July 14, 1925. 1,546,133

J. P. HOOPER

APPARATUS FOR FORMING THREADS OF VISCOUS MATERIAL

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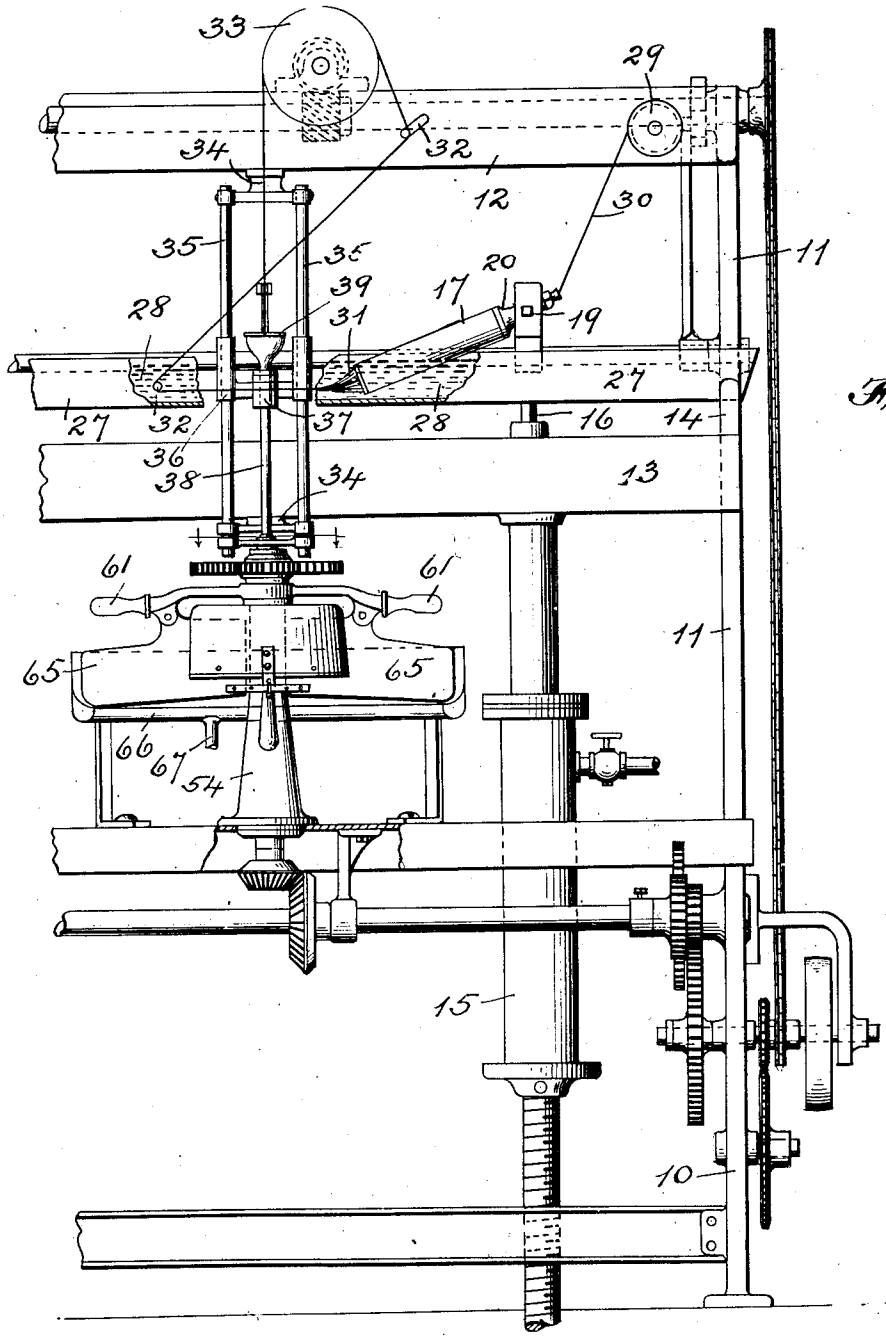


Fig. 1.

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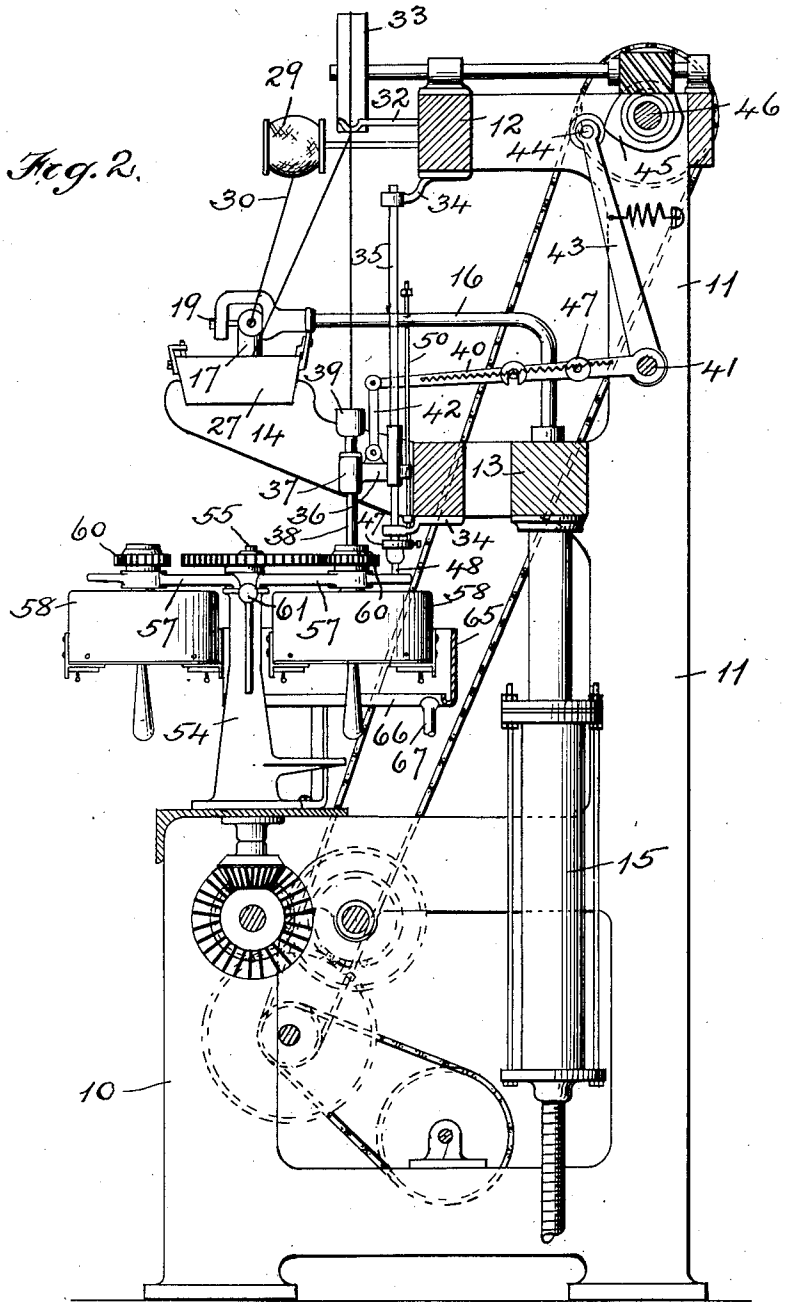
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Fig. 2.



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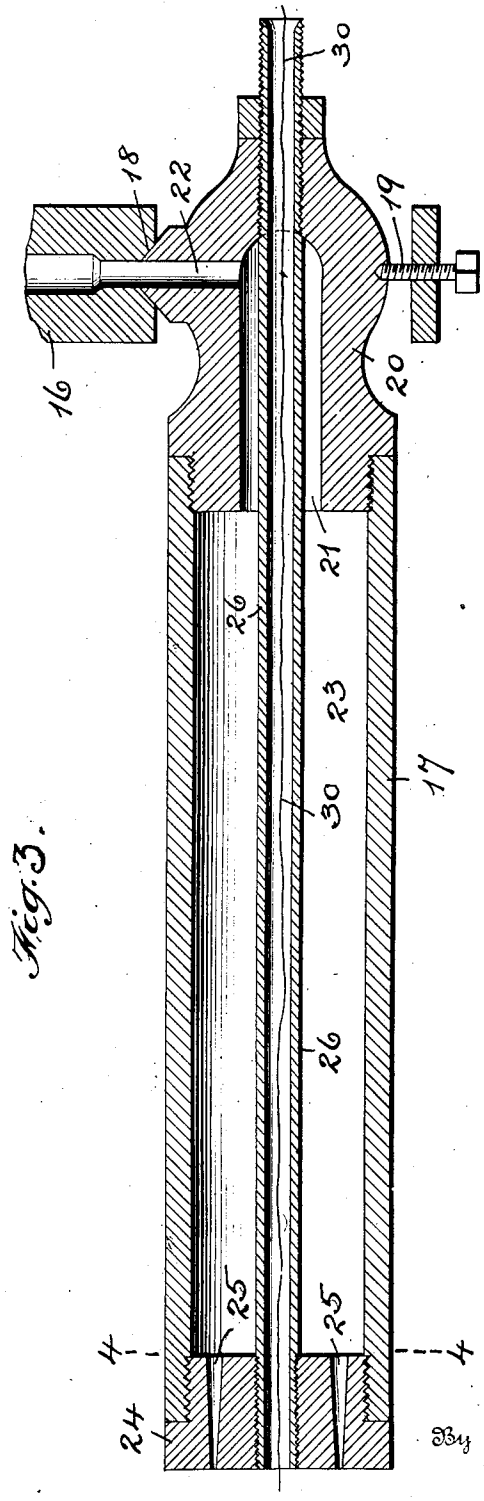


Fig. 3.

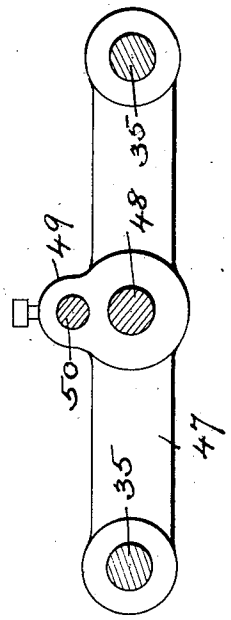


Fig. 5.

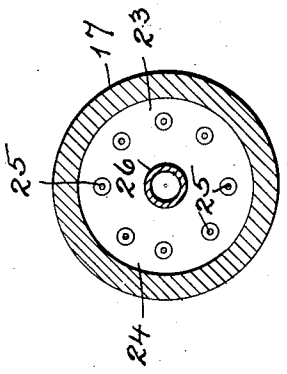


Fig. 4.

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APPARATUS FOR FORMING THREADS OF VISCOUS MATERIAL

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Fig. 6.

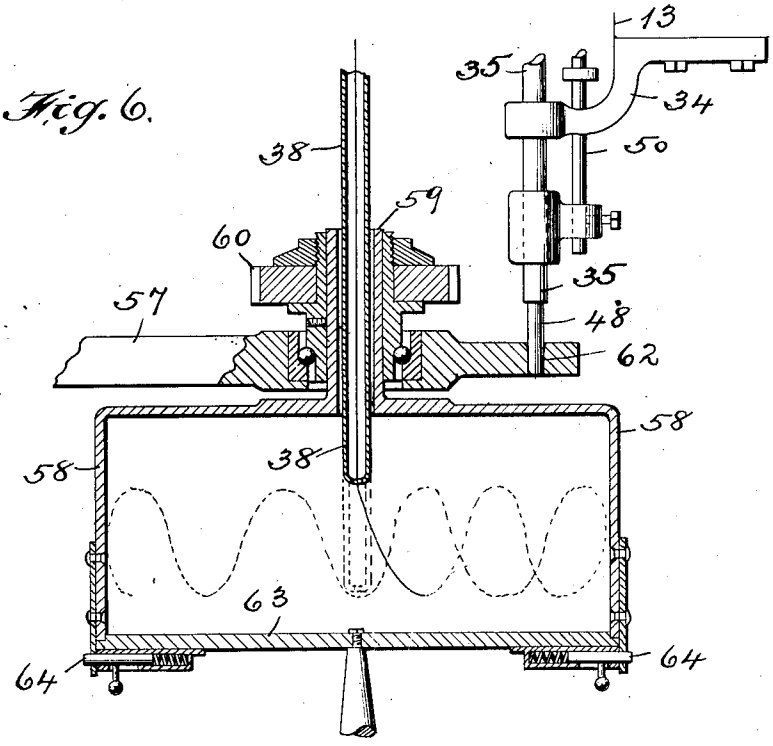
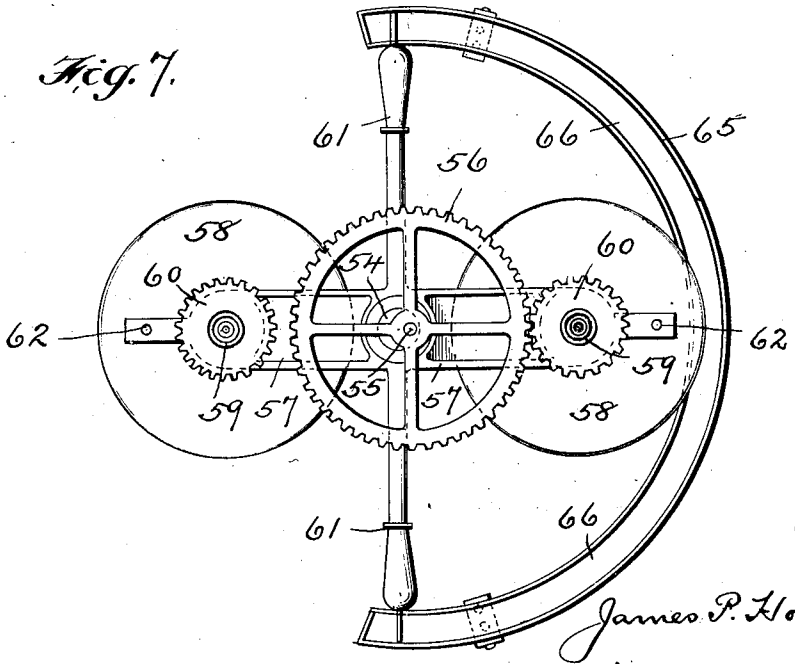


Fig. 7.



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Patented July 14, 1925. 1,546,133

UNITED STATES PATENT OFFICE.

JAMES P. HOOPER, OF RUXTON, MARYLAND, ASSIGNOR TO JAMES P. HOOPER MANUFACTURING COMPANY, OF BALTIMORE, MARYLAND, A CORPORATION OF MARYLAND.

APPARATUS FOR FORMING THREADS OF VISCOUS MATERIAL.

Application filed September 11, 1920. Serial No. 409,655.

To all whom it may concern:

Be it known that JAMES P. HOOPER, a citizen of the United States, residing at Ruxton, in the county of Baltimore and State of Maryland, has invented certain new and useful Improvements in Apparatus for Forming Threads of Viscous Material, of which the following is a specification.

This invention relates to an improved mechanism for forming viscous threads; partially solidifying the same; depositing the partially solidified thread in the form of a skein in a suitable receptacle and expelling, by centrifugal force, the excess moisture and thereby drying and further hardening the thread.

The invention further consists of improved mechanisms and devices for carrying out the several steps above enumerated.

With these, and other objects in view, the invention is illustrated in the accompanying drawing, wherein,—

Fig. 1. shows the improved mechanism in front elevation.

Fig. 2. illustrates the same in sectional side elevation.

Fig. 3. shows an enlarged longitudinal section through the spinneret.

Fig. 4. illustrates a cross-sectional detail through the spinneret,—the section being taken on the line 4—4 of Fig. 3.

Fig. 5. shows a plan view of the bolt-carrying bar and a cross-section through the guide rods and operating rod.

Fig. 6, illustrates an enlarged sectional detail through one of the centrifugal cups and the means for revolving the same together with the means for locking the cup mechanism in the rotating position, and

Fig. 7. shows a plan view of the cup carrier and the driving mechanism.

Referring to the drawings by reference numerals, 10, 11, 12, 13 and 14, designate supporting members of a frame which sustain a pump or plunger structure 15, which forces viscous material through a tube or pipe 16, to a spinneret 17. This spinneret is connected to the end of the pipe 16 by means of a beveled joint shown at 18, in Fig. 3 and a retaining screw 19, holds the parts together in such manner as to permit the spinneret to be rocked without interrupting the connection.

The spinneret which is best seen in Figs. 3 and 4, consists of a cylinder 17, having a head 20, at the inlet-end with a central passage 21 and a side passage 22, through which the viscous material passes on its way to the spinneret chamber 23.

The outlet-end of the spinneret cylinder is closed by a nozzle 24, through which a series of fine perforations or passages 25, extend, and a central tube 26, extends all the way through the spinneret and its head for a purpose that will presently be explained.

Beneath the spinneret there is provided a receptacle 27 which is sustained by the supporting members 14, and during the operation of the machine, the discharge-end of the spinneret dips into a setting solution 28, that is contained in said receptacle so that the strands of viscous material discharged through the passages 25 of the nozzle will be subjected to the action of the setting solution, as and for purposes well known in the art.

It is my purpose to provide means whereby I may feed a strand of thread in such manner that the strands of viscous material ejected through the nozzle 24, may cover said thread and be reinforced thereby. To this end I provide a thread carrier 29, from which a thread 30, is run to and through the central tube 26, of the spinneret passing out through the discharge end of the tube beyond the nozzle 24, where it combines with the viscous strands 31 and enters the setting solution.

After being subjected to the action of the solution, the thread is then passed over suitable guide devices 32, and around a roller 33, which latter directs the thread downwardly to a mechanism which will now be explained.

The under side of supporting member 12 and the under side of the front member 13, carry supporting brackets 34, which latter sustain two spaced-apart vertical guide rods 35. These rods are rigid and have no movement and simply serve as guides for a cross-head structure 36, which latter has a central bearing or supporting arm 37, that carries a depending tube 38 with a funnel 39 at its upper end for a purpose that will also presently be explained.

This cross-head 36, tube 38 and funnel 39 are all designed to have a somewhat slow but vertically reciprocating movement whereby to feed the coated thread into a

receptacle in which the lower end of the tube projects.

This vertical movement is effected through the movement of a lever 40 which latter is carried on a horizontal rock-shaft 41,—a link 42, serving to connect the lever 40 with the cross-head 36. An arm 43 is also carried on the rock-shaft 41, and has a roller 44, that contacts with a cam 45, on a cam-shaft 46.

It is believed to be obvious that as the cam 45, revolves, the arm 43 and lever 40 will be rocked, and link 42, will cause the cross-head 36 to reciprocate vertically on the guide-rods 35 thereby imparting a like vertical movement to the tube 38.

It is to be noted that lever 40, has a joint 68 therein whereby the same may be broken at the joint and the forward end thereof moved upwardly without regard to the arm 43. This construction is provided to enable the cross-head and guide tube 38 to be elevated without stopping the cam-shaft, for a purpose that will presently be explained.

The lower ends of the vertical guide rods 35, also serve as guides for a horizontal latch or bolt-carrying bar 47 whose under side carries a vertically projecting bolt 48 and whose rear side has a perforated lug 49. An operating rod 50 has its lower end projecting down through the lug 49, and is rigidly held therein by means of set screw 51. This operating rod 50, extends vertically and passes freely through an eye 52 on the rear of the cross-head 36, so that said cross-head may make its vertical reciprocations without moving said operating rod.

The upper end of the operating rod 50 is provided with a stop nut or equivalent device 53, so that when the cross-head 36, is elevated by hand, for the purpose of raising the lower end of tube 38, said cross-head eye 52, will strike the stop nut 53; raise the rod 50, and lift the bar 47 and bolt 48. The reason for this will hereinafter be more fully explained.

Below the cross-head 36 and receptacle 27, there is provided a vertical pedestal 54 which is mounted on the supporting member 10 and a vertical shaft 55, extends up through this pedestal and carries a gear 56 on its upper end which latter revolves in a horizontal plane. The axis of this gear 56 is not central with the vertical axis of the pedestal but is eccentric with respect thereto, as can be clearly seen in Fig. 7 of the drawing.

A horizontal bar 57 is mounted on the upper end of the pedestal immediately beneath the gear 56 and this bar extends at opposite sides from said pedestal-end and carries a rotatable inverted cup or housing 58, at each end thereof. Each cup has a hollow sleeve 59 projecting upwardly therefrom which passes through a bearing structure on the arm that is constructed to facilitate its rotation, and each sleeve is rotatable through a pinion 60, although in the present structure but one cup and one pinion is to be revolved at a time.

Two operating handles 61 are provided in the bar 57 which extend at right angles thereto whereby the bar may be rotated on the pedestal.

By reference to Figs. 2 and 6 it will be noted that the bar 57 and pedestal 54 are so positioned with respect to the vertical axis of the depending tube 38, that the bar may be swung so that one cup-sleeve 59 at a time may be positioned directly beneath the depending tube in order that the latter may be projected down therethrough and into the interior of the inverted cup 58 beneath it.

It will also be noted, by reference to Fig. 7, that when the bar is so turned as to permit the lower end of the vertical tube 38 to enter the cup-sleeve 59, that at that position the gear 56, will mesh with the pinion 60 of said cup-sleeve and cause the latter and its cup to be revolved.

When the cup-sleeve and tube are in register and the tube is lowered so its lower end will project into the cup, the lowering of the tube through the downward movement of the cross-head 36, will cause the bolt 48, to be lowered and when so lowered, this bolt enters a perforation 62, in the end of the bar 57 whereby to lock the same against accidental displacement.

From the foregoing explanation it is to be understood that as the tube 38 reciprocates vertically, during the formation of the thread, its lower end, from which the thread is ejected, will move up and down in the inverted cup while the latter is revolved. These movements cause the thread to be thrown laterally against the circular sides of the cup and laid there in a skein-like form. The vertical movement of the tube and the rotation of the cup also serve to impart a slight tension and twist on the thread.

Each cup is provided with a detachable bottom 63 and bolts 64 which retain the same in place, and upon removal of the bottom the skein will drop from the cup.

When the thread leaves the end of tube 38, it is wet with the setting solution and during rotation of the cup this moisture leaks from the bottom and is thrown laterally by centrifugal force. I therefore provide a shield device 65, with a gutter or trough 66 at its lower edge whereby to catch this thrown moisture and carry it off through a drain pipe 67.

When a cup has been filled with thread, the operator may raise the cross-head 36 in the guide rods 35,—the lever 40, during this movement simply breaking on the pivoted joint therein and this upward movement of said cross-head raises the tube 38, entirely from the cup-sleeve. During the last por-

tion of this upward movement, the rod 50, is lifted and bar 47 will therefore be raised so as to lift the bolt 48 from engagement with the bar 57.

The bar 57, may then be turned end-for-end which swings the filled cup from beneath the raised tube and brings the empty cup into position. This swinging movement of the bar 57, also carries the pinion of the filled cup out of mesh with the central gear 56, but moves the pinion of the empty cup into mesh therewith. The tube and lock may then be lowered and the operation continued.

Having described my invention, I claim,—

1. In a device for receiving threads of viscous material the combination with an inverted cup, of means for pendantly sustaining said cup, means for rapidly revolving said cup and means for delivering the thread at the axis of said inverted cup.

2. In a device for receiving threads of viscous material the combination with a pedestal of a vertical shaft through the pedestal, a gear on the upper end of said shaft,— the axis of the gear being eccentric with respect to the axis of the pedestal, means mounted to turn from the center of the pedestal and extending to opposite sides of said pedestal-center, an inverted cup carried by said latter means on opposite sides of the axis of the pedestal, means attached to each cup by which the latter may be driven when at one side only of the eccentrically mounted gear and means for delivering the thread at the axis of the driven cup.

In testimony whereof I affix my signature.

JAMES P. HOOPER.