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1,683,478

S. A. NEIDICH
VISCOSE TREATING APPARATUS

Filed June 30, 1926

FIG. I.

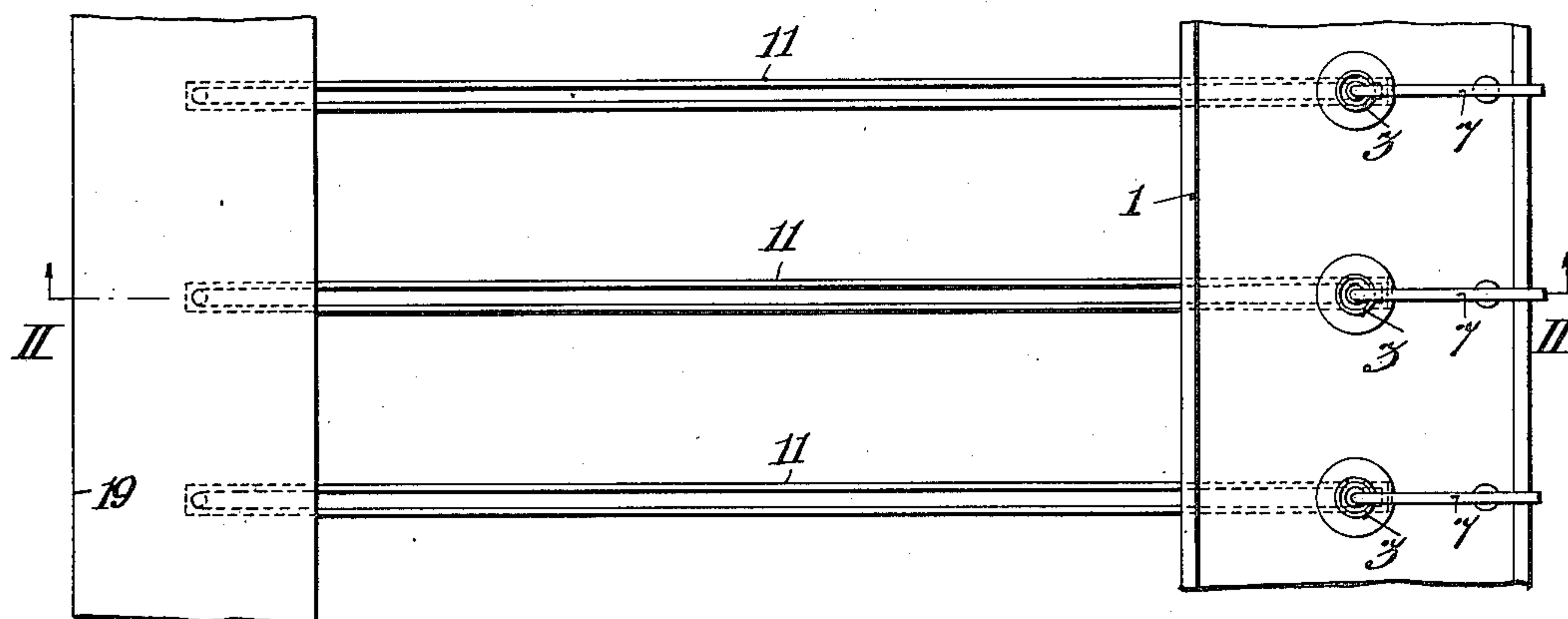


FIG. II.

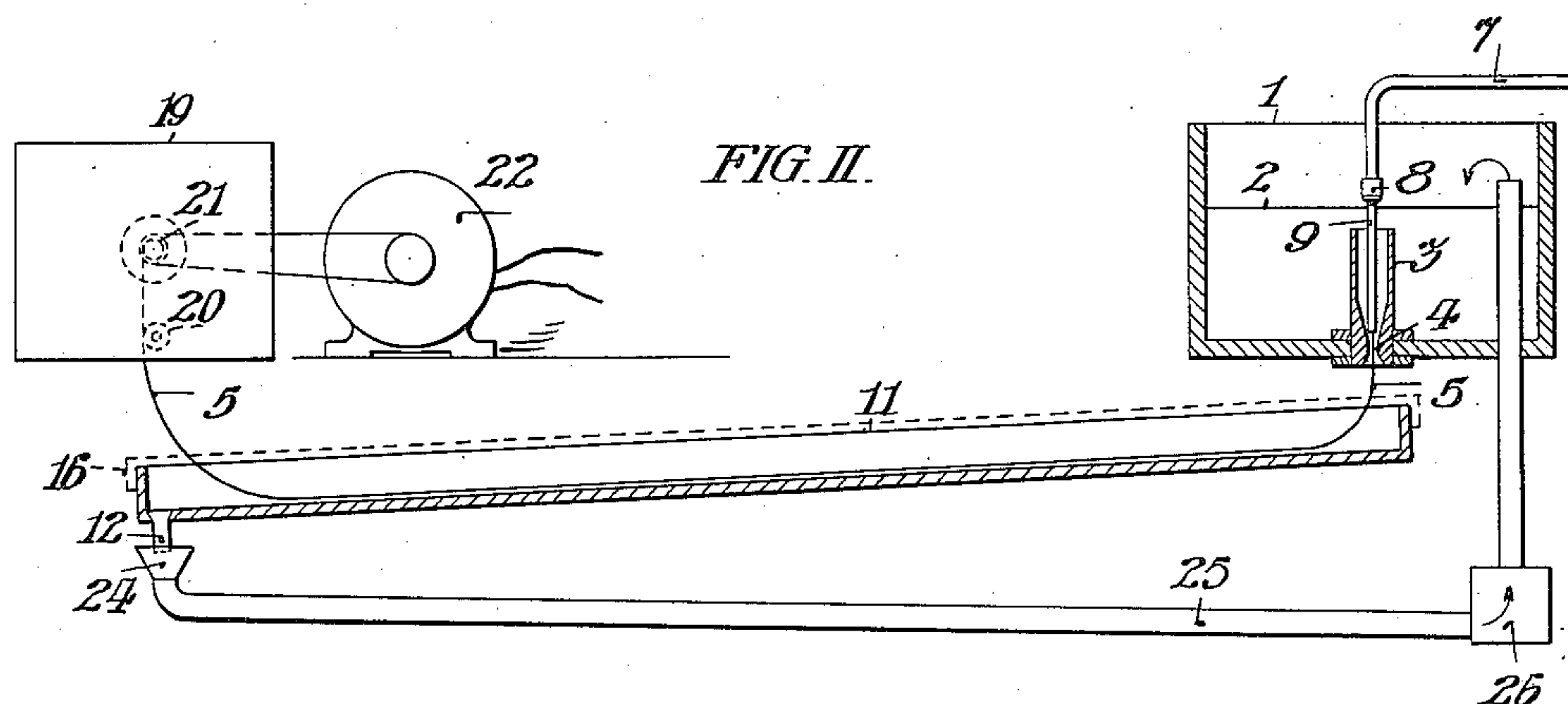


FIG. III.

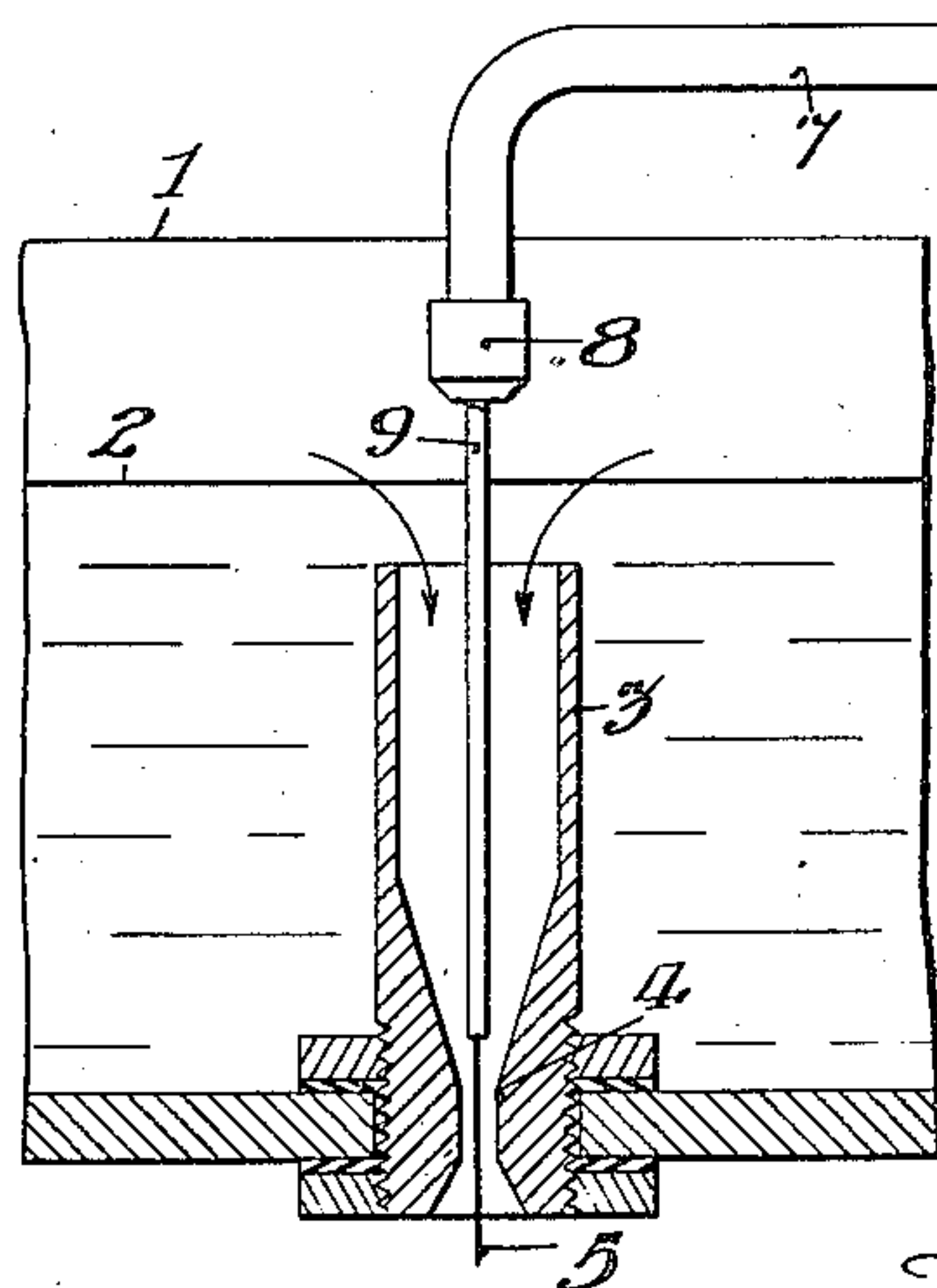
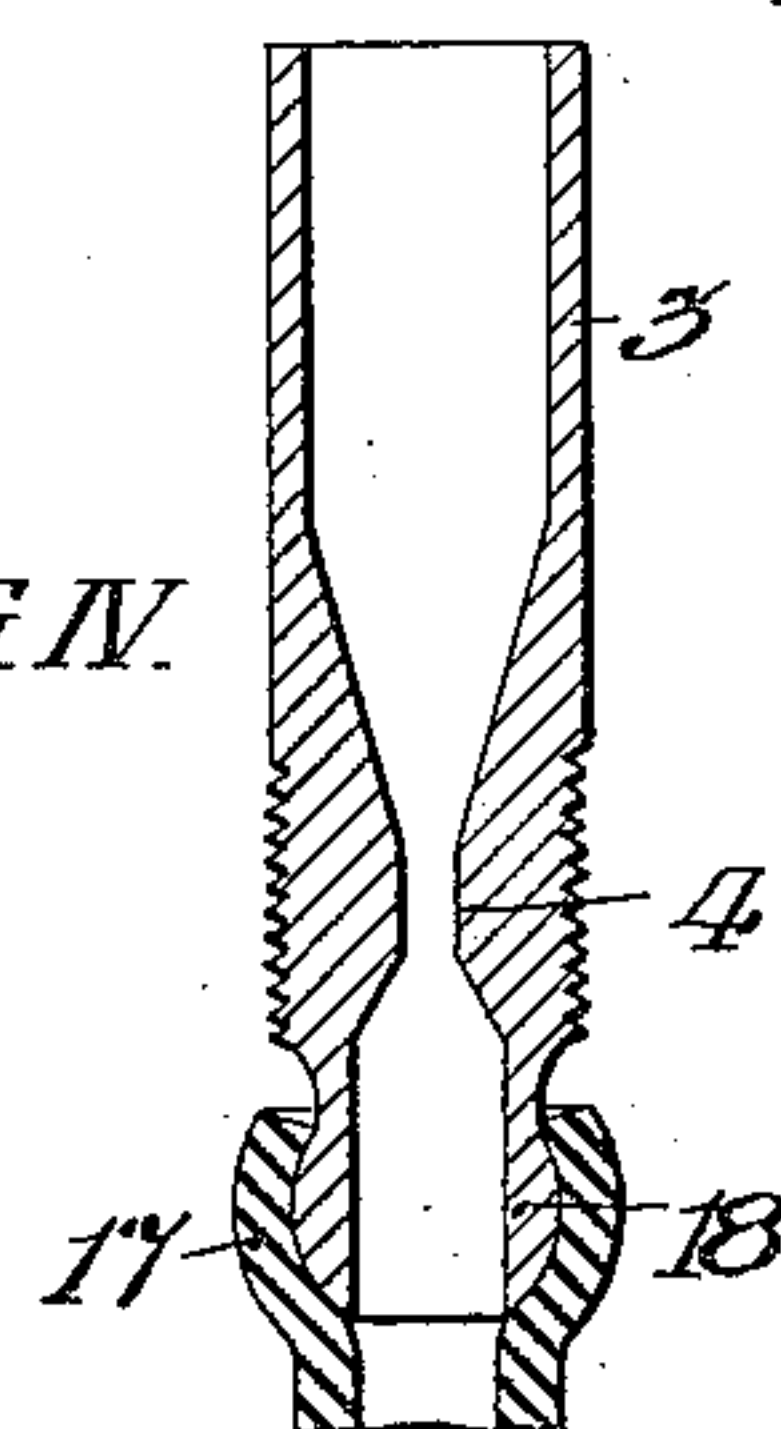


FIG. IV.



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VISCOSITY-TREATING APPARATUS.

Application filed June 30, 1926. Serial No. 119,591.

My invention relates to the manufacture of filaments by projecting liquid viscose (cellulose sulphocarbonate or thiocarbonate) through orifices into a coagulating medium, for instance a bath containing chemicals in aqueous solution which coagulate the viscose as semi-solid impure cellulose hydrate complexes. Such a solution may contain a suitable acid, for instance sulphuric or hydrochloric acid or an acid salt such as sodium bisulphite or ammonium chloride either with or without neutral salts or dehydrators, or both.

All such viscose products are amorphous and primarily so soft and impressionable that they may be marred by handling and must be dehydrated and desiccated to render them firm enough in texture for commercial use. Ordinarily, the filaments are withdrawn from the coagulating bath by frictional engagement with a roller or rollers. However, such means for discharging the filaments from such baths tend to mar the filaments by stretching and flattening them, whereas, it is highly desirable to maintain such filaments of uniform diameter and cylindrical, so that the dried filaments manifest a uniform lustre and brilliance; it being noted that any flattened or indented portion of such a filament is manifested by reflection of light therefrom in a manner different from the normal cylindrical surface thereof.

Moreover, such roller filament discharging means, and all other discharging means which must be maintained in motion are objectionable because of the cost of the operation and maintenance thereof. Therefore, it is the object and effect of my invention to provide what may be termed static, as distinguished from such kinetic, means for progressing a viscose filament from the region where it is coagulated to the region where it may be wound upon a spool or otherwise disposed for further treatment.

As hereinafter described, my invention includes means to utilize movement of a coagulating fluid to effect the desired movement of the filament through and from such liquid; particularly, an automatically operative ejecting device, or series of devices, of the general character of what is known to the chemical trade as an "aspirator," wherein movement of the liquid through a conduit having a restricted passageway creates a partial vacuum to suck the filament to and through such passageway.

My invention includes the various novel features of construction and arrangement hereinafter more definitely specified.

In said drawings; Fig. I is a plan view of a viscose filament coagulating apparatus conveniently embodying my improvement.

Fig. II is a vertical sectional view of said apparatus taken on the line II—II in Fig. I.

Fig. III is a fragmentary vertical sectional view showing the ejector indicated at the bottom of the tank in Fig. II, but on a larger scale.

Fig. IV is a fragmentary vertical sectional view of a modified form of ejector.

In said figures; 1 indicates a tank containing a viscose coagulating medium 2, conveniently an aqueous solution containing fourteen per cent, of sodium bisulphite and one-fourth of one per cent, of tri-sodium phosphate. Said tank has, in the bottom thereof, one or more, and preferably an extensive series, of outlet conduits 3 of which three are shown in Fig. I and but one is shown in Fig. II, each including a restricted passageway 4, through which the viscose filament 5 may be automatically longitudinally progressed by and with the fluid 2 which gravitates through said conduit 3 and passageway 4. Said filament 5 is formed of viscose supplied through the pipe 7 and extruded through the spinneret 8; the latter having the guide tube 9 arranged to automatically guide said filament into said passageway 4.

As above contemplated, the construction and arrangement of the filament ejecting means above described are such that a partial vacuum is created at the upper end of said passageway 4; by the downward flow of the fluid 2 therethrough, which is effective to engage and progress said filament 5 longitudinally through said passageway, by and with said fluid 2. Said fluid and the filament which it thus conveys, gravitate into the conduit 11. In the form indicated, which is adapted to conduct a liquid which is not substantially volatile, said conduit is a narrow trough, open at the top and inclined downwardly toward the left in Fig. II, so that the coagulating medium 2 gravitates therethrough to the outlet 12. Said conduit 11, is conveniently formed of molded hard rubber and three-eighths of an inch wide one and a half inches deep, and six feet long.

If it is desired to heat the coagulating

medium 2 to the point of its vaporization or to employ a vaporous or gaseous coagulating medium; the conduits 11 may be provided with covers 16 to confine the vapor or gas of such a medium, and such inclosed conduits may be advantageously employed even with an aqueous solution, to exclude dust from such solution and prevent its evaporation.

However, as shown in Fig. IV, the conduit 3 may discharge into a cylindrical conduit 17, in lieu of a trough; and such conduit 17 may be a flexible rubber tube, directly connected with the nozzle 18 on said conduit 3.

When discharged from the coagulating apparatus above described; the filament 5 is coagulated to a state in which it may be wound or otherwise manipulated without marring, and it may be directed around a suitable guide roller 20 to winding mechanism 19 arranged to wind it upon suitable spools 21.

It is to be particularly noted that, in order to avoid stretching such filaments 5 it is necessary to operate the winding mechanism to take up said filaments at the same rate at which they are progressed through the fluid discharging mechanism above described. Therefore, I find it desirable to operate said winding mechanism by an electric motor 22 and to so coordinate the operation of said motor with the operation of the filament ejecting mechanism aforesaid that the motor is stopped if and when the rate of take-up tends to exceed the rate of progression of the filament through the coagulating device. A modified form of my invention is disclosed in application Serial No. 117,366, filed June 21, 1926, for improvement in viscose treating apparatus.

The liquid 2 discharged with said filament 5 may be caught in the receptacle 24 and returned to said tank 1, by means of the pipe 25 and the pump 26. However, the coagulating medium may be otherwise disposed and conserved.

I prefer to use the liquid coagulating medium aforesaid containing PO_4 ions, because the latter have a desulphurizing effect upon the filament, as set forth at length in Letters Patent of the United States No. 1,576,529 granted to William Mendel March 16, 1926. However, any other fluid having a chemical effect upon the viscose filament may be employed, as the vehicle for conveying it as above described, or a fluid which is chemically inert with reference to the filament may be used as such vehicle; for instance, water or air.

Therefore, I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein, without departing from the essen-

tial features of my invention, as defined in the appended claims.

I claim:

1. In viscose treating apparatus; means constructed and arranged to automatically, longitudinally, progress a viscose filament by a fluid; comprising a conduit and means arranged to cause said fluid to progress thru said conduit; said conduit having a short restricted passageway opening into a long passageway of greater cross sectional area; and means arranged to extrude a viscose filament directly into said restricted passageway; whereby, the rate of flow of said fluid is accelerated at said restricted passageway, and said fluid subjects said filament to maximum longitudinal stress, local to said extruding means, to progress said filament.

2. In viscose treating apparatus; means constructed and arranged to automatically, longitudinally, progress a viscose filament by an aqueous viscose coagulating fluid; comprising a conduit and means arranged to cause said fluid to progress thru said conduit; said conduit having a short restricted passageway opening into a long passageway of greater cross sectional area; and means arranged to extrude a viscose filament directly into said restricted passageway; whereby, the rate of flow of said fluid is accelerated at said restricted passageway, and said fluid subjects said filament to maximum longitudinal stress, local to said extruding means, to progress said filament.

3. In viscose treating apparatus; means constructed and arranged to automatically, longitudinally, progress a viscose filament by an aqueous viscose coagulating fluid containing a desulphurizing agent; comprising a conduit and means arranged to cause said fluid to progress thru said conduit; said conduit having a short restricted passageway opening into a long passageway of greater cross sectional area; and means arranged to extrude a viscose filament directly into said restricted passageway; whereby, the rate of flow of said fluid is accelerated at said restricted passageway, and said fluid subjects said filament to maximum longitudinal stress, local to said extruding means, to progress said filament.

4. In viscose treating apparatus; means constructed and arranged to automatically, longitudinally, progress a viscose filament by a fluid; comprising a conduit and means arranged to cause said fluid to progress thru said conduit; said conduit having a short restricted passageway opening into a long passageway of greater cross sectional area; means arranged to extrude a viscose filament directly into said restricted passageway; whereby, the rate of flow of said fluid subjects said filament to maximum longitudinal stress, local to said extruding means, to progress said filament; and means arranged

to take up the filament from said conduit at the same rate that it is being progressed thru said passageway.

5. In viscose treating apparatus; means
5 constructed and arranged to automatically, longitudinally, progress a viscose filament by a fluid; comprising a conduit and means arranged to cause said fluid to progress thru said conduit; said conduit having a short
10 restricted passageway opening into a long passageway of greater cross sectional area; means arranged to extrude a viscose filament

directly into said restricted passageway; whereby, the rate of flow of said fluid is accelerated at said restricted passageway, 15 and said fluid subjects said filament to maximum longitudinal stress, local to said extruding means, to progress said filament; and mechanically operated means arranged to uplift said filament from said conduit. 20

In testimony whereof, I have hereunto signed my name at Burlington, New Jersey, this 17th day of May, 1926.

SAMUEL A. NEIDICH.