This invention relates to improvements in web feeding and conditioning devices. The main objects of my invention are:

First, to provide a device for feeding a web or webs of waxed paper to wrapping instrumentalities and provided with means for properly conditioning the web for the feeding and wrapping operations.

Second, to provide a device of the type described having feed rollers and a surface traversed by the web under the influence of the feed rollers, the said surface being cooled to a substantial extent whereby to condition the web for feeding and wrapping.

Third, to provide a device of the type described having a surface traversed by a web or webs during feeding thereof and having means associated therewith for forming a thin coating of frost or ice thereon to condition the web or webs and reduce friction incident to drawing of the web across the surface.

Fourth, to provide a web feeding and conditioning device of the type described in combination with a wrapping machine for conditioning the web prior to being wrapped.

Fifth, to provide a web cooling and conditioning device adapted to be associated with a feeding and wrapping machine.

Sixth, to provide a web conditioning device adapted for use in combination with a web feeding and wrapping machine, the said device being cooled and shaped to contact a web or webs passing thereover throughout a relatively large area whereby to effectively cool and condition a web coating on said web.

Further objects relating to details and economies of my invention will definitely appear from the description to follow. The invention is defined in the claims.

A structure embodying the features of my invention is illustrated in the accompanying drawing, wherein:

Fig. 1 is a view in side elevation partially broken away and in vertical section on line I—I of Fig. 2, illustrating details of my device and its association with means for feeding a web of waxed paper and for cutting, forwarding, and wrapping the web material around an article to be wrapped.

Fig. 2 is a fragmentary view in end elevation illustrating the cooling or conditioning device of my invention in association with the web and web feeding means.

This invention relates in general to web feeding and conditioning means and more particularly to the usual means in such machines for feeding a waxed web, cutting the same into sheets, and forwarding them to the wrapping instrumentalities. It is generally known that in feeding wax paper from a web roll, cutting the web into sheets, and forwarding the sheets into wrapping position, numerous difficulties are encountered. This is especially true when the temperature of the room in which the operations are performed is elevated or when the temperature adjacent the paper for any reason approximates the melting point of the wax. Under such a condition, the paper becomes limp or weak and often cannot be advanced by the rollers or belts usually employed, without buckling, or it sags and becomes displaced when delivered to position to receive the article to be wrapped. Likewise, wax from the paper will collect on thefeed rolls and on other parts of the wrapping mechanism, so that the paper will cling to the same instead of feeding correctly into the machine.

It is likewise a fact that under the conditions noted the cutting knives are apt to become fouled by surplus wax, causing the paper to hang to the knife and disturb its normal movement.

As stated above, the heat may be caused in a number of ways to hinder the feeding of a single web of wax paper. Heat is also present when a plurality of sheets are laminated by certain known processes. This likewise may cause a collection of wax on the various feeding and cutting elements.

This invention therefore is concerned with the provision of cooling or conditioning means for a web or webs of paper employed in a wrapping machine. It broadly resides in the idea of cooling the web or webs to a temperature lower than the normal room temperature before the same enter the feed rollers and, more specifically, in employing a cooling element with which the paper contacts, the temperature of which is reduced sufficiently to cause a thin coating of frost or ice to be formed thereon. Aside from the novel association of a frosted surface traversed by the web prior to entering the wrapping machine, my invention contemplates the formation of said surface in a novel and improved shape to facilitate passage of the web thereacross, both the shape of the surface and the coating of frost or ice thereon facilitating the passage of the web. The thin coating of frost or ice on the conditioning element prevents the paper from sticking thereto; that is, it lubricates the element and decreases the friction of the paper sliding thereover.

Referring to the drawing, the reference numeral 1 in general indicates a suitable wrapping
machine having an elevating plunger 2 adapted to elevate an article such as a loaf of bread 3 through a chute 4 into wrapping material 5 and through the folding elements 6.

The reference numeral 7 indicates a bracket suitably supported on the machine frame 8 carrying at its outer end a core 9 on which is wound a web 10. The web is waxed and interlocked in the wrapping of loaves of bread, boxes, containers, and the like. Web 10 is threaded between a pair of feed rolls 11, 12, of which the former is mounted on a shaft 13 driven by a suitable means (not shown) and the latter is rotateably mounted on spindle 14 and resiliently urged into contact with the web by means of suitable coil springs 15. Roller 11 is intermittently driven to advance the web a predetermined distance by timing and controlling means of well known type which it is not thought necessary to particularly describe.

A suitable length of the web being fed by rollers 11, 12, a cutting knife 16 is actuated upwardly from beneath the web to sever the same against a stationary cooperating shear blade 17. Knife 16 is reciprocated by means of an arm 18 connected to the knife support 19 and pivoted to the machine framework at 20. At its opposite end, arm 18 has a follower 21 cooperative with suitably driven cam 22 to actuate the knife in the manner described so as to cut sheets 5 of predetermined length from the web at timed intervals.

Upon leaving cutter 16, the sheets are forwarded by a suitably driven belt 23 into position for wrapping. The pivoted idler rolls 24 rest on the sheet during forwarding thereof by belt 23 and a gauge stop 25 positions the sheet properly above the knife 16 and below the wrapping elements 6.

For the purpose of properly cooling and conditioning web 10 prior to entry of the same between feed rolls 11, 12, I mount a cooling unit generally indicated 26 between the web reel and the said rolls. The unit is in the form of a box 27 having a cooling surface 28 which is gradually curved and which extends parallel to the web travel at 28 so that web 10 in passing thereover will engage the box over a substantial area and across the entire width thereof to insure effective cooling. Box 27 has arranged interiorly thereof a cooling coil or equivalent element 29 containing a refrigerant and extending outwardly of the box. The coil is connected with a suitable refrigerating device (not shown) whereby the interior of box 27 is effectively cooled.

The cooling is carried out to a degree sufficient to cause a thin coating of frost or ice to be formed on the exterior surface of box 27. This frosted or iced condition, as well as the formation of the box in the shape shown and described, is essentially important in my invention since I have found that the surface of frost or ice prevents the paper from sticking to the cooler and lubricates its passage thereover while the particular shape of the box likewise materially tends to facilitate the said passage. Obviously, the frosted surface is highly effective in solidifying the wax web coating.

It will be evident that if desired a refrigerating unit of different shape could be employed, such, for instance, as a rotating refrigerated roll. However, a rotary element may be found impractical due to difficulty in maintaining such a member cold enough to form ice on its surface, this in turn being due to the difficulty of making proper flexible connections. Likewise, I have found that a stationary unit is more effective not only because of its simplicity but also because of the fact that the web is waxed and then interlocked in the wrapping material 5 and through the folding elements 6. The position of the unit is such as to allow the web an even coating on which is wound a web 10. The web is waxed and interlocked in the wrapping of loaves of bread, boxes, containers, and the like. Web 10 is threaded between a pair of feed rolls 11, 12, of which the former is mounted on a shaft 13 driven by a suitable means (not shown) and the latter is rotateably mounted on spindle 14 and resiliently urged into contact with the web by means of suitable coil springs 15. Roller 11 is intermittently driven to advance the web a predetermined distance by timing and controlling means of well known type which it is not thought necessary to particularly describe.

A suitable length of the web being fed by rollers 11, 12, a cutting knife 16 is actuated upwardly from beneath the web to sever the same against a stationary cooperating shear blade 17. Knife 16 is reciprocated by means of an arm 18 connected to the knife support 19 and pivoted to the machine framework at 20. At its opposite end, arm 18 has a follower 21 cooperative with suitably driven cam 22 to actuate the knife in the manner described so as to cut sheets 5 of predetermined length from the web at timed intervals.

Upon leaving cutter 16, the sheets are forwarded by a suitably driven belt 23 into position for wrapping. The pivoted idler rolls 24 rest on the sheet during forwarding thereof by belt 23 and a gauge stop 25 positions the sheet properly above the knife 16 and below the wrapping elements 6.

For the purpose of properly cooling and conditioning web 10 prior to entry of the same between feed rolls 11, 12, I mount a cooling unit generally indicated 26 between the web reel and the said rolls. The unit is in the form of a box 27 having a cooling surface 28 which is gradually curved and which extends parallel to the web travel at 28 so that web 10 in passing thereover will engage the box over a substantial area and across the entire width thereof to insure effective cooling. Box 27 has arranged interiorly thereof a cooling coil or equivalent element 29 containing a refrigerant and extending outwardly of the box. The coil is connected with a suitable refrigerating device (not shown) whereby the interior of box 27 is effectively cooled.

The cooling is carried out to a degree sufficient to cause a thin coating of frost or ice to be formed on the exterior surface of box 27. This frosted or iced condition, as well as the formation of the box in the shape shown and described, is essentially important in my invention since I have found that the surface of frost or ice prevents the paper from sticking to the cooler and lubricates its passage thereover while the particular shape of the box likewise materially tends to facilitate the said passage. Obviously, the frosted surface is highly effective in solidifying the wax web coating.

It will be evident that if desired a refrigerating unit of different shape could be employed, such, for instance, as a rotating refrigerated roll. However, a rotary element may be found impractical due to difficulty in maintaining such a member cold enough to form ice on its surface, this in turn being due to the difficulty of making proper flexible connections. Likewise, I have found that
2,178,692

2. In a wrapping machine, including means for supporting a roll of waxed paper, means for intermittently feeding a web from said roll, intermittently operable cutting means for severing lengths from said web disposed at the rear of the feeding means, means for folding said lengths around an article to be wrapped, and means for forwarding the lengths to said folding means; a conditioning device for cooling the wax on said web disposed in advance of and close to said feeding means, comprising a cooling element between said roll and said feeding means, said element contacting the web throughout the entire width of the latter during the feeding thereof, and a refrigerating coil in said element, said element being sufficiently cooled thereby to present an external coating of frost or ice at the surface contacted by the web to facilitate feeding of the latter.

3. In a wrapping machine, including means for supporting a roll of waxed paper, means for feeding a web from said roll, cutting means for severing lengths from said web disposed at the rear of the feeding means, means for folding said lengths around an article to be wrapped, and means for forwarding the lengths to said folding means; a conditioning device for cooling the wax on said web disposed in advance of and close to said feeding means, comprising a cooling element between said roll and said feeding means, said element contacting the web throughout the entire width of the latter during the feeding thereof, and a refrigerating coil in said element, said element being sufficiently cooled thereby to present an external coating of frost or ice at the surface contacted by the web to facilitate feeding of the latter.

4. In a wrapping machine, including means for supporting a roll of waxed paper, means for feeding a web from said roll, cutting means for severing lengths from said web to which said feeding means delivers, means for folding said lengths around an article to be wrapped, and means for forwarding the lengths to said folding means; a conditioning device for cooling the wax on said web disposed in advance of the feeding means, comprising a refrigerating element between said roll and said feeding means and in contact with said web, said element being shaped to contact the web over a substantial area during the feeding thereof, said element presenting an external coating of frost or ice at the surface contacted by the web to facilitate feeding of the latter.

5. In a wrapping machine, the combination of means for supporting a web of waxed paper in roll form, means for feeding the web from the roll, and means for conditioning the web for the feeding operation to prevent melting of the wax thereon, comprising a fixed cooling element having a curved surface in contact with the web throughout a substantial area during feeding of the web and refrigerating means in the element adapted to cool the latter, the surface of said element having a coating of frost or ice thereon to facilitate feeding of the web thereof.

6. In a wrapping machine, the combination of means for supporting a web of waxed paper in roll form, means for feeding the web from the roll, and means for conditioning the web for the feeding operation to prevent melting of the wax thereon, comprising a fixed cooling element having a curved surface in contact with the web during feeding of the web, the surface of said element having a coating of frost or ice thereon to facilitate feeding of the web thereof.

7. A cooling device of the type described for conditioning a moving web of waxed paper, comprising a fixed cooling box traversed by the web during feeding thereof, said box contacting the web throughout the entire width thereof and having a gradually curved surface whereby to engage the web substantially longitudinally, and a refrigerating coil in said box containing a refrigerant, said box having a coating of frost or ice thereon to facilitate feeding of the web.

8. A cooling device of the type described for conditioning a moving web of waxed paper, comprising a fixed cooling box traversed by the web during feeding thereof, said box contacting the web throughout the entire width thereof and having a gradually curved surface whereby to engage the web substantially longitudinally, said box having a coating of frost or ice thereon to facilitate feeding of the web.

9. A cooling device of the type described for conditioning a web of waxed paper, comprising a fixed cooling element traversed by the web during feeding thereof, said element contacting the web throughout a substantial area, and a refrigerating coil in said element containing a refrigerant, said element having a coating of frost or ice thereon to facilitate feeding of the web.

10. A cooling device of the type described for conditioning a web of waxed paper, comprising a fixed cooling element traversed by the web during feeding thereof, said element contacting the web throughout a substantial area, said element having a coating of frost or ice thereon to facilitate feeding of the web.

11. In combination, a reel supporting a roll of previously waxed paper, means for feeding said paper, and means in contact with the paper to cool and condition the same, comprising a fixed cooling element normally having a surface of frost or ice thereon, said surface being gradually curved to engage the paper throughout a substantial area during its passage.

12. In combination, means for feeding previously waxed paper, and means in contact with the paper during feeding thereof to cool and condition the same, comprising a fixed cooling element normally having a surface of frost or ice thereon, said surface engaging the paper throughout a substantial area.

JOHN W. SMITH.