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KNIFE HEATER FOR WRAPPING MACHINES

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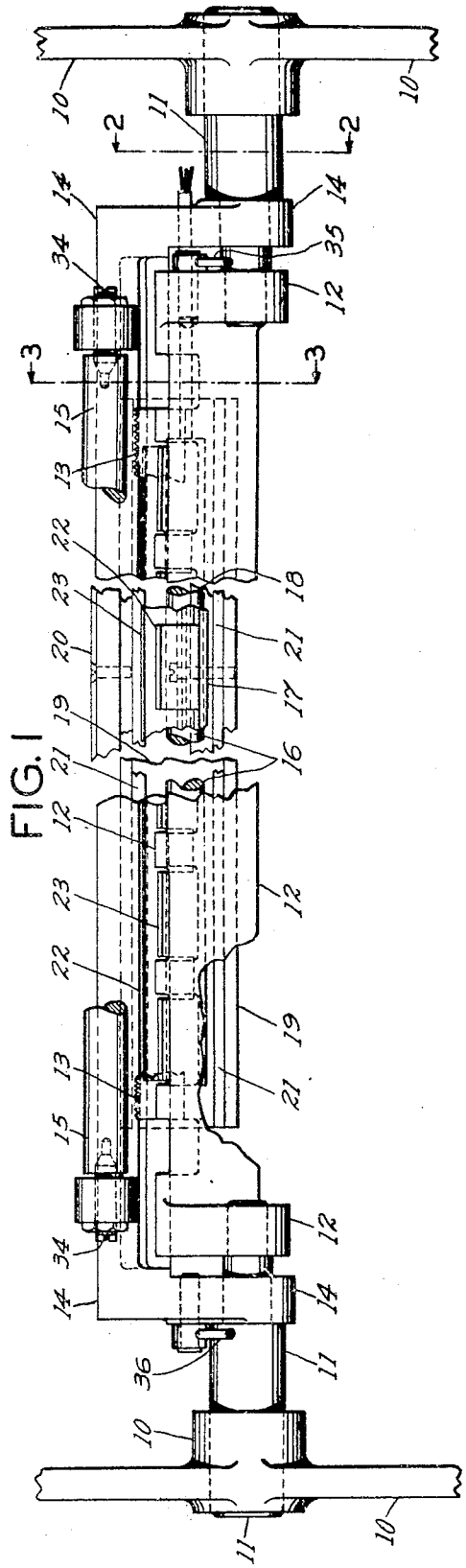

FIG. 1

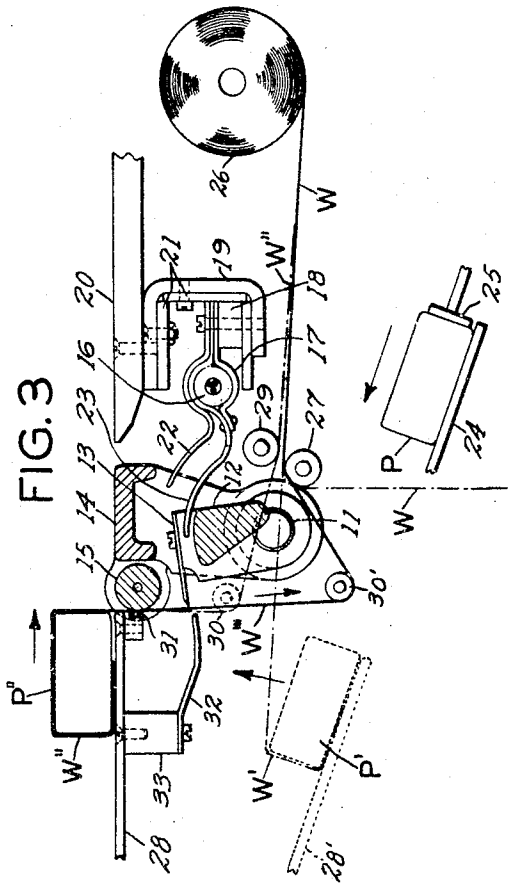

FIG. 3

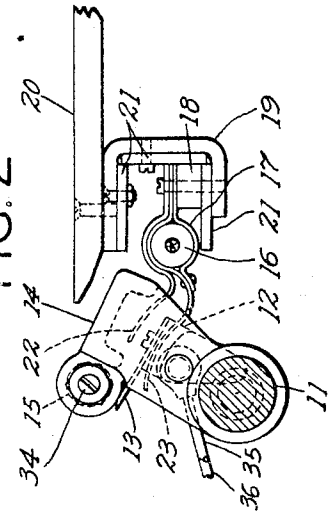

FIG. 2

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UNITED STATES PATENT OFFICE

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KNIFE HEATER FOR WRAPPING MACHINES

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This invention relates to improvements in a combined knife and clamp heater for wrapping machines using plastic coated material such as waxed paper, its main object being to replace the two movable heating units now employed in such machines by a single stationary unit so arranged as to convey heat to the oscillating knife which cuts the wax paper, or other plastic coated material, and to also heat the swinging frame which carries the roller which clamps the wax paper, or other plastic coated material, against the package holding table while being cut.

Since in wax paper wrapping machines the knife, to prevent accumulation of wax on the cutting edge, is preferably kept clean by heating the same, an electric heating unit is incorporated with the knife in present machines of this kind so that it has to travel back and forth with the oscillating knife to the detriment of the wire connections carrying the current. Furthermore, a heating unit is installed, for a similar purpose, in the swinging frame of the paper clamp roller which presses the wax paper against the package supporting table while a length sufficient for the next package is pulled off the supply reel by a downwardly moving roller and while this length is being cut off by the knife. It is the combination of these two movable heating units into one stationary unit which forms one of the principal objects of the present invention.

This object is accomplished by placing an electric heating unit into a suitably located stationary non-heat-conducting holder, rigidly suspended from the frame of the wrapping machine, and by providing the said holder with two radiating vanes projecting into the paths of the oscillating parts to be heated, so that heat is conveyed to them by radiation and convection, when, in the performance of their motions, they enter into juxtaposition with these vanes. By this arrangement, the heating unit and its electrical connections are held in a stationary position while the moving parts pass into the range of the heated vanes, thereby eliminating the trouble due to broken heater connections which is present with separate heaters attached to the moving parts.

With these and other objects not specifically mentioned in view, the invention consists in certain constructions and combinations which will be hereinafter described and then specifically set forth in the claims hereunto appended.

In the accompanying drawings:

Fig. 1 is a side elevation of the combined heating unit and of the movable parts to be heated;

Fig. 2 is an end elevation taken on line 2—2 of Fig. 1, showing the knife and clamping frame in heating position; and

Fig. 3 is an end elevation, partly in cross-section, on line 3—3 of Fig. 1 showing the knife and clamping frame in cutting position.

In carrying the invention into effect, there is provided a movable knife and clamping member acting on a plastic coated material, and a means for heating said knife and clamping member to keep them free of any plastic material which may adhere thereto. In the best constructions contemplated, the means for heating the knife and clamping member includes a plurality of plates or vanes adjacent to which the knife and clamping member move, and means for heating said plates or vanes. These various means and parts may be widely varied in construction within the scope of the claims, for the particular machine selected to illustrate the invention is but one of many possible concrete embodiments of the same. The invention, therefore, is not to be restricted to the specific construction shown and described.

Referring to the drawings, the end frames 10 support the shouldered studs 11 on which pivot the knife frame 12 carrying the knife 13, and the clamping frame 14 having the clamp roller 15. The heating unit 16 is carried by the spring holder 17 attached to a block 18 supported by a channel 19 suspended from the folder table 20 of the wrapping machine, the channel 19 being lined with heat-insulating plates 21 to prevent heat loss by conduction.

The holder 17 is provided with two ver-

tically spaced parallel curved heating vanes 22 and 23, the upper of which is a solid plate passing between the clamping frame 14 and the knife 13, while the lower vane is located below the knife and is slotted to permit the knife frame 12 to enter part way into the same, so that the knife, when not cutting, moves between the two heating vanes; and the clamping frame, in its open or down position approaches the upper vane 22; the knife and clamping frame thus receiving, by radiation and convection, heat conducted to the vanes 22 and 23 from the unit 16 before each entrance into their respective working positions.

The package P in Fig. 3, resting on the plate 24, is moved in the direction of the arrow by the pusher 25, engaging and taking along with it, in moving forward, the end of the wrapping paper W which is unwound from a reel 26 and hangs down from a roller 27 after the wrapper for the preceding package has been cut. Upon arriving at the swinging table 28, which is then in its downmost position 28′, the wrapper end is folded under the package, so that in the dotted position P′ of the package, the wrapper is in the position W′ folded around the front end of the package. The lifting table then ascends into position 28 carrying the wax paper with it into position W″, forming a wrapper around the top and rear end of the package in position P″. When in this position, the clamping frame 14 moves into holding position, the roller 15 pressing the wrapper W″, which now runs over rollers 29 and 30, against the rubber block 31 attached to table 28. The roller 30, which is attached to a swinging arm, then descends into position 30′, thereby unwinding from the reel 26 an additional length of wrapper, shown at W‴, sufficient for completing the package, whereupon the knife 13 cuts the wrapper along the ledger plate 32 fastened to block 33 carried by table 28. Having cut the paper, the knife then moves back into the position shown in Fig. 2. The package P″ is now moved backward, in the direction of the arrow, pulling the hanging wax paper with it, passing over the clamp roller 15 which in the meantime has moved a short distance away from block 31, and continues onto the plate 20 on which the side folds of the package are made. The roller 15 turns on the trunnions 34 supported by frame 14. Connecting rods 35 and 36, actuated by cams or other suitable means from the drive of the wrapping machine, impart motion of the knife frame 12 and to the clamping frame 14.

What is claimed is:

1. The combination with a knife acting on a plastic coated material, of mechanism for moving said knife in and out of cutting position, and means for establishing in the path of said knife a heated zone, whereby said knife is kept practically free of plastic material.

2. The combination with a knife acting on a plastic coated material, of mechanism for moving said knife in and out of cutting position, and means for establishing in the path of said knife a heated zone, whereby said knife is kept practically free of plastic material, said means being operative on the knife while the latter is out of cutting position.

3. The combination with a knife acting on a plastic coated material, of mechanism for moving said knife in and out of cutting position, and means for establishing in the path of said knife a heated zone, whereby said knife is kept practically free of plastic material, said means including two separated heated plates between which said knife moves.

4. The combination with a knife acting on a plastic coated material, of mechanism for moving said knife in and out of cutting position, and means for establishing in the path of said knife a heated zone, whereby said knife is kept practically free of plastic material, said means including an electrical heating element.

5. The combination with a knife acting on a plastic coated material, of mechanism for moving said knife in and out of cutting position, and means for establishing in the path of said knife a heated zone, whereby said knife is kept practically free of plastic material, said means including a plurality of separated heated plates between which said knife moves and a device for heating said plates.

6. The combination with a knife acting on a plastic coated material, of mechanism for moving said knife in and out of cutting position, and means for establishing in the path of said knife a heated zone, whereby said knife is kept practically free of plastic material, said means including a plurality of spaced vanes between which said knife moves.

7. The combination with a knife acting on a plastic coated material, of mechanism for moving said knife in and out of cutting position, and means for establishing in the path of said knife a heated zone, whereby said knife is kept practically free of plastic material, said means including a plurality of spaced vanes between which said knife moves and a device for heating said vanes.

8. The combination with a knife and clamping member acting on a plastic coated material, of mechanism for moving said knife and clamping member in and out of operative position, and means for establishing in the path of said knife and clamping member a heated zone, whereby said knife and clamping member are kept practically free of plastic material.

9. The combination with a knife and clamping member acting on a plastic coated

material, of mechanism for moving said knife and clamping member in and out of operative position, and means for establishing in the path of said knife and clamping member a heated zone, whereby said knife and clamping member are kept practically free of plastic material, said means being operative on the knife and clamping member while they are out of operative position.

10. The combination with a knife and clamping member acting on a plastic coated material, of mechanism for moving said knife and clamping member in and out of operative position, and means for establishing in the path of said knife and clamping member a heated zone, whereby said knife and clamping member are kept practically free of plastic material, said means including two separated heated plates adjacent to which said knife and clamping member move.

11. The combination with a knife and clamping member acting on a plastic coated material, of mechanism for moving said knife and clamping member in and out of operative position, and means for establishing in the path of said knife and clamping member a heated zone, whereby said knife and clamping member are kept practically free of plastic material, said means including an electrical heating element.

12. The combination with a knife and clamping member acting on a plastic coated material, of mechanism for moving said knife and clamping member in and out of operative position, and means for establishing in the path of said knife and clamping member a heated zone, whereby said knife and clamping member are kept practically free of plastic material, said means including a plurality of separated heated plates adjacent to which said knife and clamping member move and a device for heating said plates.

13. The combination with a knife and clamping member acting on a plastic coated material, of mechanism for moving said knife and clamping member in and out of operative position, and means for establishing in the path of said knife and clamping member a heated zone, whereby said knife and clamping member are kept practically free of plastic material, said means including a plurality of spaced vanes adjacent to which said knife and clamping member move.

14. The combination with a knife and clamping member acting on a plastic coated material, of mechanism for moving said knife and clamping member in and out of operative position, and means for establishing in the path of said knife and clamping member, a heated zone, whereby said knife and clamping member are kept practically free of plastic material, said means including a plurality of spaced vanes adjacent to which said knife and clamping member move and a device for heating said vanes.

15. Means for establishing a heated zone in the path of a moving knife acting on a plastic coated material whereby said knife is kept practically free of plastic material, comprising two separated plates and a device for heating said plates.

16. Means for establishing a heated zone in the path of a moving knife acting on a plastic coated material whereby said knife is kept practically free of plastic material, comprising two separated plates and an electrical device for heating said plates.

17. Means for establishing a heated zone in the path of a moving knife acting on a plastic coated material whereby said knife is kept practically free of plastic material, comprising a plurality of separated vanes and a device for heating said vanes.

18. Means for establishing a heated zone in the path of a moving knife and clamping member acting on a plastic coated material whereby said knife and clamping member are kept practically free of plastic material, comprising a plurality of stationary separated plates and a device for heating said plates.

19. Means for establishing a heated zone in the path of a moving knife and clamping member acting on a plastic coated material whereby said knife and clamping member are kept practically free of plastic material, comprising a plurality of stationary vanes and an electrical device for heating said vanes.

20. Means for establishing a heated zone in the path of a moving knife and clamping member whereby said knife and clamping member are kept practically free of plastic material, comprising a support, a spring holder and a plurality of vanes attached to said support, and an electrical heating element interposed between the spring holder and the vanes.

In testimony whereof, I have signed my name to this specification.

FRANK REINHOLD SCHMITT.