

March 5, 1935.

F. A. PARKHURST

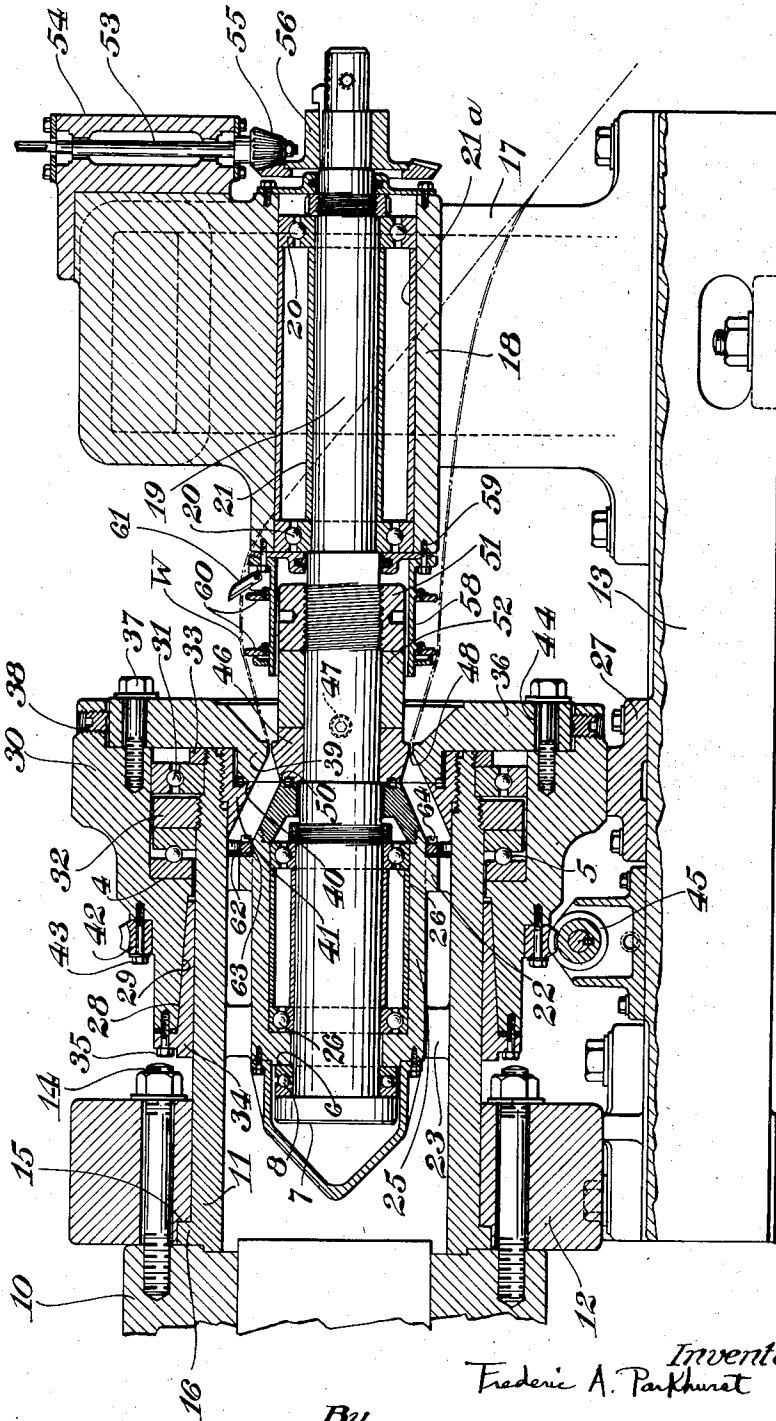
1,993,349

APPARATUS FOR FORMING SHEET MATERIAL

Filed April 14, 1931

3 Sheets-Sheet 1

Fig. 1



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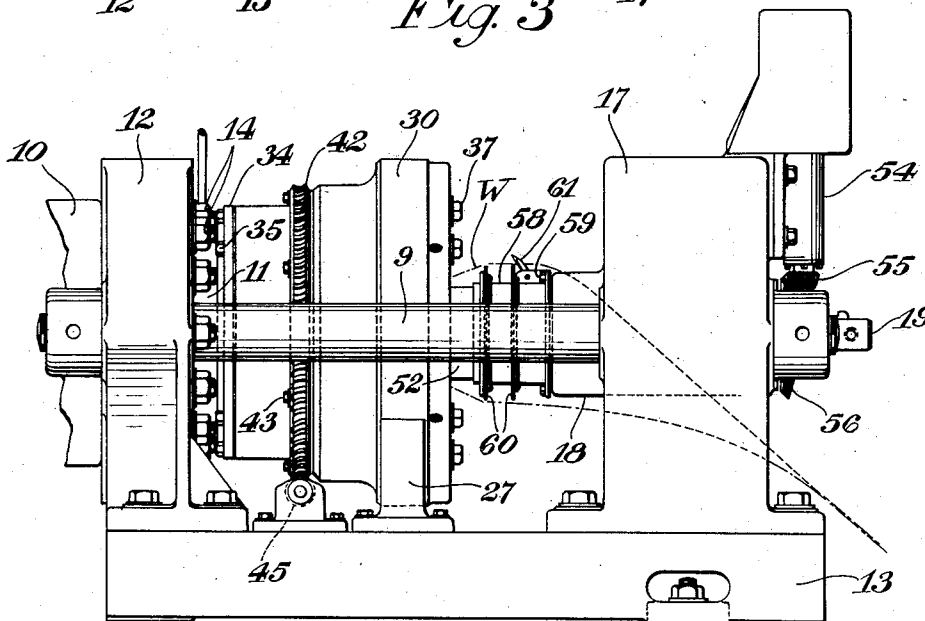
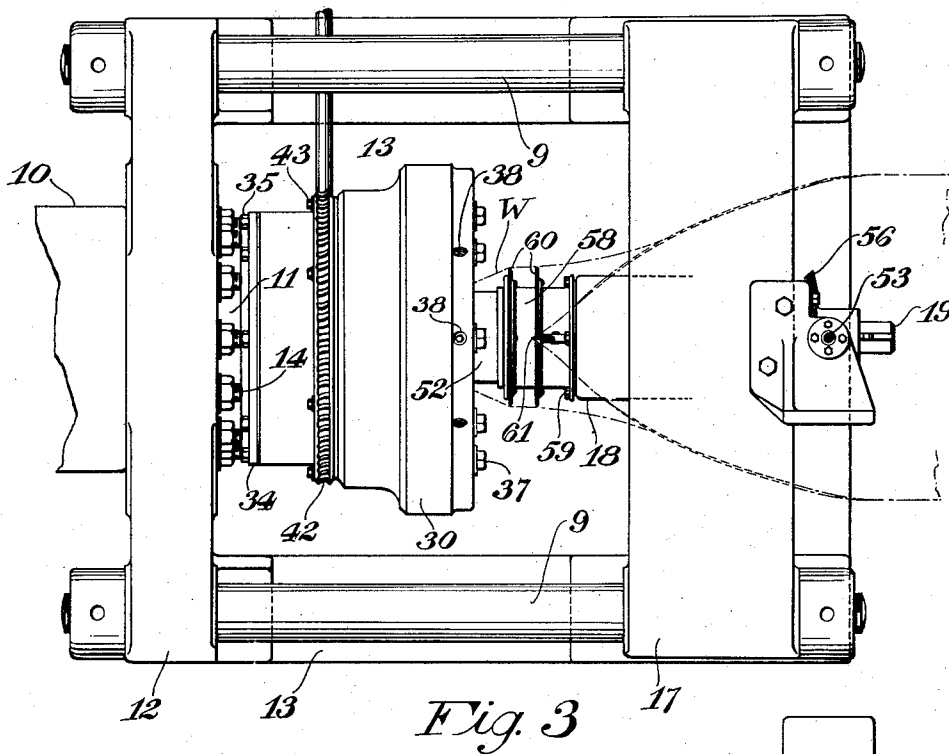


Fig. 2

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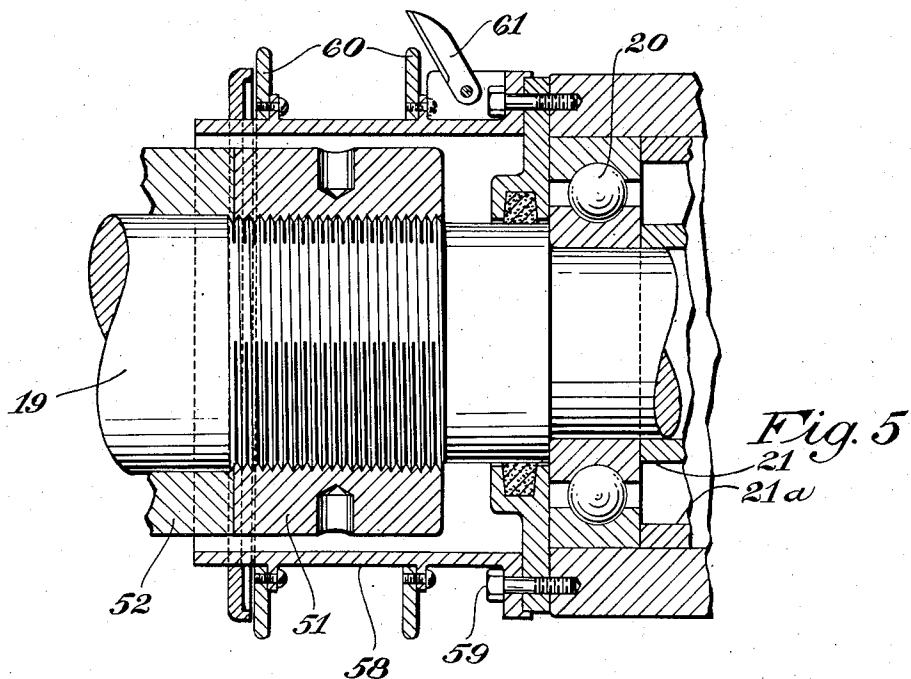
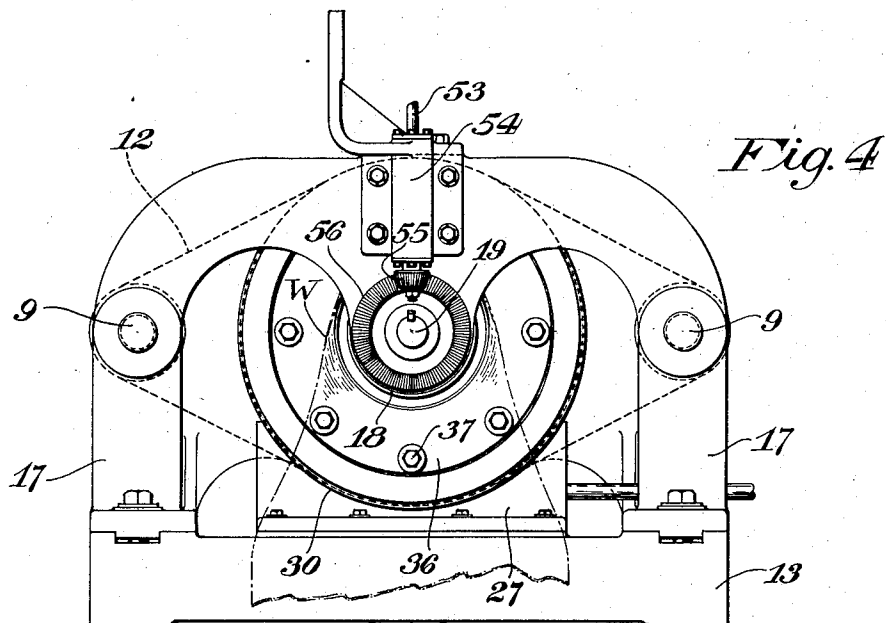
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APPARATUS FOR FORMING SHEET MATERIAL

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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APPARATUS FOR FORMING SHEET MATERIAL

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Application April 14, 1931, Serial No. 529,996

2 Claims. (Cl. 18—14)

This invention relates to apparatus for forming a web or sheet from plastic material. The apparatus of the invention is particularly adapted for forming a thin web of pyroxylin by extruding a mass of pyroxylin in plastic condition under heavy pressure through a narrow annular orifice to form a tube which is slit subsequently and opened in the form of a flat sheet. It has been found by practical experience with apparatus for this purpose that the sheet produced is subject to variations in thickness and frequently contains minute waves which may not be apparent to the eye and do not affect the value of the material for certain uses but which render it unfit for purposes where a sheet of perfect uniformity is required.

It is the object of the present invention to provide an apparatus of this type adapted to minimize the difficulties experienced with former apparatus and to produce a web or sheet of greater uniformity.

Before explaining in detail the present invention, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention beyond the terms of the several claims hereto appended as considered in view of the prior art and the requirements thereof.

The invention will be more clearly understood from the following description in conjunction with the accompanying drawings: in which,

Fig. 1 is a sectional elevational view of an apparatus embodying the invention;

Fig. 2 is an elevational view of the same;

Fig. 3 is a plan view of the same;

Fig. 4 is an end elevational view of the same; and

Fig. 5 is a detail, sectional view of a portion of the apparatus.

An apparatus embodying the invention is illustrated in the accompanying drawings and comprises an extrusion press 10 having a discharge nozzle 11. The discharge nozzle 11 is carried by a support 12 extending upwardly from a platform 13 and is provided with a flange 16 engaging a shoulder 15 on the support. Bolts 14 passing through the support 12 and engaging the press 10 hold the nozzle 11 upon the press 10. A support 17 of inverted U-shape is carried upon the plat-

form 13 and is provided with a hollow depending portion 18 within which one end of a mandrel 19 is rotatably supported upon ball bearings 20 separated by spacers 21 and 21a. A hollow casing 25 is centrally positioned within the nozzle 11 and is carried by supports 22 and 23 which may be formed as an integral part of the casing. The other end of the mandrel 19 is rotatably carried by ball bearings 26 within the casing 25. A strainer screen 62 is positioned between the casing 25 and the inner surface of the nozzle 11 and is held in position by a perforate clamping ring 63 secured to the casing 25 as by bolts 64. Axial thrust of the mandrel is taken by ball bearings 8 interposed between a collar 7 on the mandrel and a shoulder 6 on the casing 25. A shaft 53 is rotatably mounted in bearings formed in a bracket 54 carried by the support 17 and carries a pinion 55 adapted to mesh with a bevel gear 56 keyed upon the mandrel 19. The supports 12 and 17 are connected by tie rods 9.

A head 30 is rotatably supported near one end upon ball bearings 31 positioned between rings 32 and 33 threaded on the nozzle. A sleeve 34 rotatably mounted on the nozzle is secured to the other end of the head 30 by bolts 35 and is provided with a tapered surface 28 adapted to engage a tapered bore 29 in the head. Outward axial thrust of the head is taken by ball bearings 5 interposed between the ring 32 and a shoulder 4 on the head. A ring gear 42 is secured upon the head 30 by bolts 43 and is engaged by a worm 45 driven from any suitable source of power. The head 30 rotatably engages a bearing 27 secured upon the platform 13 between the supports 12 and 17.

A disk 36 surrounds the mandrel 19 and is adjustably mounted upon the head 30 by bolts 37 passing through slots 44 in the disk and engaging the head. The disk is adjustably positioned by screws 38 carried by the head and engaging the periphery of the disk. The inner end of the disk is provided with a portion 39 which extends inwardly into the nozzle 11 and abuts a shoulder 40 upon a ring 41 threaded in the interior surface of the nozzle. A disk 46 is mounted upon the mandrel 19 as by set screws 47 and extends adjacent the inner edge of the disk 36 to provide an orifice 48 therebetween. One face of the disk 46 is held against the end 50 of the casing 25 by a nut 51 and spacer ring 52.

A sleeve 58 surrounds the mandrel 19 and is secured to the support 17 as by bolts 59. Spaced guides 60 are suitably secured upon the sleeve 58.

A knife 61 is secured upon the sleeve 58 between the support 17 and the guides 60.

In operation the worm 45 and the shaft 53 are rotated to rotate the head 30 and mandrel 19 respectively. The extrusion press 10 is then operated to force pyroxylin in plastic condition under heavy pressure through the orifice 48 to produce a tubular plastic sheet which travels over the guides 60 and is slit by the knife 61 to produce a sheet or web W of pyroxylin which is conveyed to other apparatus for drying. The supports 12 and 17, the rods 9 and platform 13, preferably, are constructed as a single unit of sufficient weight to prevent relative lateral movement between mandrel and nozzle and to prevent any lateral movement of the nozzle that might be induced by the action of the extrusion press. Relative displacement of the mandrel and nozzle due to axial thrust of the mandrel caused by the enormous pressure of the plastic has been extremely difficult to overcome and must be overcome to produce a satisfactory product. This displacement is minimized by the construction of the invention.

What I claim is:

1. In combination, spaced supports, a nozzle, one of said supports serving to support said nozzle, a mandrel carried at one end by the other support and projecting into said nozzle, spaced means within said nozzle for supporting the other end of the mandrel, a head rotatably mounted on said nozzle between said supports, an annular disc mounted on said head and surrounding said mandrel to provide an orifice therebetween, said disc having a portion extending axially into said nozzle and away from said orifice, and auxiliary supporting means adjacent said disc for supporting said head.

2. In combination, spaced supports, a nozzle, one of said supports serving to support said nozzle, a mandrel carried at one end by the other support and projecting into said nozzle, spaced means within said nozzle for supporting the other end of the mandrel, and a head rotatably mounted on said nozzle.

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