Aug. 28, 1945. F. H. DENNER 2,383,474

APPARATUS FOR DRYING

Filed March 13, 1942 2 Sheets-Sheet 1

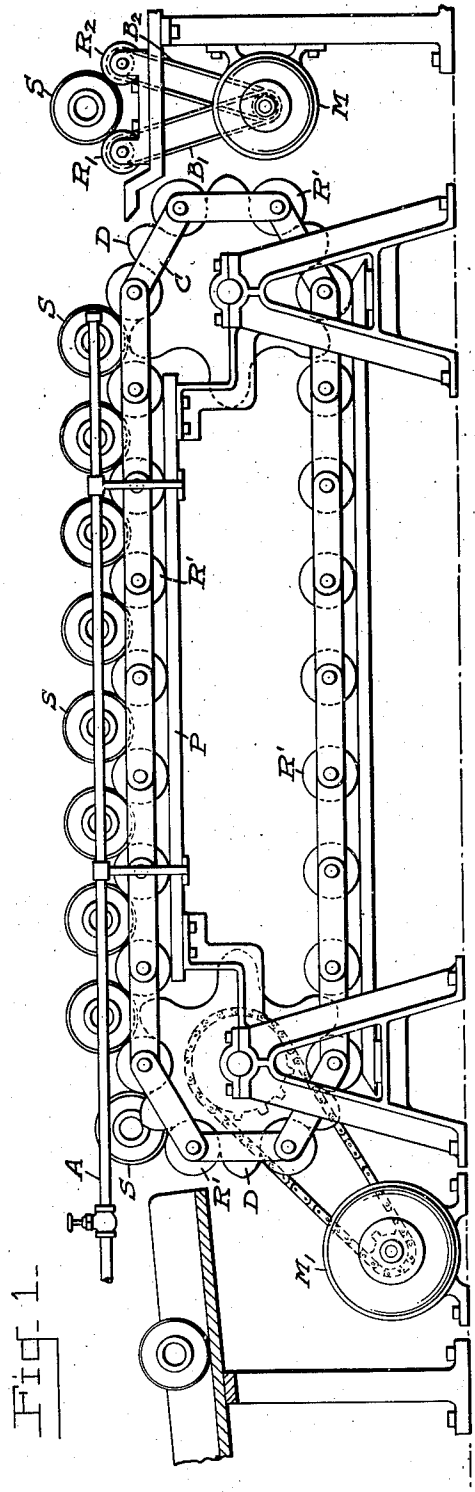


Fig. 1.

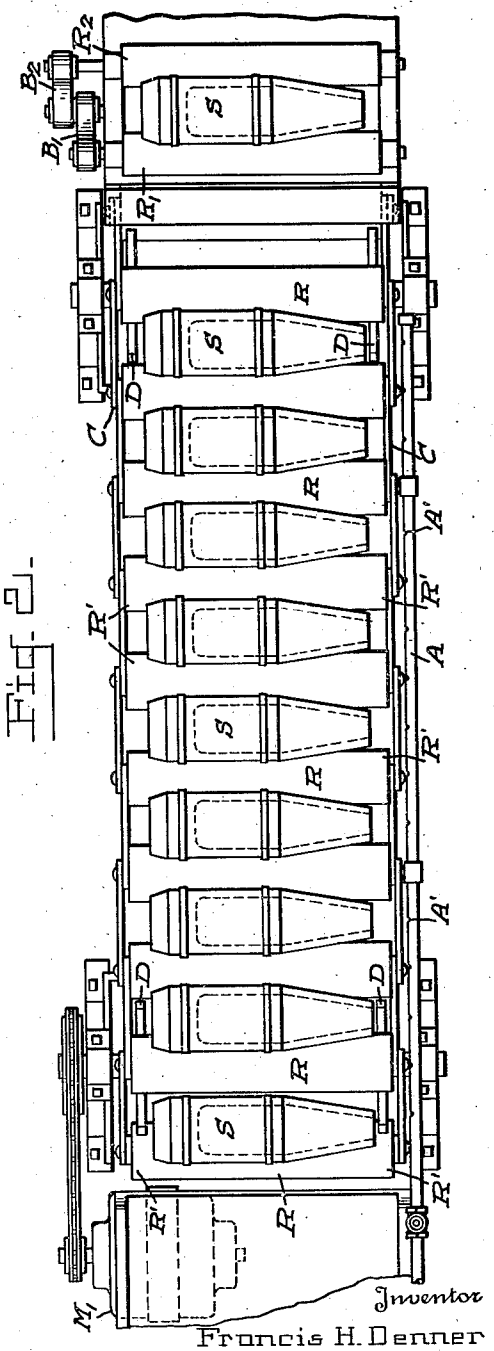


Fig. 2.

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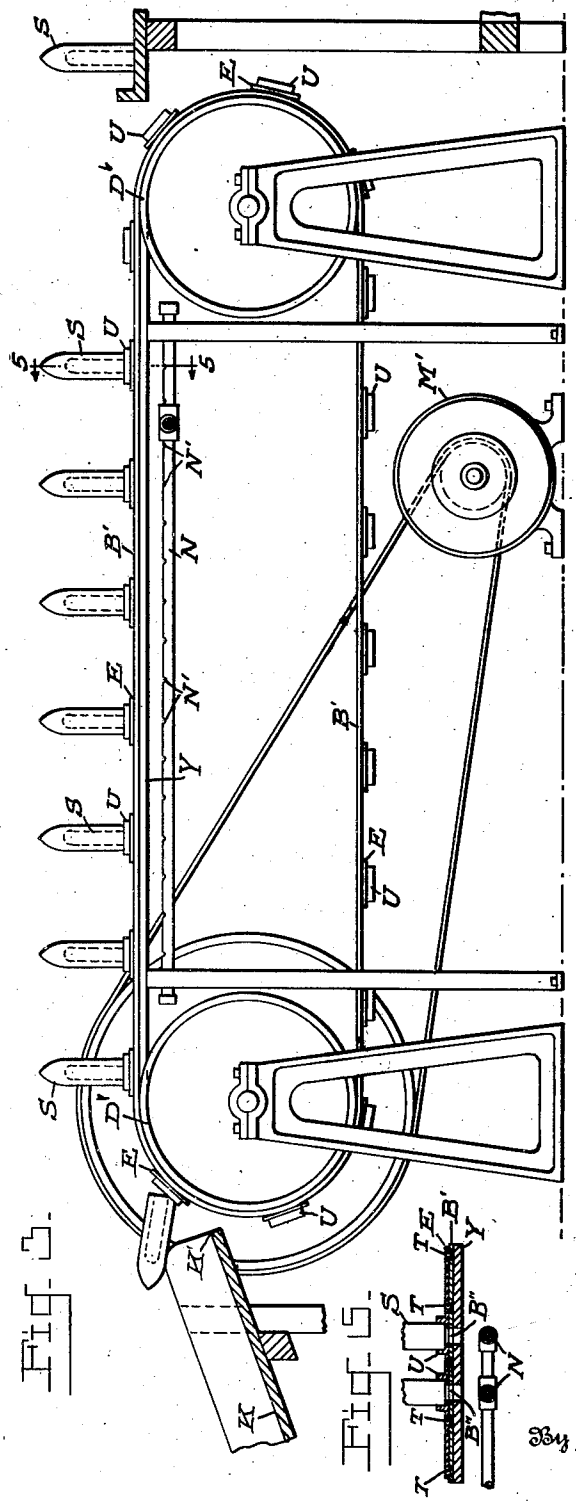


Fig. 5.

Fig. 5.

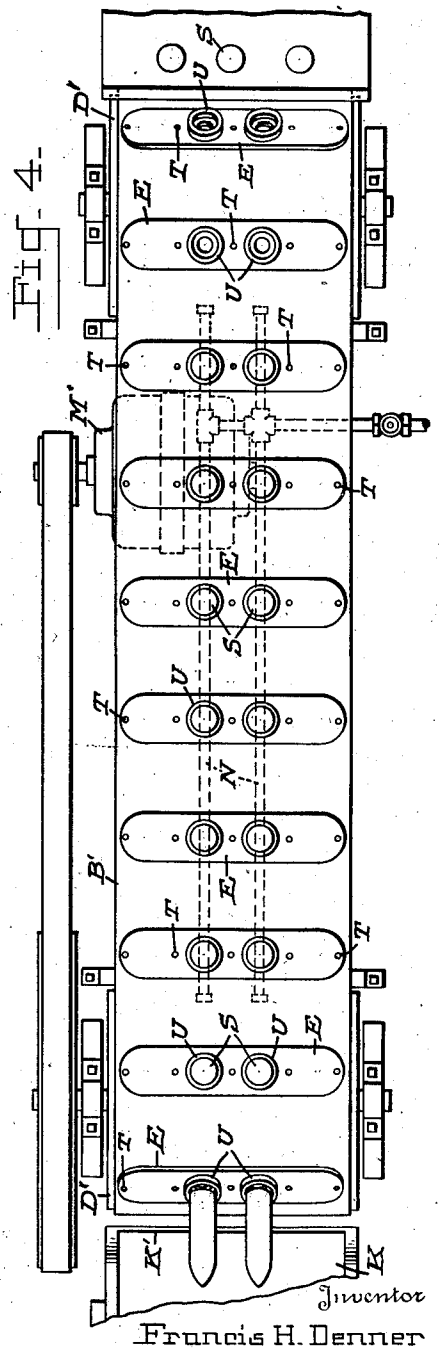


Fig. 4.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR DRYING

Francis H. Denner, Dover, N. J.

Application March 13, 1942, Serial No. 434,536

1 Claim. (Cl. 34—105)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to an apparatus for quickly and evenly drying the interior portions of bodies.

An object of this invention is to provide an apparatus for quickly and evenly drying bodies while they are being conveyed along production lines.

Another object of this invention is to provide means for producing a quickly and thoroughly dried body without the presence or formation of "puddles."

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings in which:

Figure 1 is a view in elevation of preferred apparatus which embodies one phase of my invention; and in particular this figure shows a conveyor belt adapted to simultaneously rotate and convey a shell which has been painted on the rollers R_1, R_2.

Figure 2 is a plan view of the apparatus shown in Fig. 1, and in particular shows an air duct A having outlets A' for directing compressed air into the interior portions of rotating shells S.

Figure 3 shows a modified form of my invention and in this instance the shells S are conveyed in a vertical position without rotation imparted thereto.

Figure 4 discloses a plan view of the apparatus disclosed in Figure 3.

Figure 5 discloses a section taken substantially on the line **5—5** of Figure 3.

A feature of this invention is that a cylindrical unloaded ordnance shell S is rotated about its cylindrical axis when paint is applied to the interior portions of the shell, preferably by spraying the paint, and then the ordnance shell is rotated in its transit to where the next manufacturing operation is performed as drying air is injected into the interior portions of the shell. Specific apparatus for rotating a cylindrical body on a moving belt is disclosed in the following U. S. Patents: 1,005,335, Seigle, issued Oct. 10, 1911; 1,705,084, Draper, issued March 12, 1929; and 2,219,166, Schaefer, issued Oct. 22, 1940.

Paint is sprayed into the interior portions of the shell S while it is rotating on the rotatable rollers R_1, R_2 (Fig. 1) which are driven by means of any conventional driving means such as a motor M throught belts B_1 and B_2.

After the paint spraying operation shell S is placed upon the flexible conveyor belt C having rollers R rotatably mounted thereon with ends R' adapted to be engaged by sprockets D at each end of the belt. Preferably only one of the sprockets D is connected directly to a motor M_1 which serves to propel the conveyor belt. The upper surface of fixed platform P is adapted to engage the rollers R whereby rotary movement is imparted to them thus causing the shells S to rotate in their transit from the place where the interior portions were sprayed to the place where the next manufacturing operation is performed, i. e., to the place where the outer surface of the shell is painted.

An air duct A containing warm compressed drying air and having apertures A' therein is disposed in fixed relationship to the moving and rotating shells on conveyor C whereby, in effect, the interior portions of the shells are subjected to a continuous blast of warm air as they are moved from the place where the first (painting) operation was performed to the place where the next operation (painting of the exterior portion of the shell) is to be performed.

By imparting a rotary movement to the shell when it is painted and when it is drying assures a smooth even film on the interior portions of the shell material and prevents the presence or formation of "puddles" of the paint; by providing the associated drying means assures the production of an ideally painted shell in a short time.

Shells of caliber 37 mm. to 155 mm. may be painted by the method and apparatus disclosed herein and there does not appear to be a limit on the sizes of shells which might be painted.

If desired, shells of the larger calibers may be rotated by hand in the drying operation; in that case the shells are manually rotated on a suitable flat surfaced rack and associated with an air duct similar to the air duct A shown in Figures 1 and 2.

During the drying operation, in the modification shown in Figures 3, 4, and 5 the shells S are held on a movable conveyor belt B' having open bottomed cup-shaped members U mounted thereon which are adapted to hold the shells S stationary with their axis vertical. Table Y prevents the belt B' from sagging. Air manifolds N containing warm compressed air and having apertures N' adapted to direct the compressed

air into the interior portions of the shell through aligned belt and table holes B'' (Fig. 5) are disposed stationary within the loop of conveyor belt B' whereby, in effect, the interior portions of the shells S are subjected to a continuous blast of warm air as they are moved from the place where the first (painting) operation was performed to the place where the next operation (painting of the exterior portion of the shell) is to be performed.

The cup-shaped members U are held on the belt by means of countersunk head screws T (Fig. 5) passing through the belt material and engaging threads in lateral extensions of the cup-shaped member U. Countersunk holes on the inner surface of the belt B' receive the corresponding head of screws T so that a smooth inner belt surface is preserved whereby conventional cylindrical driving drums D' may be employed to propel the belt. At least one of the drums is connected to a prime mover such as an electric motor M'. It is understood that other means may be employed for holding the members U on belt B'.

The shells S are loosely held in the cup-shaped members U so that as the corresponding belt portions pass around one of the drums D', shells S abut against the edge K' of stationary chute K whereby the shells S become disengaged from their corresponding member U and slide down the chute K into a suitable retainer (not shown).

In the arrangement shown in Figs. 3–5 the shells are not rotated as they are dried but since they are held in a true vertical position by table Y the paint on the interior will settle uniformly over the entire inner surface.

I claim:

In an apparatus for drying the inside hollow portions of bodies, an endless horizontally movable conveyor belt, a support for the belt and means for driving said belt, cup-shaped holders on the belt having openings therethrough receiving the open ends of the bodies to hold them loosely and gravitationally in vertical position whereby when the bodies reach the end of their horizontal travel they will fall by gravity from the holders, a pipe extending parallel to the path of the conveyor belt and having upwardy directed spaced apertures therein, said conveyor belt having aligned holes in registry with the openings in the cup-shaped holders so that each aperture will project a jet of air directly into the open end of each body through the opening in said conveyor and holders, as the bodies successively pass the apertures.

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