane, and/or the like—when the same is being formed into a tube preliminary to the utilization of sections of such tube in the formation of bags.

A primary object of the invention is the provision of simple and efficient means for uniting the superposed layers of paper or other bag-making material constituting the seam of the tube produced by such paper-bag-making machine, whether such paper or other material is coated stock or the seam is secured by an adhesive, prior to separation of such tube into bag blanks.

A further object of the invention is to provide a device which may be employed for the intended purpose and so mounted with respect to the bag-making machine as to be readily displaceable when the type of paper or other bag-making material employed does not require the application of heat and pressure means to insure union of the overlapping edges of the paper or other material forming the tube and the final closing of the seam thereof.

A further object of the invention is to provide an ironing device in the form of an endless metal band arranged to travel in engagement with the seam of the tube at the same surface speed at which the tube of bag-making material is moving.

A further object of the invention is to provide simple and efficient means for heating the endless ironing band.

And a still further object of the invention is to provide weighting or tension rolls whereby pressure may be applied to the endless ironing band while the same is traveling in contact with the seam of the tube.

These and other features of the invention are more fully set forth hereinafter, reference being had to the accompanying drawing, more or less diagrammatic in character, in which:

Figure 1 is a diagrammatic view in plan of sufficient of a bag-making machine to illustrate the position of the endless ironing band, the heating means therefor, and the operating means.

Fig. 2 is an enlarged view in side elevation, partly in section, of the heating and pressure device, and

Fig. 3 is a cross-sectional view on the line III—III, Fig. 2, looking in the direction of the arrow a.

In the formation of a tube from which bags are subsequently produced, a continuous web of bag-

making material—paper or the like—is suitably passed from a roll of the same to forming means whereby such web is folded longitudinally, and its marginal edges caused to overlap longitudinally thereof at some suitable position laterally with respect to the folded marginal edges of the tube that is produced. In the manufacture of such tube, the essential necessity is the formation of a proper seam at the overlapping marginal edges of the original web. It is understood, of course, that the nature of the adhesive employed will depend upon the character of the bag-making material to be joined. Some papers are harder surfaced than others, and many bags are made from waxed and other coated papers in which the seam may be sealed or closed by the application of heat and/or pressure thereto, the waxed or other coating softening to an extent sufficient to insure proper adherence under such conditions. When an adhesive is employed, it is desirable that it be of a character that will unite the overlapping edges of the bag-making material forming the seam and dry in a relatively short interval of time. Some adhesives, when employed with some forms of bag-making material, require a considerable length of time to dry; hence, it is frequently difficult to know exactly when the seam is completely adherent, and the tube formation assured.

To facilitate the seaming operation, whether it is one requiring softening of a waxed or other coating or the drying of an adhesive connecting the overlapping portions of the web of bag-making material forming the seam of the tubular structure, I apply heat and pressure to such seam after said edges have been overlapped; the adhesive, when employed, having been applied prior to the overlapping of such edges. For this purpose, I arrange an endless band of flexible metal that will be driven at the same surface speed at which the tubular body moves; the endless band being disposed in contact with the overlapping edges forming the seam, and so arranged that a considerable portion thereof may apply suitable pressure to such seam. In addition to the means employed whereby this band may apply pressure, I provide means whereby this endless band may be heated so that, as it moves with the tubular body, the combination of heat and pressure will cause the adhesive to firmly set and hold the seam in an entirely tight condition.

Various other types of papers—cellulosic sheet products and the like, those having wax coatings, as well as those having various forms of water or moisture-proof varnish coatings, some

of which are employed to provide moisture-proof receptacles—may have their seams united by the combined heat and pressure, and, in many instances, without the interpositioning of a line of adhesive, the heating means employed softening the coated surface of the cellulosic sheet, and the pressure applied causing such softened portions to become permanently adherent. Bags made of waxed paper may be combined in a similar manner, the heat causing the wax to melt to an extent sufficient to permit permanent adherence.

The endless band of metal will be of a character sufficiently flexible to pass around relatively small, suitably driven drums, in order that it may be positively driven with the tube and, at the same surface speed as the latter. In order that the lower run of the band may be pressed against the seam of the tube, I arrange a group of weighting rollers to bear upon the upper surface of the lower contacting portion of the band, and these rollers may be driven, such rollers being of a size that will insure application of the desired pressure throughout the entire extent of such band without any lessening of such pressure, thereby insuring that the entire seam will be subjected to identical pressure as it passes beneath the moving metal band.

This band may be heated in any suitable manner. As shown in the drawing, an electrical heating device is arranged beneath the upper run of the belt, and the amount of heat supplied is such that, in a short while, the temperature of that portion of the band in contact with the seam will be only one or two degrees below the temperature of the same at the point of heating. As the combined heating and pressure device comprising the heated continuous metal band is located over the former plate which lies within the tube being formed, the heat of the pressure device will be transmitted to a certain extent to the said former plate.

In the drawing, 10 and 11 illustrate the first pair of draw rolls of the bag-forming mechanism, mounted on shafts 10<sup>a</sup> and 11<sup>a</sup>, such rolls serving to impart movement to the paper tube indicated at x. This tube has been developed in any usual way over a former 12 commonly used in bag-making machines, and the heating and pressure-applying device is mounted just in advance of the said draw rolls.

This heating and pressure device comprises a pair of drums 15 and 16 mounted upon shafts 15<sup>a</sup> and 16<sup>a</sup> with an endless, flexible band of metal—which may be of polished steel, indicated at 17—passing over said drums. The shaft 16<sup>a</sup> may be mounted in adjustable boxes 18 and backed up by tension springs 19 for the purpose of keeping the endless metal band taut upon the drums which support and drive the same.

The bearings and/or boxes for the shafts 15 and 16, as well as the latter, are carried by a suitable frame, which may comprise side bars 20, and these, in turn, through the shaft 15<sup>a</sup>, are carried by arms 21 hung from the shaft 10<sup>a</sup> of the upper draw roll 10. These arms 21 are in such relation to their support and the heating and pressing device including the side bars 20 that the latter may be lifted and swung on said arms out of the way, when it is not in use.

In order that the endless band may be properly positioned for surface contact with the seam of the tube, adjusting screws 25 are carried by the table 26 and underlie the side bars 20 in which

the journal boxes for the shafts 15<sup>a</sup> and 16<sup>a</sup> of the rolls carrying said endless band are mounted.

In order to impart pressure to the endless band as it moves in surface contact with, and at the same rate of speed as the seamed tube, a series of tension rolls 28 of suitable weight are provided to rest upon the lower run of the endless ironing band, and these rolls are disposed in the space between the drums 15 and 16 over which said band passes. These tension rolls may be carried by a suitable support or frame 29 which is preferably disposed for slight vertical movement between the side bars 20, being mounted upon cross-bars 30 carried by the side bars 20. The side walls of the frame 29 are slotted at 31 for the passage of said cross-bars. The side bars are tied together in spaced relation by an upper cross-plate 32, and between the latter and the support 29, coiled pressure springs 33 may be mounted and guided by pins 29<sup>a</sup> carried by the top of the frame 29. These springs serve to press the rolls 28 into contact with the endless ironing band 17 in addition to their weight.

Provision is made for heating the endless ironing band 17 and, while such heating means may be of any suitable type that will insure the desired temperature, an electric heater 35 of suitable type is preferably employed, which may be mounted above the upper run of the endless band 17. The band will pick up this heat by induction, and at all times such heat will be sufficient to insure that the endless band will have the desired temperature for proper contact with the seam of the tube to be sealed. When the heating and pressing device is to be lifted out of the way, the heater 35 is set to one side.

Power to drive one of the drums over which the endless metal band passes may be taken from the shaft 10<sup>a</sup> of the upper draw roll 10 by a chain 36, and it will be understood that the speed of the endless band will be identical with that of the draw rolls so that the band will contact with the seam of the tube and move at exactly the same surface speed as the tube without relative movement or slip. At the same time, the endless band will be pressed into contact with the seam by the weighted tension rolls 28.

While the endless ironing band has been illustrated as centrally disposed for engagement with a centrally disposed tube seam, it will be understood that it may be shifted laterally of the tube and the forming blade over which the tube is folded, as may be desired, to properly overlie the tube seam no matter what the position of the latter may be. The drums 15 and 16 are positioned on the respective shafts 15<sup>a</sup> and 16<sup>a</sup> and may be held thereto by set screws 15<sup>b</sup> and 16<sup>b</sup>, respectively. These drums may be shifted longitudinally of these shafts so as to overlie the seam of the tube, at whatever position the latter may be arranged, by releasing these set screws and resetting the same. In any shifting of the drums with the ironing band 17, the rolls should be shifted with them in order that they may overlie said band, and one simple means of effecting this adjustment is to provide the side walls of the frame 29 carrying said rolls with extensions 29<sup>b</sup> which flank the drums, as clearly illustrated in Figs. 1 and 2. This frame 29 slides on the cross-bars 30, and in any adjustment thereof, the upper ends of the springs 33 will slide beneath the cross-plate 32. In lieu of such arrangement, the frame may be positioned by adjustable collars mounted on the cross-bars 30.

Various modifications may be made in the de-

tails of construction and arrangement forming the subject of this invention without departing therefrom, all of which is deemed to be within the scope of the appended claims.

I claim:

1. The combination with a paper-bag-making machine having means for overlapping the longitudinal edges of a web of paper in the formation of a tube, of heating means having a translational motion in the same direction and with the same speed as the traveling folded web and overlying and contacting the overlapping edges of the same.

2. The combination with a paper-bag-making machine having means for overlapping the longitudinal edges of a web of paper in the formation of a tube, of heating means having a translational motion in the same direction and with the same speed as the traveling folded web and overlying the overlapping edges of the same, and means for holding said traveling heating means in contact with said overlapping edges.

3. The combination with a paper-bag-making machine having means for overlapping the longitudinal edges of a web of paper in the formation of a tube, of continuously moving heating means having a translational motion in the same direction as the traveling folded web and overlying and contacting the overlapping edges forming the tube seam, and means for effecting movement of said heating means at the same rate of speed as the traveling folded web.

4. The combination with a paper-bag-making machine having means for overlapping the longitudinal edges of a web of paper in the formation of a tube, of continuously moving heating means having a translational motion in the same direction as the traveling folded web and overlying the overlapping edges forming the tube seam, means for effecting movement of said heating means at the same rate of speed as the traveling folded web, and means for holding said traveling heating means in contact with said overlapping edges.

5. The combination with a paper-bag-making machine having means for overlapping the longitudinal edges of a web of paper in the formation of a tube, of a traveling band having a translational motion in the same direction and with the same speed as the traveling folded web and overlying and contacting the overlapping edges connecting the same, and means for heating said band.

6. The combination with a paper-bag-making machine having means for overlapping the longitudinal edges of a web of paper in the formation of a tube, of a traveling band having a translational motion in the same direction and with the same speed as the traveling folded web and overlying the overlapping edges connecting the same, means for heating said band, and means for holding said band in contact with said overlapping edges.

7. The combination with a paper-bag-making machine having means for overlapping the longitudinal edges of a web of paper in the formation of a tube, of a traveling band having a translational motion in the same direction as the traveling folded web and overlying and contacting the overlapping edges connecting the same, means for heating said band, and means for effecting movement of said band at the same surface speed as the traveling folded web.

8. The combination with a paper-bag-making machine having means for overlapping the longitudinal

edges of a web of paper in the formation of a tube, of a traveling band having a translational motion in the same direction as the traveling folded web and overlying the overlapping edges connecting the same, means for heating said band, means for holding the band in contact with the overlapping edges, and means for effecting movement of said band at the same surface speed as the traveling folded web.

9. The combination with a paper-bag-making machine having means for overlapping the longitudinal edges of a web of paper into tubular form, a continuously movable traveling element extending longitudinally with respect to the overlapping edges of the material forming the tube and moving with the same, means for heating said traveling element, and means for causing said traveling element to exert pressure on said seam during its travel with the same.

10. The combination with a paper-bag-making machine having means for overlapping the longitudinal edges of a web of paper into tubular form, a continuously movable traveling element extending longitudinally with respect to the overlapping edges of the material forming the tube and moving with the same, means for heating said traveling element, and rolling weights for causing said traveling element to exert pressure on said seam during its travel with the same.

11. The combination with a paper-bag-making machine having means for overlapping the longitudinal edges of a web of paper into tubular form, of an ironing element extending longitudinally with respect to and contacting the overlapping edges of the material forming the tube, means for heating said ironing element, and means for causing said ironing element to move at the same surface speed as the seamed tube.

12. The combination with a paper-bag-making machine having means for overlapping the longitudinal edges of a web of paper into tubular form, of an ironing element extending longitudinally with respect to the overlapping edges of the material forming the tube, means for heating said ironing element, means for causing said ironing element to move at the same surface speed as the seamed tube, and means for holding said ironing element in contact with the seam.

13. Seam-sealing means for paper tubes subsequently formed into bags, comprising an endless metal band in pressure contact with the seam of said tube, means for moving the tube, means for imparting translational motion to the metal band with the same surface speed and in the same direction as the tube, and means for heating said metal band.

14. Seam-sealing means for paper tubes with overlapping edges subsequently formed into bags, comprising an endless metal band contacting with and overlying the overlapping edges constituting the seam of said tube, means for moving the tube, means for imparting a translational motion to the metal band in the same direction and with the same surface speed as the tube, means for heating said metal band, and means for applying pressure to said metal band during its movement.

15. Seam-sealing means for paper tubes with overlapping edges subsequently formed into bags, comprising an endless ironing band contacting with and overlying the overlapping edges constituting the seam of said tube, means for moving the seamed tube, means for imparting a

- translational motion to the ironing band in the same direction and with the same surface speed as the tube, means for heating said ironing band, and a series of weighted rollers in contact with the upper side of the lower run of said ironing band for applying pressure thereto during its movement.
16. In seam-sealing means for paper-bag-machines, the combination of a supporting frame, swingable supports carrying the same, a pair of drums rotatably mounted in said frame, a flexible ironing band stretched over said drums, and means for driving the drums to effect movement of said ironing band.
17. In seam-sealing means for paper-bag-machines, the combination of a supporting frame, swingable supports carrying the same, a pair of drums rotatably mounted in said frame, a flexible ironing band stretched over said drums, means for driving the drums to effect movement of the ironing band, a series of weighting rollers arranged to rest upon the lower run of said ironing band, and a laterally adjustable support for said weighting rollers.
18. In seam-sealing means for paper-bag-machines, the combination of a supporting frame,

swingable supports carrying the same, a pair of drums rotatably mounted in said frame and adjustable laterally of the same, a flexible ironing band stretched over said drums, means for driving the drums, a series of weighting rollers adapted to rest upon the lower run of said ironing band, an adjustable support for said weighting rollers positioned with respect to said band, and means whereby said roller support may be laterally moved with the drums when the latter are adjusted.

19. In seam-sealing means for paper-bag-machines, the combination of a supporting frame, swingable supports carrying the same, a pair of drums rotatably mounted in said frame and adjustable laterally of the same, a flexible ironing band stretched over said drums, means for driving the drums, a series of weighting rollers adapted to rest upon the lower run of said ironing band, an adjustable support for said weighting rollers positioned with respect to said ironing band, means whereby said roller support may be laterally moved with the drums when the latter are adjusted, and springs for applying pressure to said weighting rollers.

WILLIAM C. HEPKE.