

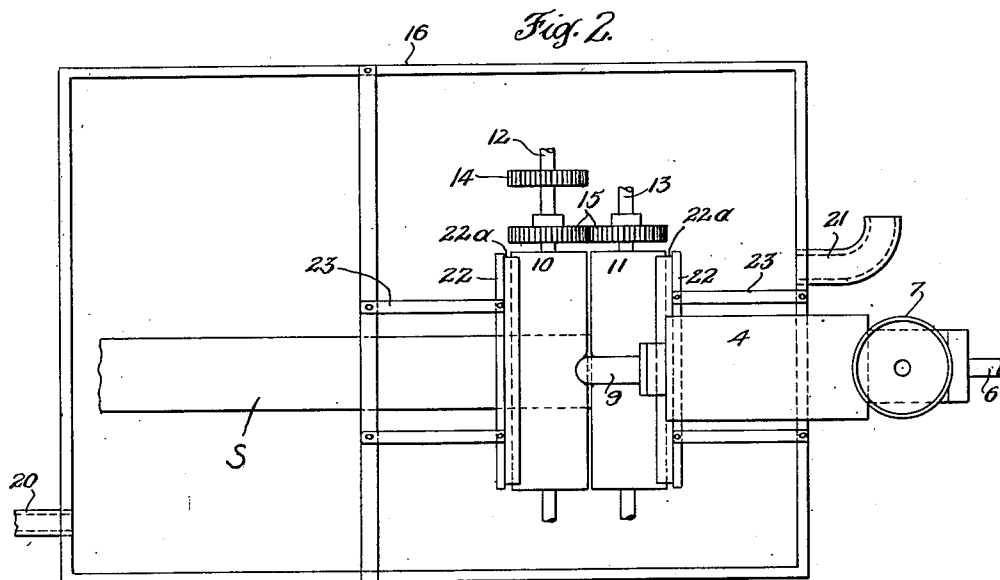
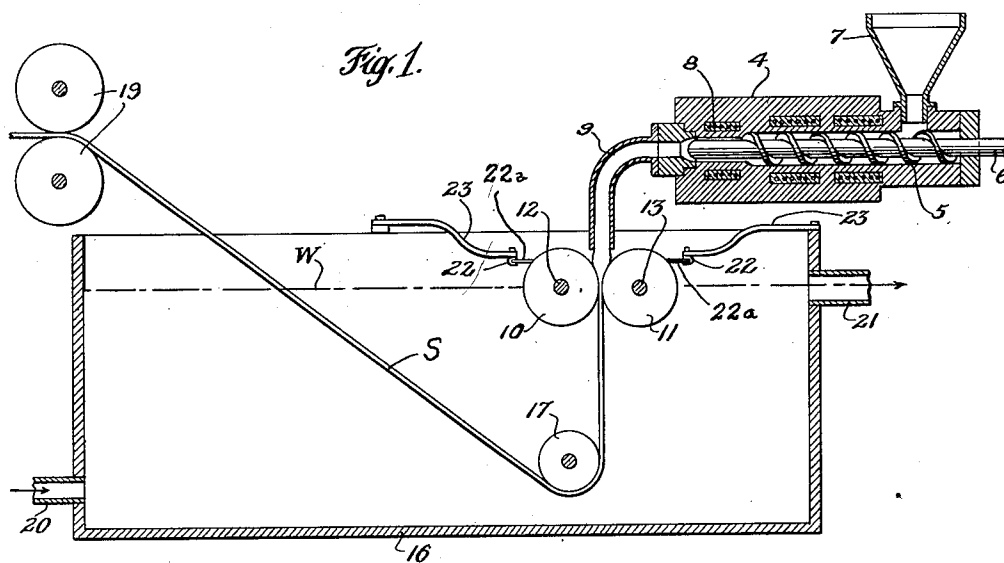
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MECHANISM FOR FORMING STRIP STOCK FROM POLYAMIDES

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MECHANISM FOR FORMING STRIP STOCK
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3 Claims. (Cl. 18-9)

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This invention relates to a method and equipment for use in forming strip stock from high molecular weight synthetic linear polyamides known to the trade as nylon, for instance polyhexamethylene adipamide and polyhexamethylene sebacamide.

The principal object of the invention is to improve the quality, uniformity and appearance of the finished product, particularly when made in accordance with the method and by use of the equipment disclosed in copending application Ser. No. 767,282, filed on August 7, 1947, issued as Patent No. 2,585,156, on February 12, 1952. In the application referred to the nylon material is heated above its melting point and while in its molten condition is continuously fed to the entrance nip of a pair of forming or working rolls which are maintained at a temperature below the solidification point of the nylon by means of a liquid bath, preferably a water bath, in which the rolls are partially submerged. The nylon is chilled and solidified as it passes through the cooled rolls.

We have found that in producing strip stock according to said prior application, there is a tendency toward development of pits or bubbles in the formed strip. This seems to result from the carrying of water by the forming rolls from the cooling bath into the molten nylon being fed to the rolls. Since the molten nylon is well above the boiling point of water, any droplets of water which are carried into the molten nylon volatilize and thereby form imperfections, especially surface imperfections, which are retained in the material of the strip as it is solidified between the rolls. We have further found that the carrying of water by the forming rolls results in a pronounced "plotchy" or water-marked effect on the surfaces of the strip stock.

With the foregoing in mind the object of this invention may be said to involve the provision of equipment which overcomes the foregoing and other objections, and results in the production of an improved product.

How the foregoing objects and advantages are obtained will appear more clearly from the following description which refers to the accompanying drawings wherein:

Figure 1 is a somewhat diagrammatical, vertical, sectional view through equipment embodying the present invention; and

Figure 2 is a top plan view of the equipment shown in Figure 1.

Much of the equipment illustrated is identical with that shown in the prior application above

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referred to, but for the sake of completeness of the present disclosure, such portions will be here described. A screw feeder is employed which comprises a casing 4 having a screw shaft 5 with one end 6 projecting from the casing for association with a suitable drive mechanism, not shown. The nylon material, in flake or granular form, is introduced into the feeder through a funnel 7, and as the material is advanced by the screw 5 toward the discharge nozzle 9, it is heated to a temperature above its melting point by any appropriate source of heat such as the inset electrical heating coils 8.

The molten nylon is discharged from the nozzle at a point which is located in close proximity to the entrance nip of a pair of rolls 10-11 which are adapted to be mounted and supported on the actuating shafts 12-13. Shaft 12 is adapted to be driven by a gear 14 associated with any suitable power source and the two shafts are geared to rotate together in a direction toward each other as viewed from above by means of the gearing 15.

The rolls are mounted within a tank 16 which contains a cooling liquid such as water, preferably to a level W, which is maintained at or close to the plane of the axes of rotation of the rolls 10-11.

The nylon leaves the nozzle 9 in the form of a molten stream which is rapidly chilled and is shaped and solidified as it passes through the rolls 10-11. As the solidified nylon strip, indicated by the letter S, leaves the rolls 10-11 it passes downwardly into the tank 16 and under the guide roll 17 and from there out of the tank to a pair of rolls 19 which latter are constructed and arranged so as to maintain some slight tension on the strip S while at the same time permitting slippage when required to avoid impairment or breakage of the strip.

The tank 16 is adapted to be supplied with water or other cooling liquid through a supply connection 20, and overflow is provided by a pipe 21 which latter may include an elbow of fairly large diameter as shown and which may be turned to raise or lower the discharge end thereof, thereby making possible some variation in the level of the water in the tank.

In order to remove the film of cooling water which normally adheres to the rolls 10-11 at the point where the surface of the rolls emerges from the water, we provide scraping means in the form of channel strips 22, having flexible wiper blades 22a. The members 22 are adapted to be mounted by means of supporting straps 23 which may

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have some resilience or spring action so as to keep the wiper blades in contact with the rolls. The wiper blades themselves are desirably made of a somewhat flexible material which is resistant to elevated temperatures, such as the temperatures at which the rolls operate. One highly effective form of wiper is to employ a plurality of very thin strips of a synthetic linear polyamide, for instance polyhexamethylene adipamide. Such strips may readily be clamped within a member 22 of channel form, as is shown. The wiper blades may be made of certain other materials, for example polytetrafluoroethylene. Other scraping, wiping or drying means, of course, could be employed but I have found that the simple equipment which I have illustrated and described is very effective for the purpose.

The scrapers 22 remove water before it is carried over to the point where the stream of molten nylon is delivered. As a result the strip stock produced is free of defects or bubbles within the material, and the surfaces of the strip are of uniform appearance, being free of splotchy or water-marked effects.

We claim:

1. Equipment for fabricating strip stock from synthetic linear polyamides comprising a liquid cooling bath, a pair of forming rolls mounted with a portion only of the circumference of each submerged in the liquid and arranged to rotate toward each other as viewed from above, means for feeding a stream of molten polyamide to the rolls at a point above the level of the liquid,

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means for drawing the formed strip away from the rolls below the surface of the cooling bath, in which construction the strip forming surfaces of the rolls are exposed to the liquid of the cooling bath throughout a portion of the roll circumference and thereby entrain liquid of the cooling bath, and wiper mechanism for removing such entrained liquid from the rolls and associated therewith at a point above the level of the liquid and in advance of the point where the stream of molten polyamide is delivered.

2. Equipment according to claim 1 in which the wiper mechanism comprises scraper blades engaging the surface of the rolls.

3. Equipment according to claim 2 in which the scraper blades are yieldingly urged against the rolls.

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