Jan. 5, 1943. A. L. BAUSMAN 2,307,562

COOLER FOR HOT CHOCOLATE COATED GOODS LIKE CANDIES, ETC.

Filed April 3, 1940 2 Sheets-Sheet 1

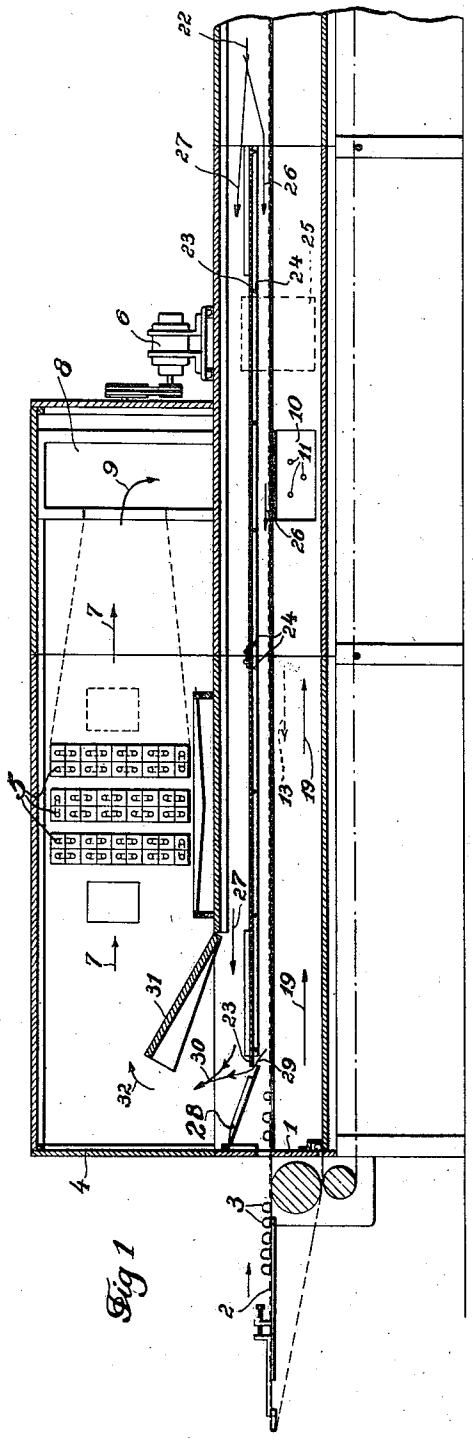


Fig 1

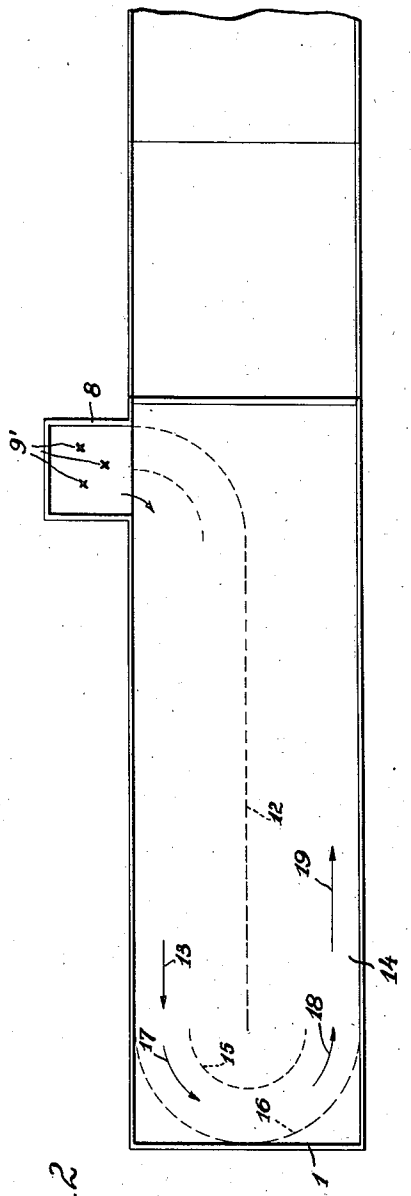


Fig. 2

INVENTOR:
Alonzo Linton Bausman
BY George Benjamin
ATTORNEY

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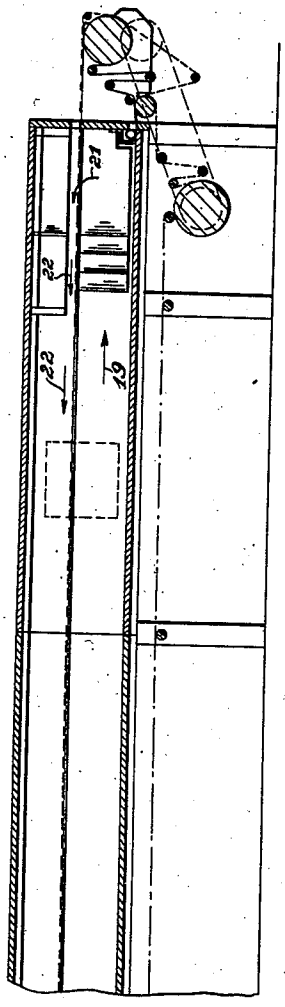


Fig. 1a

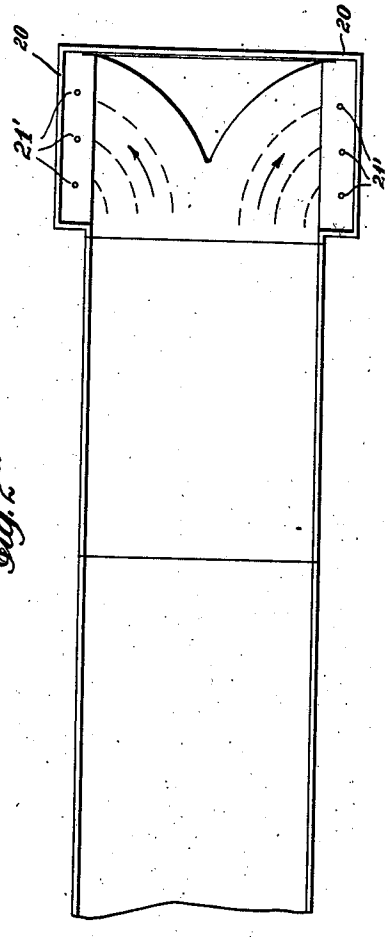


Fig. 2a

INVENTOR:
Alonzo Linton Bausman
BY George Benjamin
ATTORNEY

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UNITED STATES PATENT OFFICE

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COOLER FOR HOT CHOCOLATE COATED GOODS LIKE CANDIES, ETC.

Alonzo Linton Bausman, Springfield, Mass., assignor to National Equipment Company, Springfield, Mass.

Application April 3, 1940, Serial No. 327,625

7 Claims. (Cl. 34—225)

The object of the invention is a cooler for hot chocolate coated goods like candies, etc.

Such goods emerge from the coating machine with a temperature of e. g. 88° to 90° F., and usually are cooled thereafter, for solidifying or "setting" the chocolate, in a cooler having the form of a long tunnel shaped casing through which the goods are conveyed on a travelling support or conveyor belt in countercurrent to and in contact with one leg of a stream of cooling air circulated in a closed circuit.

This cooling, for obvious reasons, should be done very rapidly. It has been found, however, that if the speed of cooling exceeds a certain limit the so desirable gloss or shine of the chocolate surface is impaired more or less, and uniform results are no more obtainable.

It further has been found that these drawbacks are caused substantially only by a too sudden initial cooling or temperature "shock."

The invention now consists in a partition arranged in the goods-entrance zone of said casing in the general direction of said countercurrent and adapted, while maintaining said countercurrent contact until close to the goods-entrance end of said casing, to split from said countercurrent of air a shunt current prevented, by said partition, from contact with said goods, to thereby reduce, with a minimum waste of power and with a minimum of structure, the rate of heat exchange between said goods and said countercurrent of air in said zone below the rate corresponding to the countercurrent in the other parts of the apparatus.

In the drawings an embodiment of the object of the invention is shown by way of example.

Fig. 1 is a diagrammatic sectional elevation of the goods entrance end of the apparatus;

Fig. 1A is a similar elevation of the other end of the apparatus;

Fig. 2 is a diagrammatic plan view of Fig. 1;

Fig. 2A is a diagrammatic plan view of Fig. 1A.

Through the long tunnel shaped casing 1 is passed the usual endless conveyor belt 2 conveying the candies 3 or the like coming from the coating machine (not shown) through the casing. These candies have e. g. a temperature of 88° to 90° F.

In an upper compartment, enlargement or chamber 4 of the casing 1 are provided the usual cooling coils 5. A fan (not shown) driven by a motor 6 draws air through the coils 5 in the sense of the arrow 7 and presses this air down through a lateral flue 8 in the sense of the arrow 9. In Fig. 2 the ends of the arrows 9 are marked by crosses 9' for indicating the direction of flow in the usual manner.

The flue 8 is not in direct open connection with the upper part of the casing proper but opens into the lower part of said casing beneath the upper leg of the conveyor belt 2 by means of the port 10. In this port the direction of flow is marked by small circles 11 indicating a forward flow.

Said lower part of the casing, in the goods-entrance zone of the apparatus, is divided by a vertical wall 12 (Fig. 2) into two channels 13 and 14. Rounded partitions or deflector walls 15 and 16 secure a smooth flow of the air from the channel 13 to the channel 14, as shown by the arrows 17 and 18.

The air then flows beneath said upper conveyor leg in the sense of the arrows 19 substantially through the full length of the apparatus to the far end thereof.

At the latter end the casing is T-shaped having lateral enlargements, risers or flues 20, in which the air rises for coming into that part of the chamber 1 which is situated above the upper or operative leg of the conveyor 2. The current in the risers 20 is indicated by the arrows 21 in Fig. 1, and by the little circles 21' in Fig. 2.

In said upper part of the casing 1 the air flows in countercurrent to the goods in the sense of the arrows 22.

Near the goods-entrance zone of the apparatus, in accordance with the invention, is provided a lying or horizontal partition 23, which is supported by rollers 24, and is therefore slidable and easily adjustable. For making this partition accessible for adjustment purposes a door 25 is provided.

By this partition the air current, in the upper part of the casing, is divided into two branches as indicated by the bifurcation of the leftmost arrow into the branches 26 and 27.

The lower branch 26 remains in countercurrent contact with the goods 3.

Opposite the left end of the partition 23 a stationary baffle plate 28 is provided. From this baffle plate the partition 23 is separated by a slot 29 the width of which is regulated by the adjustment of the partition 23.

The upper branch current of air flows above the partition 23 out of contact with the goods and is reunited with the lower branch current behind the slot 29 as indicated by the bifurcated arrow 30, in Fig. 1.

The air flows then around a second stationary

baffle plate 31, in the sense of the arrow 32, for being recirculated through the apparatus.

In the slot 29 the lower branch current of air is throttled and correspondingly slowed down, thereby preventing the beforementioned cooling shock.

By way of example, but not in the sense of limitation, the following temperatures may be mentioned.

The air comes from the coils 5 through the port 10 at about 34° F. It has been found that this relatively low temperature is not objectionable because the lower part of the casing, where such low temperatures prevail, is separated from the goods by the conveyor belt 2.

The air emerges from the risers 20 with a temperature of about 40° F. and when it approaches the right end of the partition 23 it has a temperature of about 50° F.

The temperature of the upper branch current is thereafter no more considerably changed because this branch is out of contact with the goods. The lower branch current under the partition 23, however, is considerably throttled and slowed down by the slot 29. Hence the temperature in this lower branch rises considerably. In the zone of the door 25 the temperature may be 58°, and near the slot 29 it may be 65°. Thereby the cooling shock and its bad consequences are avoided in spite of the fact that by the high air velocity in the other parts of the apparatus the cooling is done very rapidly and efficiently.

It is self evident that the upper branch current 27 need not be passed through the casing at all but may be conducted by an outside tube or channel to and into the enlargement or chamber 4 for reunion with the second or throttled branch current.

The cooling shock, instead of the described method, may be avoided in many other ways. E. g. warmer air may be introduced or recirculated into the cooling air current near said entrance zone, or a heating device may be provided there for said air current, or the cross section of the apparatus may be enlarged in said zone with a corresponding slowing down of the air current. The described method, however, is preferred for reasons of simplicity, convenience and efficiency.

Instead of or in addition to making slidable the partition 23 the width of the slot 29 and thereby the degree of throttling, of course, may be regulated by making the baffle plate 28 or a part thereof angularly adjustable or by providing a special regulation member, shutter or valve for said slot.

The invention makes it possible to extend the countercurrent leg of the closed cooling air circuit very close to the goods-entrance end of the casing without danger of drawbacks by the above mentioned cooling shock.

What I claim is:

1. A cooler for hot chocolate coated goods comprising, in combination, an elongated casing a movable support adapted to carry said goods through said casing, cooling means, means for circulating air through said casing and past said cooling means in a closed circuit in part of which it flows in contact with and in counter-current to said goods, a partition arranged in the goods-entrance zone of said casing in the general direction of said counter current and adapted, while maintaining said counter current contact below said partition until close to the goods, entrance end of said casing, to split from said counter current of air a shunt current prevented, by said partition, from contact with said goods, and means for reuniting said counter current and shunt current for recirculation.

2. A cooler as in claim 1 in which the spaces above and below said partition are in open connection with each other at that end of said partition which is remote from the goods-entrance zone of the apparatus.

3. A cooler as in claim 1 in which said partition terminates short of the goods-entrance end of said casing.

4. A cooler as in claim 1 in which said partition is adapted for adjustment and for control, thereby, of the volume of said shunt current and of that part of said counter current which is maintained below said partition, in contact with the goods until close to the goods-entrance end of said casing to become reunited then with said shunt current.

5. A cooler as in claim 1 in which said partition is adjustable horizontally.

6. A cooler as in claim 1 in which said partition is slidable.

7. A cooler as in claim 1 in which said partition is slidably mounted on antifriction members.

ALONZO LINTON BAUSMAN.