Oct. 8, 1935. J. P. SMITH 2,016,841

APPARATUS AND METHOD FOR PREPARING SAUSAGE CASINGS, ETC

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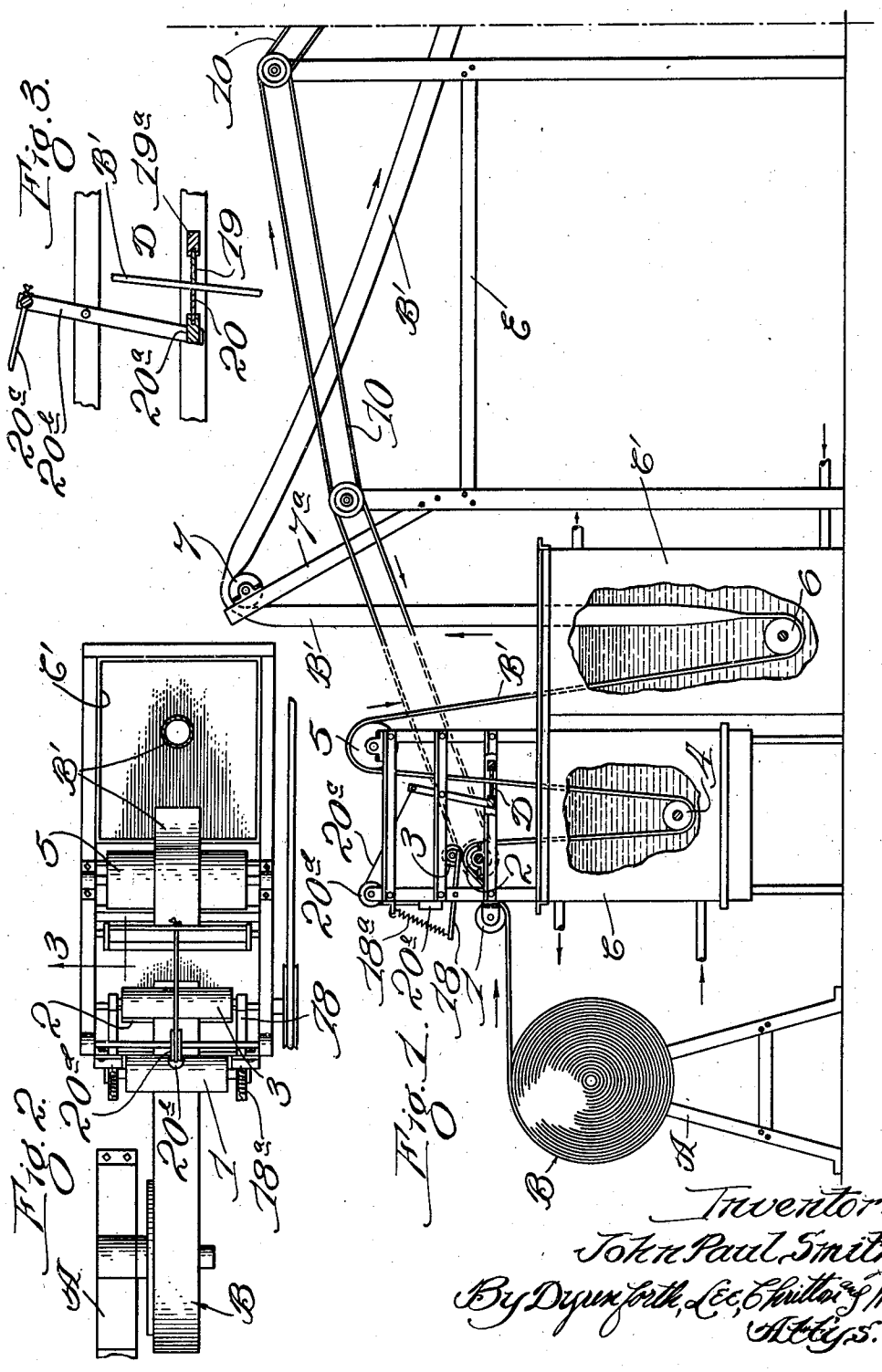

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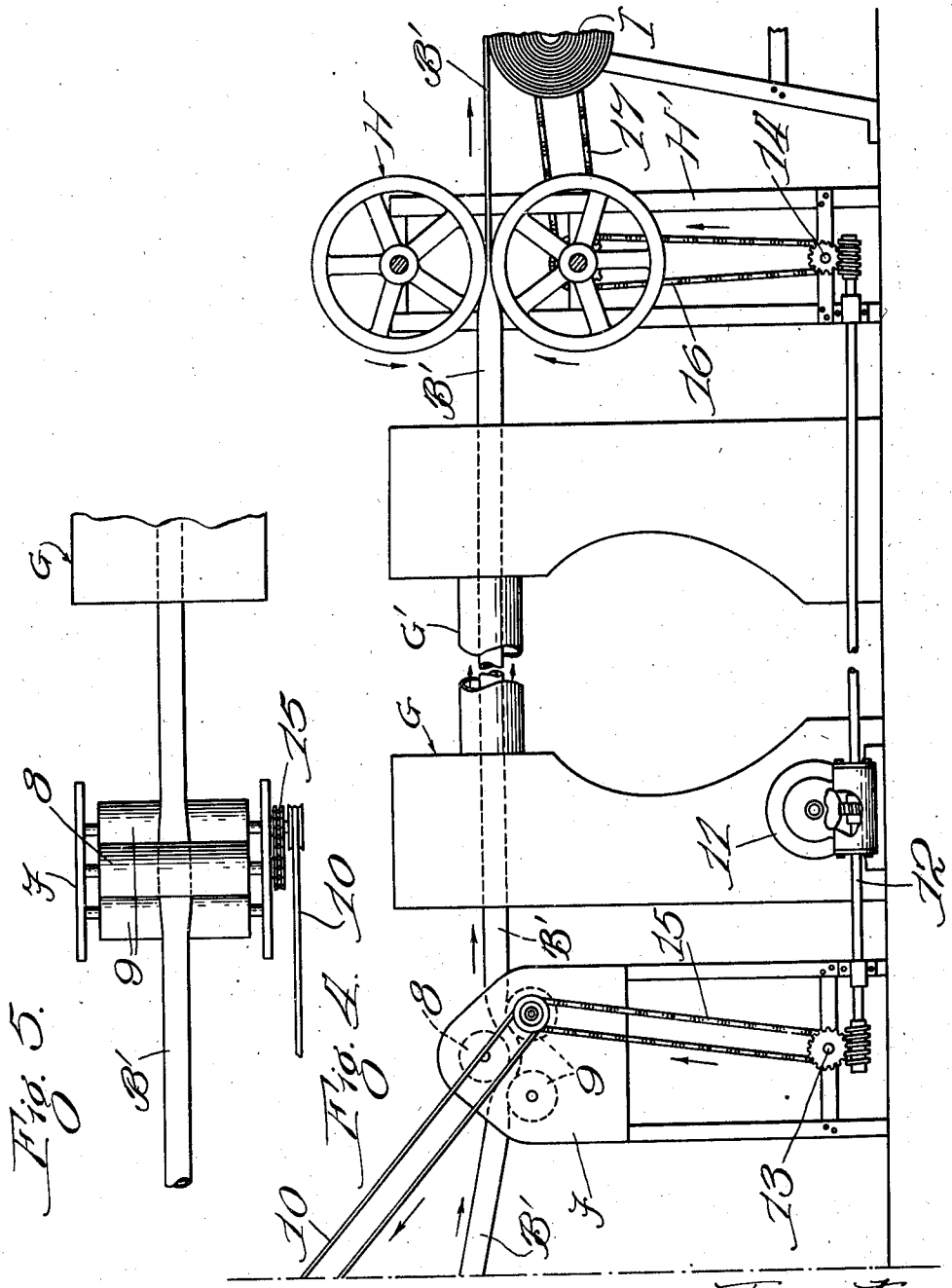

Fig. 4.

Fig. 5.

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APPARATUS AND METHOD FOR PREPARING SAUSAGE CASINGS, ETC.

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7 Claims. (Cl. 34—24)

This invention relates particularly to a method and apparatus which may be usefully employed, especially in the manufacture of cellulose tubes, such as artificial sausage casings. Such tubes are extruded in seamless form and in different sizes by methods known in the art. In the manufacture, viscose is extruded in seamless, tubular form into a coagulating and regenerating bath. The tubing may be passed through a succession of baths for completing the regeneration (conversion to cellulose), then through cleansing baths, and finally through a bath containing a small percentage of glycerine, which acts as a softening agent.

The present invention deals with a cellulose tubing which has been produced in some such manner as has been described and pertains to the drying of the cellulose tubing. If desired, a solution of gelatin may be introduced into the tubing for the purpose of providing an interior coating which is capable of swelling when it receives moisture, such coating adhering to the meat as well as to the tubular body whose interior surface it coats. Where this expedient is employed, a 20% water solution of gelatin would serve the purpose. If desired, a small percentage of glycerine may be incorporated in the solution, also.

In accordance with the present invention, cellulose tubing produced in any desired manner is fed through a bath which preferably contains heated water, say of about 50° C., and thence through a drying apparatus. In this operation, a body of gaseous fluid, preferably air, is introduced into a length of the tubing, and is maintained within that portion of the tubing which extends through the heater and into the bath mentioned above, which precedes the heater.

The tubing, as it is drawn through the apparatus, is subjected to a flattening operation, so that the body of air in the tubing is maintained in substantially the same zone during the progress of the drying operation. The bath through which the tubing passes, by reason of the water pressure which it exerts upon the tubing, forms a seal for the trapped air at the rear end of the body of air. The arrangement is such that the length of the body of air trapped in the tubing may vary somewhat, and thus the present invention provides for a certain flexibility in operation not heretofore obtained by known processes.

The invention is illustrated in a preferred embodiment in the accompanying drawings, in which—

Fig. 1 is a broken side elevational view of apparatus adapted to the practice of the process, showing that portion of the apparatus which is in the rear of the heater; Fig. 2, a plan view of the tanks and attendant parts shown in Fig. 1; Fig. 3, a broken detailed view, partly in section, illustrating a squeezer which is shown on a smaller scale in Fig. 1; Fig. 4, a broken side elevational view of the portion of the apparatus which is complemental to that shown in Fig. 1, this portion of the apparatus comprising the heater, the flattening rolls in front of the heater, and the take-up roll; and Fig. 5, a broken plan view of the left-hand portion of the apparatus shown in Fig. 4.

In the apparatus as illustrated, A designates a stand, or support, upon which is mounted a roll B of the tubing which is to be dried, the tubing as drawn from the roll B being designated B'; C and C', tanks, or vats, which contain baths which are preferably of water; D, a squeezer surmounting the tank C, this device being particularly desirable where a solution of gelatin, for example, has been introduced into the casing before threading the casing into the apparatus; E, a scaffold-structure; F, a stand, or pedestal, which supports certain operative parts; G, a heater having a relatively large tube, or conduit, G' through which heated air, for example, may pass for the purpose of drying the tubing B'; H, tube-flattening rolls mounted on a stand H' in advance of the heater; and I, a take-up roll upon which the tubing, after flattening, is wound.

In the example given, the tubing passes from the roll B under a roller 1; thence between a roller 2 and a pressure-roll 3; thence into the bath in the tank C and about a roller 4 in the lower portion thereof; thence upwardly and about a roller 5; thence downwardly into the bath in the tank C' and about a roller 6 in the lower portion thereof; thence upwardly and about a roller 7 carried by an arm 7a forming a part of the structure E; thence between a roller 8 and a coacting pair of spaced rollers 9 mounted on the stand F; thence through the tube G' of the heater; thence between the flattening rolls H; and, finally, under the take-up roll I. Those rollers which serve as feed-rollers are geared together (excepting the flattening rolls H) by suitable belting 10.

The driven parts are actuated, in the illustration given, by an electric motor 11 geared to a longitudinal shaft 12 which serves to actuate shafts 13 and 14 mounted in the lower portions of the stands F and H'. The shaft 13 is geared to the roller 9, as by a chain 15. The shaft 14 is connected by a chain 16 to the lower member of the flattening rolls H. The shaft of said lower roll drives a chain 17 which, in turn, drives the take-up roller I through the medium of a suitable clutch-device (not shown).

The driven parts are geared together in proper relation to draw the cellulose tube through the apparatus without injury to the tubing.

The roller 3 is shown (Fig. 1) mounted on a

lever 18 which is yieldingly held by a spring 18a.

The squeezer D is shown as comprising a pair of resilient scrapers 19 and 20, preferably of rubber, the former being carried by a fixed member 19a and the latter by a movable member 20a mounted on a lever 20b whose free end is connected with a flexible member 20c which passes over a sheave 20d and is attached to a weight 20e. The arrangement is such that the members 19 and 20 act like a squeegee, so that if gelatin solution is contained in the tubing it will be squeezed back into that portion of the tubing which is in the bath contained in the tank C, and such portion of the gelatin solution as passes the squeegee is evenly distributed upon the inner wall of the cellulose casing.

The heated water in the tank C' serves to keep the gelatin coating sufficiently soft or fluid to allow the tubing to open up properly under the influence of the elongated air bubble which extends back into the bath in the tank C'. The tanks C and C' may be heated in any suitable manner. In the illustration, suitable circulating pipes are shown attached to the tanks, to enable heated water to be circulated. If desired, heating coils may be introduced into the tanks, and the circulating pipes may be omitted.

Referring to Fig. 4, the roller 8 serves as a pressure roller which exerts only moderate pressure upon the tubing B', such moderate pressure being insufficient to flatten the tubing. This permits the elongated body of air to extend rearwardly into the bath in the tank C'. The pressure of the water in the tank C' tends to flatten the tubing for some distance above the roller 6. However, undue extension of the air-body, such as might come from variation in the heating of the tubing, for example, tends to lower the point of sealing. On the other hand, if the length of the confined body of air becomes shortened, the point of sealing in the tank C' rises. Thus, the improved process provides for a flexibility in operation which has not been attained hitherto in drying processes of this general character.

The construction and operation of heaters are known; hence, no detailed explanation is necessary. Suffice it to say that heated air passes through the tubing G' and thus serves to dry the cellulose tubing as it passes through the heating apparatus.

In introducing air into the tubing B', it will be understood that this may be accomplished by any suitable means for forcing air under light pressure into the advance end of the tubing, before the leading end of the tubing is subjected to pressure between the flattening rolls H. Any suitable tube-flattening means may be substituted for the flattening rolls H; and any variable-action pressure means may be employed (either in the rear of or in front of the drier) in lieu of the bath in the tank C' for permitting variation in the length of the air-body contained in the tubing. Ordinarily, in dealing with rather heavy-walled cellulose tubing of large diameter, say up to 4½" in diameter, one employs an internal gaseous pressure of about ½ lb. to 1 lb. per square inch.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

What I claim as new and desire to secure by Letters Patent is:

1. A process comprising: passing cellulose tubing into a body of liquid constituting a bath and, in flattened condition, about a roller disposed a substantial distance below the surface of the liquid; thence passing the tubing through a heater; thence passing the tubing through tube-flattening means; and maintaining a gaseous inflating body in the tubing between said tube-flattening means and the roller contained in said bath, whereby variation in the length of the gaseous body is permitted by said bath.

2. Apparatus for the purpose set forth, comprising a tank adapted to contain a heated bath; a squeezer through which tubing may pass from said bath; a second bath equipped with a flattening roller located a substantial distance below the top of the bath; a heater through which the tubing will pass after leaving the second-mentioned bath; and tube-flattening means in advance of said heater, whereby an inflating gaseous body may be maintained in said tubing, the gaseous body extending into a portion of the tubing within the second-mentioned bath, thus permitting variation in the length of the gaseous inflating body.

3. In a process of drying tubing by passing it through drying apparatus while maintaining an isolated gaseous inflating body in the portion of the tubing passing through said apparatus, the step which comprises maintaining a variable seal under pressure graduated longitudinally of the tube at an end portion of the inflated section which permits automatic lengthening and shortening of the inflated section in accordance with change in pressure therein.

4. The process as set forth in claim 3, as practiced by maintaining said variable seal at a zone which precedes the drying apparatus.

5. In a continuous tube-drying process, the method of maintaining an isolated gaseous body in a section of the tube undergoing drying which comprises: maintaining the tube in flattened sealed condition at points preceding and succeeding the inflated section and maintaining a graduated head of yielding pressure on the tube adjacent one of the flattened points, the pressure of said head decreasing in the direction of the main portion of the isolated body.

6. Apparatus for the purpose set forth comprising drying apparatus through which tubing may be passed continuously; means for effecting flattened sealing of the tubing as it emerges from the drying apparatus; and means for effecting variable sealing of the tubing before it enters the drying apparatus and thus confining a gaseous inflating body in the tubing, said last-mentioned means including a varying-head pressure device for exerting a graduated pressure longitudinally of the tubing which permits the length of the gaseous body to vary automatically in accordance with the internal pressure.

7. Apparatus as specified in claim 6, in which said last-mentioned means comprises a bath equipped with a flattening guide about which the tubing passes and which is located a substantial distance below the top of the bath.

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