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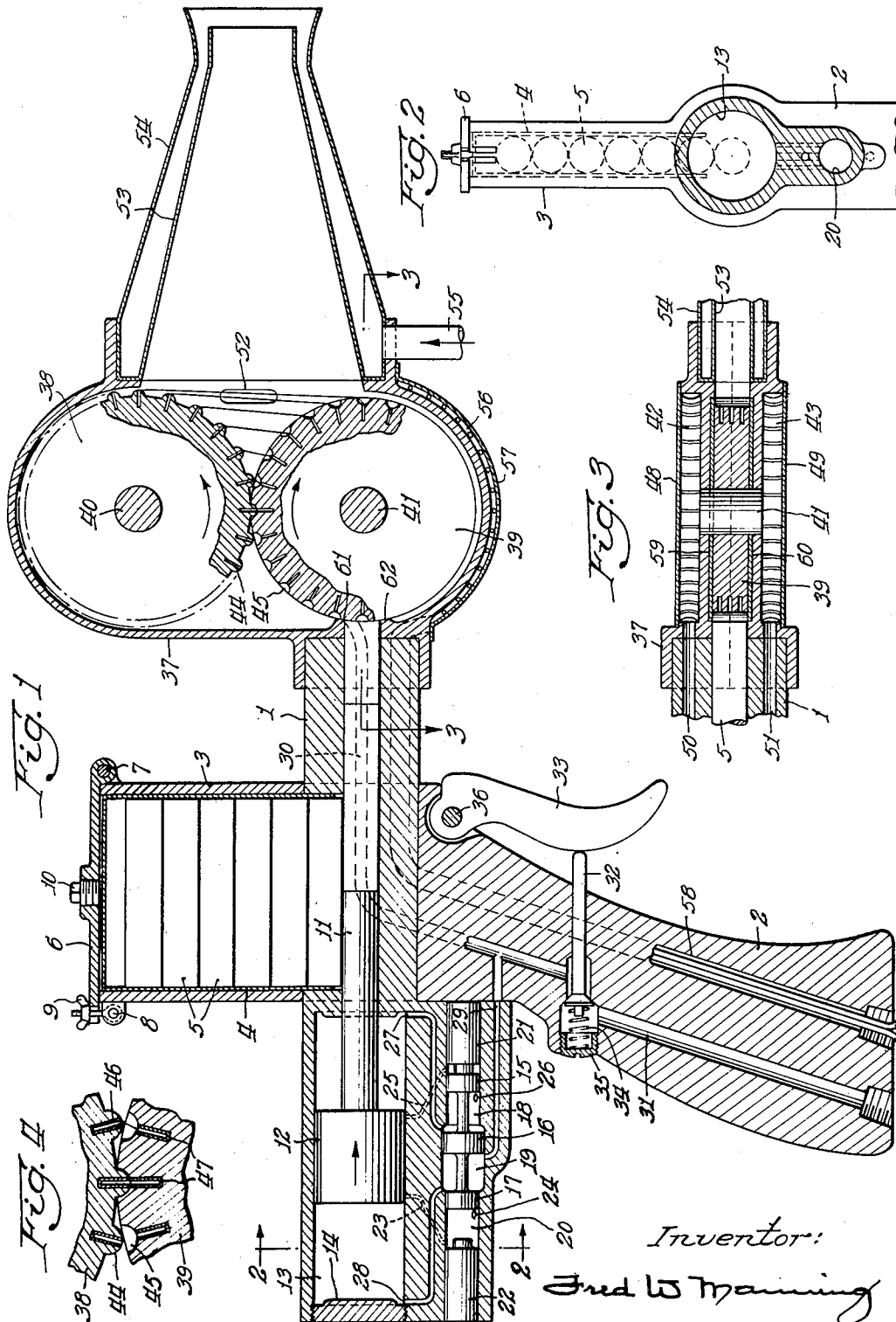
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SPINNING GUN FOR THE PRODUCTION OF FILAMENTS

Filed April 19, 1946

2 Sheets-Sheet 1



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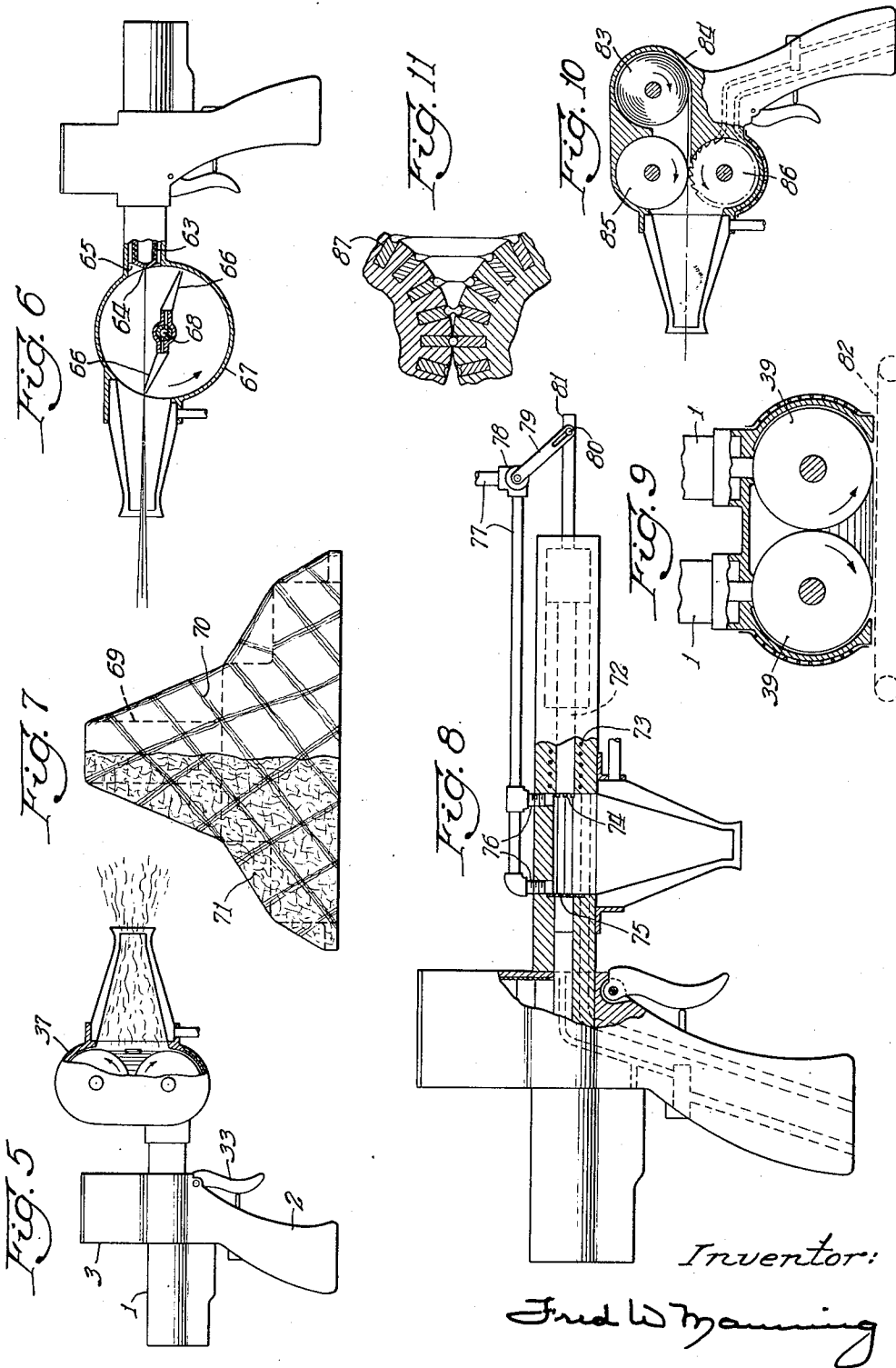
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UNITED STATES PATENT OFFICE

2,522,526

SPINNING GUN FOR THE PRODUCTION
OF FILAMENTS

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Application April 19, 1946, Serial No. 663,302

20 Claims. (Cl. 18—8)

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My invention relates to devices for the production of filaments, and particularly to magazine guns for producing and spraying filaments. This application is a continuation-in-part of my co-pending application: "Magazine Spinning Gun for the Production of Filaments," Serial No. 554,711, filed September 18, 1944, subsequently issued as Patent No. 2,437,264.

The general operations of spinning a spider's web are well known: The "Miranda" spider chooses a suitable point to extrude the first filament or dragline from its spinneret, and the extrusion is continued until a breeze anchors the free end, which may be at a comparatively great distance or even across a stream from the point at which the spider is stationed. The spider then hauls in the slack, anchors the filament at the initial spinning point, and upon the dragline lays foundation lines in triangular or trapezoidal pattern to support the web to be spun therein. A focal point for the web is chosen within the triangle or trapezoid, and radial lines are run therefrom and held in position by a spiral that extends almost to the foundation lines. The spiral lines are then coated with a viscous fluid, and if the victim thereafter enmeshed within the web is particularly active or large the spider may envelop him with a sheet of silk, which upon microscopical examination will be found to consist of a large number of contacting parallel filaments that have been extruded from a corresponding number of spinning tubes.

It should be noted that: the size and shape of the filament is first regulated by the size and shape of the orifice of the spider's spinning tube; the molecular structure of the filament is oriented by the method in which the spider uses his feet to stretch the filament while manipulating it out of his spinning tube; the filament is then conveyed by an air current and anchored in its stretched condition, and the slack taken up until it forms a substantially straight line between the anchored points. Similarly, the foundation and other lines are made up of filaments that have been stretched to, or beyond, the point at which they form substantially straight lines between the intersections. In other words, all lines are stretch-oriented, and are anchored and set under tension. The elastic limit is never reached, however, and the web is left elastomeric; and when necessary the spider will completely envelop his victim in a filamentous structure made impervious by an adhesive fluid. The wall of a cocoon of a silkworm indicates just how tough and strong a combination of a plurality of stretch-oriented, in-

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tersecting filaments bonded by a suitable adhesive can be made.

Prior practice has been to regulate the molecular size and viscosity of a plastic solution, which was usually mostly solvent, so that air pressure from a spray gun could be applied directly to the solution to blast it into filaments. Forming a web in this way results in a very weak structure of un-oriented filaments, which must rely for strength on an excessive amount of impregnant. This sometimes amounts to as much as forty gallons of solution to completely enclose a small gun of a submarine in a water-proof covering, but as indicated above, the greatest loss is in solvent which must evaporate before the covering becomes indurated. A spider could never contain a sufficient amount of solution to build a structure of enough strength to support himself, if he had to construct the web by man's present (1946) methods for spinning gun enclosures.

It is a primary object of my invention to follow more closely the habits of the spider, rather than the prior practice of man, by spinning filaments and making fabrics of substantial strength at the time and place they are required. Another object is to incorporate supply pockets or reservoirs in holding and pulling members for the usual spinneret openings, and to constantly recharge the reservoirs with fresh plastic material as the supply of each reservoir, or pair of reservoirs, is drawn into a stretch-oriented filament and thereby removed from the reservoir. A further object is to supply a method and apparatus for enclosing objects in fabrics of such great strength that no impregnant is required to give the fabrics strength, and little impregnant is required to coat the filaments and close the interstices formed by the intersections of the filaments. Other objects will become apparent from the accompanying description and illustrations.

It will therefore be understood throughout the specification and the appended claims: "positive propulsion," when applied to spinning material, means to move forward a predetermined amount of the material by relative movement of a holding means and a pulling means, or two pulling means, attached to opposite ends of the material; and "stretch-oriented filaments" is one whose strength has been substantially increased by stretching between a holding means and a pulling means, or two pulling means, to, or beyond, the point at which it forms a substantially straight line without the aid of support between the two said means.

In accordance with one aspect of my invention,

a rod of thermoplastic spinning material, such as nylon, vinylidene chloride, cellulosic derivative, glass, etc., is moved through a gun barrel into contact with a primary rotor sufficiently heated, or the pressure and relative movement between the rod and rotor may develop sufficient frictional heat, to melt a surface portion of the rod and cause it to adhere in a film coating to the rotor, or to fill supply reservoirs upon or within the rotor. These reservoirs may be circumferential grooves on the primary rotor, and the molten plastic which has been disrupted into circumferential ribbons or filaments to fill the grooves may be again disrupted into smaller filaments by adherent teeth in an opposing rotor; or both rotors may be equipped with juxtaposed spinning tubes or reservoirs in their peripheries, or in the outer end of juxtaposed radial teeth positioned in their peripheries, the reservoirs of the primary rotor being filled from the molten surface of the plastic rod, and the reservoirs of the secondary rotor being filled by pressural contact between opposing reservoirs. In the latter case, the primary and secondary rotors may be equipped with female and male molds, respectively, the female molds being filled from the molten surface of the plastic rod, and the male molds simply contacting the supply within the female molds; or spinning tubes within the female and male molds upon the peripheries of the primary and secondary molds, respectively, may be charged from the supply within the female molds by the meshing of the molds. A film coating may be carried in pressural contact between two opposing rotors, and as their peripheries take diverging paths, disrupted into a multiplicity of fine filaments, but, as in actual practice, the shape and size of the filaments can be much better regulated by extruding or pulling the filaments from reservoirs having outlets of suitable shape and size and correlated with the speed of the spinning and the extent of the stretching. The rotors, therefore, preferably rotate in contact with each other and exert no pressure or adherence whatever on the molten plastic except through their reservoirs and then only for charging, contacting, and stretching purposes; and accordingly are usually made of non-adherent materials, such as those constructed by powder metallurgy technique and impregnated with a high melting point wax. The spider pulls a definite size and shape of filaments out of a series of spinning tubes leading from a source of supply, and stretch-orient them during the pulling; I recharge my spinning tubes, or reservoirs, as exhausted from a common source of supply, and depend on adhesion of the reservoirs, or suction at opposing ends of the recharges, or both, to hold the plastic while the filaments therebetween are being stretch-oriented by movements of the ends through diverging arcuate paths.

A softened fibre for my purpose can be stretched indefinitely, and accordingly, if the reservoirs are maintained at suitable temperature, the filaments will continue to be withdrawn therefrom until their respective reservoirs are exhausted or the filaments have reached their maximum stretch between the rotors, which should occur about the same time. The filaments can then be deposited directly upon an article to be coated traveling under, or between, the arcuate paths of the rotors, or they may be broken away from the rotors by a blast of air, or force of other fluid stream, used for conveyance and depositing purposes. If the filaments are indurated

or set during stretching and maximum stretch has been reached before the sources of supply have become exhausted, the filaments will tend to break where the reservoir supplies neck down into filaments, and the breakage may be accelerated by force of a primary propulsion fluid.

Ordinarily, it is preferable to maintain the filaments in a sufficiently plastic condition to adhere to one another so that when they are deposited in an intersecting condition an integral web will be formed but, when necessary, hot air, steam, solvent vapor, adhesive spray, etc., may be used as, or incorporated in, the primary propulsion fluid for that purpose. However, if the filaments have become cured in the pulling chamber beyond the adhesive point, as for the purpose of cold-drawing, they may be brought back to the adhesive state during propulsion or after deposition by steam, hot air, solvent vapor, adhesive spray, etc., being used as, or incorporated in, a secondary propulsion fluid introduced by means of an ejector. And in either arrangement the softening fluid, or fluids for other purposes, may pass through a foraminous filament retaining wall during formation of the integral fabric, and while the latter is being subjected to a positive pressure from a surface portion of the gun. Oxidizing fluids, such as air, water, and steam; non-oxidizing fluids, such as argon, helium, nitrogen, hydrogen, and carbon dioxide; quenching fluids, such as air, water, and oil, may all be used for the purposes indicated.

An ejector may be used to coat and impregnate with discrete solids the filaments and the integral fabric formed by the deposition of the filaments in an adhesive intersecting condition; or the filaments, while in an adhesive state, may be mixed with discrete solids to bind or save stitching as the solids are deposited in the form of a sheet or blanket. Fibres deposited subsequently to the formation of an integral fabric may be aligned by brushing, blowing, etc., either before or after the filaments set. These solids may be brought into mixture with the filaments by either the primary or secondary propulsion fluids, and may consist of: fusible or binder fibres, such as nylon, rayon, glass, etc.; natural fibres, such as cotton, wool, hair, ramie, cattail, milkweed, kapok, feathers, asbestos, shredded leather, etc.; abrasive solids, such as corundum, iron oxide, carbide, silica, pumice stone and water soluble soap, etc.; purifying agents, such as carbon, fuller's earth, diatomaceous earth, catalyzing agents, etc.; decorative flakes or powders, such as aluminum, bronze, gold, silver, etc.

When enclosing an article, such as a gun or aircraft engine, in a water-proof covering, continuous filaments are spun from outstanding point to outstanding point to form structural lines. This can be accomplished by means of a spinning gun, such as described in my pending application, Serial No. 554,711, soon to issue as Patent No. 2,437,264. Either continuous or discontinuous filaments can then be deposited over the structural lines in a uniform or promiscuously intersecting condition until the interstices are sufficiently small to be coated with an impregnant sprayed on in droplets without danger of the latter going through the web. The impregnant may be a thermosetting material, such as urea-formaldehyde, phenol-formaldehyde, or melamine resin; a thermoplastic, such as a copolymer of vinyl chloride and vinyl acetate; a silicone, or any other material

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that is a fluid, or may be reduced to a fluid condition by solvent, heat, or other agent.

The plastic filamentous structure and coating or impregnant may be subjected to various treating agents in sequence as they are deposited, or together, for strengthening purposes, to prevent corrosion, and for various other reasons; a polyvinyl alcohol or sodium carboxymethylcellulose enclosure may be subjected to an application of dimethyl urea and ammonium chloride to make the former less soluble in water; tents and awnings spun from plastics may be treated with a wax, asphalt, or lacquer, for water-proofing; curtains, with a sodium silicate solution to bond thereto a subsequent coating of asbestos fibres; draperies with a fire retardant, such as ammonium sulfamate; raincoats, with a water repellent, such as a silicon vapor; sanitary napkins, with a wetting agent, such as sodium sulfonate of dioctyl succinate.

The invention is exemplified in the following description, and a preferred arrangement is illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a vertical section of a gun for spinning discontinuous filaments.

Figure 2 is a cross-section taken on line 2—2 of Figure 1.

Figure 3 is a horizontal section of the pulling chamber taken on line 3—3 of Figure 1.

Figure 4 is an enlarged fragmentary vertical cross-section of the pulling rotors shown in Figure 1.

Figure 5 is an elevation view, partly in section, of the gun shown in Figure 1 for spinning discontinuous filaments.

Figure 6 is an elevation view, partly in section, of a modified form of the gun shown in Figure 1 for spinning continuous filaments.

Figure 7 shows an article covered by continuous foundation filaments built up to support a structure of discontinuous filaments.

Figure 8 is a part elevation and part vertical section of a modified form of gun for spinning discontinuous filaments.

Figure 9 is a sectional view of the pulling chamber shown in Figure 1, but with each rotor equipped with its own charging barrel.

Figure 10 is a part section and part elevation of a spraying gun in which the magazine is charged with spools of filaments.

Figure 11 is a fragmentary vertical cross-section of a modified form of the pulling shown in Figure 1.

Referring to the drawings more specifically by reference characters: Figures 1 to 5 show a spinning gun in which a barrel 1 is supported by a gunstock 2, which is continued above the former to form a magazine 3 for a paper clip 4 containing the cartridges 5. A plate 6, hinged at 7, and fastened by means of an eye bolt 8 and a wing nut 9, forms a tight cover for the magazine, but a plastic solution or elastic fluid pressure may be admitted through the cover plate at 10. The gun barrel encloses the plunger 11, which is driven by the piston 12 operating in a cylinder 13 between the magazine and the rear cover plate 14. The valve mechanism consists of a valve having forward, center and rear spools, 15, 16, and 17, respectively, which move in forward, center, and rear valve chambers, 18, 19 and 20, respectively, and the forward and rear chambers are closed by forward and rear plugs 21 and 22, respectively. The rear valve chamber is equipped with: ports 23 and 24 leading to the cylinder and atmos-

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sphere, respectively; forward valve chamber, with ports 25 and 26 leading to the cylinder and atmosphere, respectively; and the center valve chamber, with ports 27 and 28 leading to the forward and rear ends of the cylinder, respectively, and also with a live air port 29 connecting with upper and lower air passages 30 and 31, respectively, in the gunstock. A valve 32 regulates the flow of air between the two passages, and is controlled by a pressure trigger 33, whose movement is opposed by the resistance of a spring 34 placed between the valve head and cap 35, a pin 36 being used to support the trigger. The pulling mechanism consists of a chamber 37, the halves of which may be cemented or bolted together, and encloses a pulling rotor 38 and a heating rotor 39, which are supported on pins 40 and 41, respectively, the latter being driven by turbines 42 and 43 on either end of the pin. The movements of the two rotors are synchronized through the meshing of the charging teeth 44 of the pulling rotor with the reservoirs 45 of the heating rotor, and both charging teeth and reservoirs are equipped with spinning tubes 46 and 47, respectively. The turbines are enclosed between the chamber and cover plates 48 and 49, and are driven by air pressure from branches 50 and 51 of the upper air passage, the exhaust escaping through opening 52 into the pulling chamber to air in breaking the filaments away from the rotors and conveying them from the chamber out through an ejector. The latter consists of an inner cone 53, and an outer cone 54, supplied by fluid pressure from pipe 55. Heat is furnished through an electric circuit 56 within the cover plate 57, the wires entering the gunstock through passage 58. The side plates 59 and 60, and upper and lower scraper plates 61 and 62, respectively, prevent the molten plastic from escaping from the reservoirs in the heating rotor.

The operation of the gun thus constructed has been in part indicated in connection with the foregoing description: The piston is shown in mid-position and moving forward under pressure of live air entering the rear of the cylinder through passage 29, center valve chamber 19, and passage 28, the exhaust escaping from the forward end of the cylinder through passage 27, forward valve chamber 18, and exhaust port 26. As the center spool 16 of the valve is larger in diameter than either of the end spools, the valve is held in the position shown until travel of the piston uncovers the reverse port 25 when air is admitted to the forward end of the valve. As the area of the forward spool is greater than the difference between the center and rear spools, the valve is thrown to the rear end of its stroke, and meanwhile the piston has reached the forward end of its travel and live air now enters the forward end of the cylinder through passage 29, center valve chamber 19, and passage 27, and the operation just described is reversed. Pressure on the plunger results in a corresponding pressure between a plastic cartridge and the rotor 39. If the latter is traveling at a great enough speed, sufficient frictional heat may be developed to melt a surface portion of the cartridge, otherwise heat must be applied to the rotor and/or end of the cartridge from some external source, such as the heating coils 56 within the jacket 57, or heat may be utilized from both sources. As the surface portion of the cartridge in contact with the rotor is brought to a molten condition, the pressural contact and lateral relative movement between the two will cause the molten material to be forced

into the reservoirs on the periphery of the rotor, and the insertion of the teeth of the pulling roll in the reservoirs will result in the contents of the reservoirs being charged into the spinning tubes 46 and 47. In charging position, the contents of each pair of tubes becomes united, and suction at the ends of the tubes combined with the friction of the walls of the tubes will cause the charges from each pair of tubes to neck down into single filaments as the tubes in each pair move through diverging arcuate paths. The cross-sectional area and size of the filaments will depend on the shape and size of the outlets of the spinning tubes, and the amount of stretch given the filaments before they are removed from the rotors. As the rotors are made of non-adherent material, the doctor blades 61 and 62 should prevent any adherence of the molten plastic to the peripheries of the rotors. The pulling rotor is driven by the meshing of its teeth with the reservoirs of the heating rotor but, when desirable, the second rotor may be geared to the buckets of the turbines. If the filaments are allowed to become set before being removed from the rotors, they may be brought back to an adhesive state by means of a secondary fluid entering the outer cone of the ejector through pipe 55, and for this purpose the secondary fluid may consist of, or contain, steam, solvent vapor, or any suitable adhesive; and either, or both, primary fluid (exhaust from turbines) and secondary fluid may be used to remove solvent from the plastic material as it is spun into filaments. The cartridges are enclosed in a paper clip from which the bottom end is stripped when the clip is inserted into the magazine, and as each cartridge is utilized, the piston will fly back and the plunger will allow a fresh cartridge to be dropped into position.

Figure 6 shows a modification of the gun for the purpose of spinning continuous filaments, in which the plastic cartridge is brought to a molten condition by means of heating coils 63 and extruded under plunger pressure through a plurality of openings 64, a blast of primary fluid, such as air, from annular passage 65, conveying the filaments through the ejector after being stretched by vanes 66, which rotate in a housing 67. The primary fluid may also be used to rotate the vanes but ordinarily a secondary fluid entering the stationary shaft 68 and escaping intermittently through the vanes as the openings in each become coincident during rotation of the latter, will be used for impelling the vanes as well as lifting the stretched filaments from the tips of the vanes and conveying the filaments through the ejector.

Figure 7 shows an article 69 enclosed by continuous foundation lines 70 spun from outstanding point to outstanding point, by the gun described in Figure 6, to form an integral support for discontinuous filaments 71, spun by the gun described in Figure 5. The enclosure shows the continuous filaments to be deposited in substantially uniformly intersecting condition, and the discontinuous filaments to be deposited in a promiscuously intersecting condition, but both may be deposited in either condition. After an integral pervious fabric has been formed from continuous and discontinuous filaments, it can be sprayed, or otherwise coated, with a thermosetting, thermoplastic, or other fluid material to protect the filaments from corrosion, etc., and leave the fabric pervious; or it may be sprayed, or otherwise coated, with an impregnant to leave the fabric im-

pervious. If the filaments will not adhere to the object being enclosed because of the rapid setting of the former during spinning, the filaments may be coated with an adhesive spray during the spinning, or the object to be enclosed may be coated with an adhesive prior to the spinning; if the coating will not adhere to the filaments for the same reason, the latter may be coated with an adhesive during the spinning, or the deposited filaments may be coated with an adhesive subsequent to the spinning. However, for most purposes the filaments can be deposited from either a solution or molten state in a sufficiently adhesive condition to adhere to one another and to outstanding points of the object being covered. After the fabric covering has been formed, and while still in an adhesive condition, it can be sprayed, or otherwise coated, with fibres or other discrete solids mentioned above.

Figure 8 shows another modification of the spinning gun in which one trigger controls the movements of the pistons in two opposing cylinders set at right angles to each other, one for charging cartridges into the gun barrel as required and one for reciprocating a heating member 72. The latter is heated by electric circuit 73, and is equipped with a number of spinning tubes 74, similar to those shown in the rotors of Figure 4, which on contacting the cartridge under pressure through openings in the retainer plate 75 causes surface portions of the cartridge to melt and fill the tubes. The return stroke of the heating member results in portions of the cartridge, united to the supply in the tubes, being drawn out into filaments, which are broken away at the end of their stretch and conveyed through the ejector by force of twin air streams entering through pipe connections 76 from the pipe line 77. A valve 78 controls the air flow and is connected through lever 79 with a pin 80 on an extension 81 of the piston rod, and through these connections is caused to open at the end of the piston stroke or maximum stretch of the filaments.

Figure 9 shows a rotor pulling arrangement in which the reservoirs of each rotor are charged from a separate source of supply, such as twin gun barrels, which may be attached to one gun-stock. The reservoirs in the peripheries of the rotors may be similar to those shown in the heating rotor 39 of Figure 1, or they may be similar to those shown in Figure 11. As the filaments reach their maximum stretch they may be deposited uniformly on an endless foraminous travelling belt 82 through which a treating fluid, such as the exhaust from the turbines, may pass. If the filaments have been cured beyond an adhesive condition in order to be cold drawn, the turbine pressure fluid may be heated, or consist of, or have incorporated within it, steam, solvent vapor, adhesive spray, or other softening fluid so that passage of the fluid through the deposited filaments and belt, with or without pressure exerted through the lips of the pulling chamber, will cause the filaments to bond together. The fabric can then be treated with impregnants, fibre coatings, etc., as described above.

Figure 10 shows an arrangement in which a plurality of spools of cured filaments 83 may be inserted in the magazine 84, and the filaments continuously removed from the spools, extruded and sprayed by means of the pulling rotors 85 and 86 aided by a primary or secondary propulsion fluid, as described in Figure 1. Or air pressure from the upper air passage may engage the

buckets in the lower rotor and the exhaust serve as a primary propulsion fluid. And the lower rotor and its pressure fluid may be heated to aid in reducing the cured filaments to an adhesive condition.

Figure 11 shows an arrangement of rotor teeth 87 in which the reservoirs in each rotor are charged from a separate source of supply, as in Figure 9. As the rotors are made of non-adherent material the difference in thermal conductivity between the rotors and teeth should prevent any adherence of molten plastic to the former.

The minimum temperature at which most molten filaments become adhesive is less than 10° F., and sometimes less than 5° F., below the softening point of the filaments, which varies with every plastic and may be defined as the minimum temperature at which a filament begins to lose its stretch-orientation. It therefore follows that in order to obtain an integral fabric of substantial strength, stretch-oriented filaments must be deposited at a temperature, or be subjected to a subsequent temperature, between the minimum adhesive temperature and the minimum softening temperature, providing the former is below the latter, otherwise they must depend for their adhesiveness on solvents, adhesives, etc., introduced into the conveying streams, or passed through the filaments after deposition.

It will also be evident that in order to form an integral fabric of stretch-oriented filaments at a temperature below that at which the filaments begin to lose their stretch-orientation, one of the following conditions must take place: the filaments may be united at their intersections by their own adhesiveness and the web will be homogeneous with no loss of stretch-orientation; they may be united by a solvent for the filaments and the web will be homogeneous but with loss of stretch-orientation of that portion of the filaments affected by the solvent; they may be united by a filament non-solvent adhesive and the web will cease to be homogeneous but there will be no loss of stretch-orientation; or they may be united by any combination of such operations. And the characteristics of the fabric will vary with every different method of uniting the filaments at their intersections.

It will furthermore be evident that a solid plastic may be brought to a fluid condition within a gun barrel by any appropriate means, such as the electric heating coils 63 in Figure 6, and the molten fluid then extruded through suitable openings under pressure of a plunger 11 or elastic fluid admitted to the magazine 3, in Figure 1; or a plastic in solution or other fluid state, may be contained within a suitable receptacle, such as magazine 3, and extruded through suitable openings under pressure of plunger 11, or elastic fluid admitted to the magazine, to fill reservoirs or spinning tubes positioned in or upon rotors, endless belts, or other traveling members.

It will still furthermore be evident that in order for a filament to be stretch-oriented, it must be subjected to a positive pull between members attached to opposing ends of the filament, at least one of which members must move away from the other member, and that if both members move in opposite directions, the words "holding" and "pulling" may be used synonymously.

I claim as my invention:

1. The method of producing filaments from a fluid plastic material comprising: depositing the said plastic material in discrete and uniformly spaced portions on the periphery of a primary

rotating member, rotating the peripheries of the said primary member and an adjacent secondary member through converging arcuate paths to contact each other at the said uniformly spaced portions; rotating the peripheries of the said members through diverging arcuate paths to attenuate the said uniformly spaced portions into stretch-oriented filaments; and removing the said stretch-oriented filaments from between the said members.

2. The method of producing filaments from a fluid plastic material comprising: depositing the said plastic material in discrete and uniformly spaced portions on the peripheries of a plurality of rotating members; rotating the peripheries of the said members through converging arcuate paths to unite opposing pairs of the said uniformly spaced portions; rotating the peripheries of the said members in diverging arcuate paths to attenuate the said uniformly spaced portions into stretch-oriented filaments; and removing the said stretch-oriented filaments from between the said members.

3. The method of producing filaments from a solid plastic material comprising: contacting the said solid material with a heating member to melt a surface portion of the material and deposit it in discrete and uniformly spaced portions on the heating member; contacting the said uniformly spaced portions by a pulling member; moving the said members relatively to attenuate the said uniformly spaced portions into stretch-oriented filaments; and removing the said stretch-oriented filaments from between the said members.

4. The method of producing filaments from a solid plastic material comprising: subjecting the said material to heat to reduce a surface portion of the material to a fluid condition; contacting the said fluid portion between a holding member and a pulling member to disrupt the fluid portion into discrete and uniformly spaced portions; moving the said members relatively to attenuate the said uniformly spaced portions into stretch-oriented filaments; and removing the said stretch-oriented filaments from between the said members.

5. The method of producing filaments from a solid plastic material comprising: contacting the said solid material with a heating member to melt a surface portion of the material and transfer the molten portion into a film coating on the member; contacting the said coating with an opposing pulling member to disrupt the said coating into discrete portions of predetermined size and spacing; moving the said members relatively to attenuate the said discrete portions into stretch-oriented filaments; and removing the said stretch-oriented filaments from between the said members.

6. The method of producing filaments from a solid plastic material comprising: contacting the said solid material with a rotating heating member to melt a surface portion of the material and deposit it in discrete and uniformly spaced portions on the heating member; rotating the said heating member in contact with and in an opposing direction to a rotating pulling member to cause the said uniformly spaced portions to adhere to uniformly spaced points on both of the said members and to neck down at the adhering points to form and attenuate single filaments into stretch-oriented filaments; and removing the said stretch-oriented filaments from between the said members.

7. The method of producing filaments from a solid plastic material comprising: continuously contacting the said solid material with a heating member to melt a surface portion of the material and disrupt the molten portion into discrete and uniformly spaced portions on the heating member; continuously contacting the said uniformly spaced portions with a pulling member moving relatively to the heating member to attenuate the said uniformly spaced portions into stretch-oriented filaments; and continuously removing the stretch-oriented filaments from between the said members.

8. The method of producing filaments from a solid plastic material comprising: continuously contacting the said solid material with a rotating heating member to melt a surface portion of the material and transfer the molten portion into a film coating on the heating member; continuously contacting the said film coating with a pulling member rotating in an opposing direction to the said heating member whereby the coating is disrupted between the said members into discrete portions of predetermined size and spacing and the portions attenuated into stretch-oriented filaments; and removing the said stretch-oriented filaments from between the said members.

9. In a spinning device, the combination of: a pair of rotating members, at least one of which is equipped on its peripheral surface with a series of uniformly spaced reservoirs; means for charging the said reservoirs with discrete portions of a fluid plastic material during rotation of the said members; means for rotating the peripheries of the said members in opposing arcuate paths whereby the uniformly spaced portions of the said fluid plastic in the said reservoirs of one of the said members is contacted by the other said member and the said contacted portions pulled from their respective reservoirs and stretched into filaments of predetermined size and spacing; and means for removing the said stretch-oriented filaments from between the said members.

10. In a spinning device, the combination of: a pair of rotating members equipped on their peripheral surfaces with uniformly spaced reservoirs; means for charging the said reservoirs with discrete portions of a fluid plastic material during rotation of the said members; means for rotating the peripheries of the said members in converging arcuate paths to unite the uniformly spaced portions of the said fluid plastic in opposing pairs of the said reservoirs, and in diverging arcuate paths to attenuate the said portions into stretch-oriented filaments; and means for removing the said stretch-oriented filaments from between the said members.

11. The method of making a non-woven pervious fabric comprising: subjecting a solid plastic material to heat to reduce a surface portion of the material to a fluid condition; depositing the said fluid material in discrete and uniformly spaced portions between a holding member and a pulling member; moving the said members relatively to attenuate the said discrete portions of fluid material into stretch-oriented filaments; and depositing the said filaments in a sufficiently adhesive condition to adhere to one another to form an integral fabric while maintaining their stretch-oriented condition.

12. The method of making a non-woven pervious fabric comprising: depositing a supply of fluid plastic material in discrete and uniformly spaced portions at predetermined points on a holding member; contacting the said uniformly

spaced portions with corresponding points on a pulling member; moving the said members relatively in opposing directions to produce a multiplicity of stretch-oriented filaments between the said predetermined points and the said corresponding points; and removing the said filaments from between the said members and depositing them in a sufficiently adhesive condition to adhere to one another to form an integral fabric while maintaining their stretch-oriented condition.

13. The method of producing filaments from a plastic material comprising: depositing the said plastic material in discrete and uniformly spaced portions on the periphery of a primary rotating member; rotating the peripheries of the said primary member and an adjacent secondary member through converging arcuate paths to contact each other at the said uniformly spaced portions; rotating the peripheries of the said members through diverging arcuate paths to attenuate the said uniformly spaced portions into stretch-oriented filaments; and removing the said stretch-oriented filaments from between the said members.

14. In a spinning device, the combination of: a pair of rotating members, at least one of which is equipped on its peripheral surface with a series of uniformly spaced reservoirs; means for charging the said reservoirs with discrete portions of a plastic material during rotation of the said members; means for rotating the said members to cause their peripheral surfaces to travel in opposing arcuate paths whereby the uniformly spaced portions of the said plastic in the said reservoirs of one of the said members is contacted by the other said member and the said contacted portions pulled from their respective reservoirs and stretched into filaments of predetermined size and spacing; and means for removing the said stretch-oriented filaments from between the said members.

15. In a spinning device, the combination of: a pair of rotating members equipped on their peripheral surfaces with uniformly spaced reservoirs; means for charging the said reservoirs with discrete portions of a plastic material during rotation of the said members; means for rotating the peripheries of the said members in converging arcuate paths to unite the uniformly spaced portions of the said plastic material in opposing pairs of the said reservoirs, and in diverging arcuate paths to attenuate the said portions into stretch-oriented filaments; and means for removing the said stretch-oriented filaments from between the said members.

16. The method of making a non-woven pervious fabric comprising: depositing a supply of plastic material in discrete and uniformly spaced portions at predetermined points on a holding member; contacting the said uniformly spaced portions with corresponding points on a pulling member; moving the said members relatively in opposing directions to produce a multiplicity of stretch-oriented filaments between the said predetermined points and the said corresponding points; and removing the said filaments from between the said members and depositing them in a sufficiently adhesive condition to adhere to one another to form an integral fabric while maintaining their stretch-oriented condition.

17. The method of making a non-woven fabric comprising: depositing a plastic material in discrete and uniformly spaced portions between a holding member and a pulling member; moving

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the said members relatively to attenuate the said discrete portions of plastic material into stretch-oriented filaments; and depositing the said filaments in a sufficiently adhesive condition to adhere to one another to form an integral fabric while maintaining their stretch-oriented condition.

18. The method of making a non-woven fabric comprising: depositing a plastic material in discrete and uniformly spaced portions between a holding member and a pulling member; moving the said members relatively to attenuate the said discrete portions of plastic material into tensioned, stretch-oriented filaments; and depositing the said filaments in a sufficiently adhesive condition to adhere to one another to form an integral fabric while maintaining their tensioned and stretch-oriented condition.

19. The method of making a non-woven fabric comprising: depositing a plastic material in discrete and uniformly spaced portions between a holding member and a pulling member; moving the said members relatively to attenuate the said portions into tensioned, stretch-oriented filaments; depositing the said filaments in an intersecting condition; and bonding the said deposited filaments at their said intersections into an integral fabric.

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20. The method of making a non-woven fabric comprising: depositing a plastic material in discrete and uniformly spaced solid portions between a holding member and a pulling member; subjecting the said solid portions to heat to reduce them to a fluid condition; moving the said members relatively to attenuate the said fluid portions into tensioned, stretch-oriented filaments; depositing the said filaments in an intersecting condition; and bonding the said deposited filaments at their said intersections into an integral fabric.

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