

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improved Tray for Continuous Fermentation and Drying of Processed Tea Leaf

I, PETER CROMBIE, M.B.E., I.C.S. (Retired), Calcutt Adviser to the Indian Tea Association, of Post Box 2261, Royal Exchange, 6, Netaji Subhas Road, Calcutta, West Bengal, India, a British subject, do hereby declare the invention for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an improved tray for continuous fermentation and drying of processed tea leaf.

In the manufacture of tea, the rolling of tea leaf takes place before its fermentation, and fermentation takes place before drying. Usually fermentation and drying are two distinct operations involving considerable handling of the leaf between the two stages.

We have devised and used an apparatus which combines the fermentation and drying stages into a single mechanically-coupled and continuous operation. This is achieved by providing adjacent fermentation and drying chambers, the internal conditions of which are maintained at the respective optimum for the fermentation and drying stages by means of fans, humidifiers, coolers and heaters. A plurality of trays are mounted between a pair of endless chains which travel through the two chambers (first through the fermentation chamber and then through the drying chamber) on a plurality of horizontal runners and sprockets in the chambers. Such an apparatus is disclosed in Patent specification No. 889,741.

The trays according to our aforesaid apparatus on which processed tea is spread, are of plain aluminium sheet or similar non-ferrous metal. One edge of a tray is mounted on a pair of pivot pins inserted one to each chain at suitable intervals, which act as a haulage means of the tray. The pivot pins are provided with rollers which roll along

the angle runners provided adjacent the sides of the chambers at each run. The other edge of each tray is also provided with a pair of rollers of larger diameter which are also in rolling contact with the horizontal runners. The runners are provided at each end with cut-away portions through which the rollers pass from one run to the next lower run as the tray passes from one end of a chamber to the other. The trays are provided along one edge with a horizontal projection which is adapted to overlap the edge of an adjacent tray so that the entire series of trays present a substantially unbroken surface with no gaps between them.

It is an object of this invention to provide an improved tray for an apparatus for continuous fermentation and drying of tea leaf, which is robust in construction and lighter in weight, and which provides perforations for better circulation of air. These trays will function in the same manner as aforesaid with reference to the trays used at present.

With this object, according to my invention a tray for an apparatus for continuous fermentation and drying of processed tea leaf consists of a rectangular frame of mild steel flats comprising two longitudinal side members, two cross end members and a number of intermediate members parallel to the end members, all being welded together, corner pieces at four corners, fabric supports comprising galvanised wires running parallel to the longitudinal side members of the frame and passing through holes in the cross end and intermediate members and woven wire mesh fabric stretched across the top of the frame and secured to the side and end members by angled edge plates rivetted thereto.

The longitudinal members of the frame corresponds to the width of the fermentation and the drying chambers of the apparatus, and the width of the frame may be 1 ft. 4½ ins., in which case there may be four inter-

mediate members welded at ends to the longitudinal members. The fabric supporting wires are secured to the drilled holes of the end and intermediate members by clinching which has the effect of contracting the holes to grip the wires. The angle edge plates of two adjacent trays overlap to provide an unbroken surface and to prevent air leakage as well as fall-through to the tray run below.

Another feature of the invention is that two spindles are provided in each tray along one longitudinal member of the frame passing through the corner pieces fixed to that longitudinal member at the ends of which spindles are provided two rollers which run on the angle iron runners in the chambers. The other two corner pieces, away from them, along the other longitudinal member of the frame have holes drilled through them into which the pivot pins fixed to the chains at suitable intervals are inserted thereby providing a pivotably mounted tray haulage system. On to the pivot pins are also mounted rollers to support the chain and the tray so that the chain or the tray do not drag on the angle runners when the trays are hauled by the chain.

The invention will now be described with reference to the accompanying drawings in which,

Fig. 1 is an isometric view of the tray,

Fig. 2 is a plan view of two adjacent trays along with haulage chains and runner angles,

Fig. 3 shows an elevation of a tray and

Fig. 4 is a section of a tray at A—A in Fig. 3 in an enlarged scale.

In the drawings, the tray frame comprises two longitudinal side members, two cross end members and four intermediate members made of mild steel flats 1 1" by $\frac{1}{4}$ ", all welded together at the ends. The frame is strengthened at four corners by corner pieces 2. Fabric supports 3 made of standard No. 8 galvanised wires are passed through holes in the end members and the intermediate members, and are secured thereto by clinching which has the effect of contracting the holes to cause them to grip the wires. Woven wire mesh fabric 4 is stretched across the top of the frame and secured to the side and end flat members 1 by angled edge plates 5 secured to the flats by rivets 6. The longitudinal members of the tray correspond to the width of the fermentation and the drying chambers, and the width of each tray is 1 ft. 4 $\frac{1}{2}$ ins. The angled edge plates of two adjacent trays overlap to provide an unbroken surface, to prevent air leakage and fall-through to the tray run below.

Along one longitudinal member of the frame at the two corners adjacent to that member, spindles 9 are provided at the ends of which rollers 8 are mounted. Pivot pins 7 fixed to the haulage chain 10 at suitable intervals are secured to the trays by inserting

the pivot pins into the sockets provided in the corner pieces 2 along the other longitudinal member. Rollers 8 are also mounted on these pivot pins to support the chain and the tray. The rollers 8 run on the angle iron runners 11 provided at the sides of the fermentation and drying chambers.

The trays herein described replace the trays described in Patent specification No. 889,741. Their use is not restricted to the apparatus according to that specification, but they can be used in other tea drying apparatus which function in a similar way.

WHAT I CLAIM IS:—

1. A tray for an apparatus for continuous fermentation and drying of processed tea leaf consisting of a rectangular frame of mild steel flats comprising two longitudinal side members, two cross end members and a number of intermediate members parallel to the end members, all being welded together, corner pieces at four corners, fabric supports comprising galvanised wires running parallel to the longitudinal side member of the frame and passing through holes in the cross end and intermediate members and woven wire mesh fabric stretched across the top of the frame and secured to the side and end members by angled edge plates rivetted thereto.

2. A tray as claimed in claim 1 in which the longitudinal members of the frame correspond to the width of the fermentation and the drying chambers of the apparatus, and the width of the frame may be 1 ft. 4 $\frac{1}{2}$ ins., in which case there may be four intermediate members welded at ends to the longitudinal members.

3. A tray as claimed in either of the preceding claims in which the fabric supporting wires are secured to the drilled holes of the end and the intermediate members by clinching which has the effect of contracting the holes to grip the wires.

4. A tray as claimed in any one of the preceding claims in which the angled edge plates of two adjacent trays overlap to provide an unbroken surface and to prevent air leakage as well as fall-through to the tray run below.

5. A tray as claimed in any one of the preceding claims in which spindles are provided along the longitudinal members of the frame passing through the corner pieces and at the ends of the spindles rollers are provided, which run on the angle iron runners in the chambers.

6. A tray as claimed in any one of the preceding claims in which pivot pins at suitable intervals in the chains are inserted into the sockets provided at the two corner pieces along one longitudinal member of the tray frame for haulage purpose onto which rollers are mounted to support the chain and the tray itself.

7. A tray for an apparatus for continuous

mediate members welded at ends to the longitudinal members. The fabric supporting wires are secured to the drilled holes of the end and intermediate members by clinching which has the effect of contracting the holes to grip the wires. The angle edge plates of two adjacent trays overlap to provide an unbroken surface and to prevent air leakage as well as fall-through to the tray run below.

Another feature of the invention is that two spindles are provided in each tray along one longitudinal member of the frame passing through the corner pieces fixed to that longitudinal member at the ends of which spindles are provided two rollers which run on the angle iron runners in the chambers. The other two corner pieces, away from them, along the other longitudinal member of the frame have holes drilled through them into which the pivot pins fixed to the chains at suitable intervals are inserted thereby providing a pivotably mounted tray haulage system. On to the pivot pins are also mounted rollers to support the chain and the tray so that the chain or the tray do not drag on the angle runners when the trays are hauled by the chain.

The invention will now be described with reference to the accompanying drawings in which,

Fig. 1 is an isometric view of the tray,

Fig. 2 is a plan view of two adjacent trays along with haulage chains and runner angles,

Fig. 3 shows an elevation of a tray and

Fig. 4 is a section of a tray at A—A in Fig. 3 in an enlarged scale.

In the drawings, the tray frame comprises two longitudinal side members, two cross end members and four intermediate members made of mild steel flats 1 1" by 1/4", all welded together at the ends. The frame is strengthened at four corners by corner pieces 2. Fabric supports 3 made of standard No. 8 galvanised wires are passed through holes in the end members and the intermediate members, and are secured thereto by clinching which has the effect of contracting the holes to cause them to grip the wires. Woven wire mesh fabric 4 is stretched across the top of the frame and secured to the side and end flat members 1 by angled edge plates 5 secured to the flats by rivets 6. The longitudinal members of the tray correspond to the width of the fermentation and the drying chambers, and the width of each tray is 1 ft. 4 1/2 ins. The angled edge plates of two adjacent trays overlap to provide an unbroken surface, to prevent air leakage and fall-through to the tray run below.

Along one longitudinal member of the frame at the two corners adjacent to that member, spindles 9 are provided at the ends of which rollers 8 are mounted. Pivot pins 7 fixed to the haulage chain 10 at suitable intervals are secured to the trays by inserting

the pivot pins into the sockets provided in the corner pieces 2 along the other longitudinal member. Rollers 8 are also mounted on these pivot pins to support the chain and the tray. The rollers 8 run on the angle iron runners 11 provided at the sides of the fermentation and drying chambers.

The trays herein described replace the trays described in Patent specification No. 889,741. Their use is not restricted to the apparatus according to that specification, but they can be used in other tea drying apparatus which function in a similar way.

WHAT I CLAIM IS:—

1. A tray for an apparatus for continuous fermentation and drying of processed tea leaf consisting of a rectangular frame of mild steel flats comprising two longitudinal side members, two cross end members and a number of intermediate members parallel to the end members, all being welded together, corner pieces at four corners, fabric supports comprising galvanised wires running parallel to the longitudinal side member of the frame and passing through holes in the cross end and intermediate members and woven wire mesh fabric stretched across the top of the frame and secured to the side and end members by angled edge plates rivetted thereto.

2. A tray as claimed in claim 1 in which the longitudinal members of the frame correspond to the width of the fermentation and the drying chambers of the apparatus, and the width of the frame may be 1 ft. 4 1/2 ins., in which case there may be four intermediate members welded at ends to the longitudinal members.

3. A tray as claimed in either of the preceding claims in which the fabric supporting wires are secured to the drilled holes of the end and the intermediate members by clinching which has the effect of contracting the holes to grip the wires.

4. A tray as claimed in any one of the preceding claims in which the angled edge plates of two adjacent trays overlap to provide an unbroken surface and to prevent air leakage as well as fall-through to the tray run below.

5. A tray as claimed in any one of the preceding claims in which spindles are provided along the longitudinal members of the frame passing through the corner pieces and at the ends of the spindles rollers are provided, which run on the angle iron runners in the chambers.

6. A tray as claimed in any one of the preceding claims in which pivot pins at suitable intervals in the chains are inserted into the sockets provided at the two corner pieces along one longitudinal member of the tray frame for haulage purpose onto which rollers are mounted to support the chain and the tray itself.

7. A tray for an apparatus for continuous



fermentation and drying of processed tea leaf, substantially as described and illustrated in the accompanying drawings.

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