L. E. DEMPSTER.

MACHINE FOR FORMING FILAMENTS.

APPLICATION FILED DEC. 18, 1911.

1,024,185.

Patented Apr. 23, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

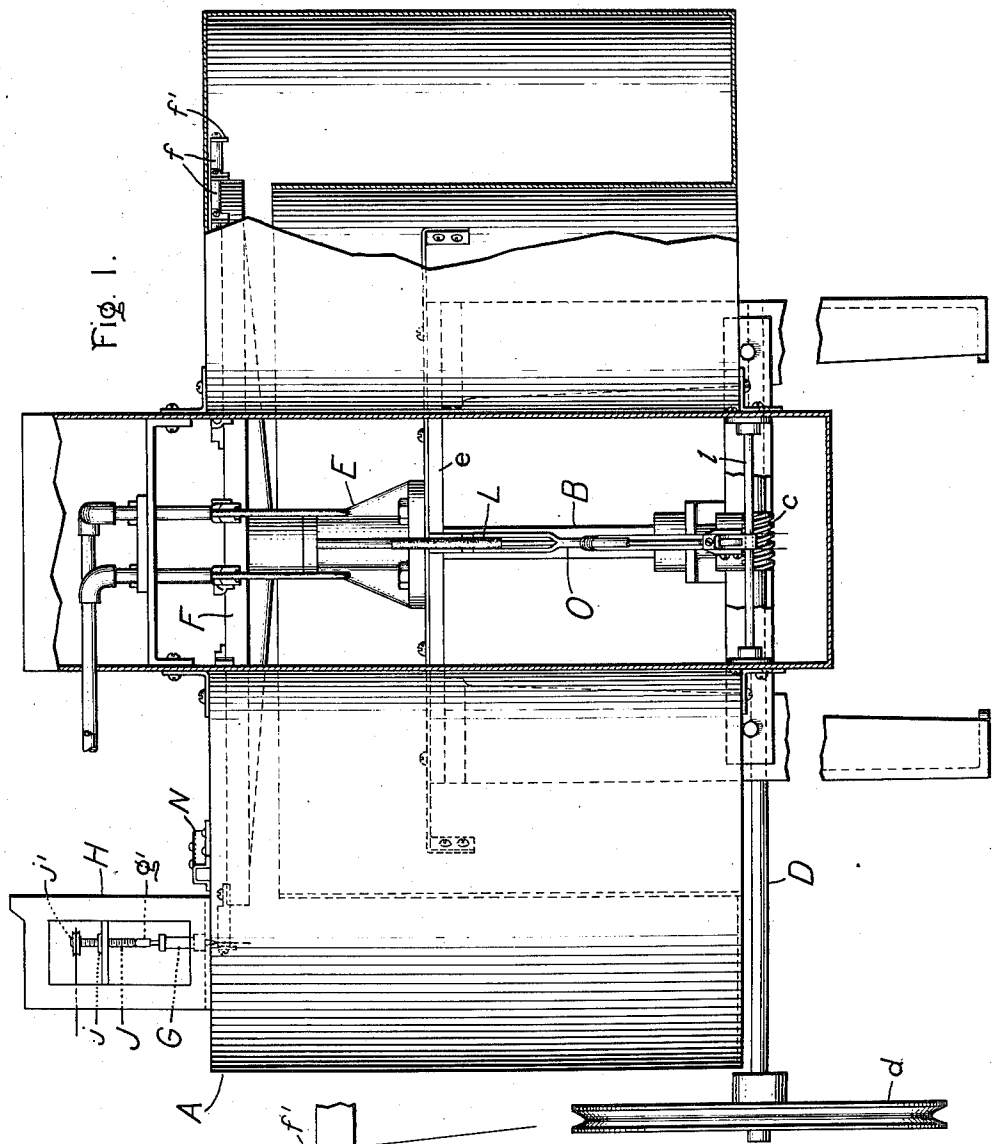
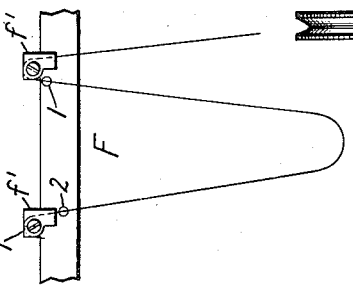


Fig. 5.



Witnesses:

George H. Tilden

J. Ellis Glen

Inventor:

Leonard E. Dempster,

by Albert G. Davis

His Attorney.

L. E. DEMPSTER.

MACHINE FOR FORMING FILAMENTS.

APPLICATION FILED DEC. 18, 1911.

1,024,185. **Patented Apr. 23, 1912.**

3 SHEETS—SHEET 2.

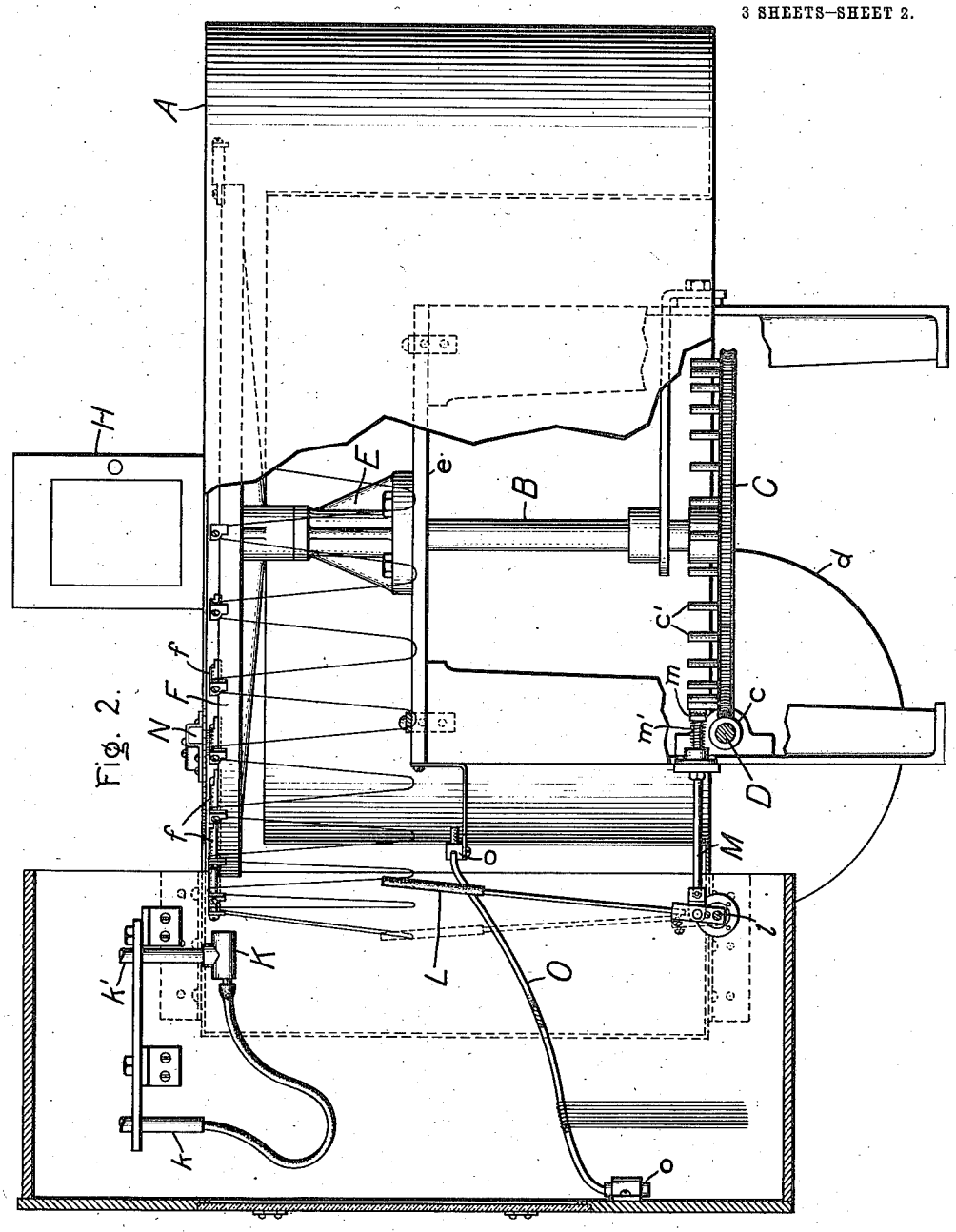


Fig. 2.

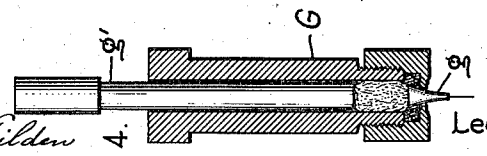


Fig. 4.

Witnesses:

George W. Tilden

J. Ellis Glen

Inventor:

Leonard E. Dempster:

by Albert G. Davis

His Attorney.

L. E. DEMPSTER.

MACHINE FOR FORMING FILAMENTS.

APPLICATION FILED DEC. 18, 1911.

1,024,185.

Patented Apr. 23, 1912.

3 SHEETS—SHEET 3.

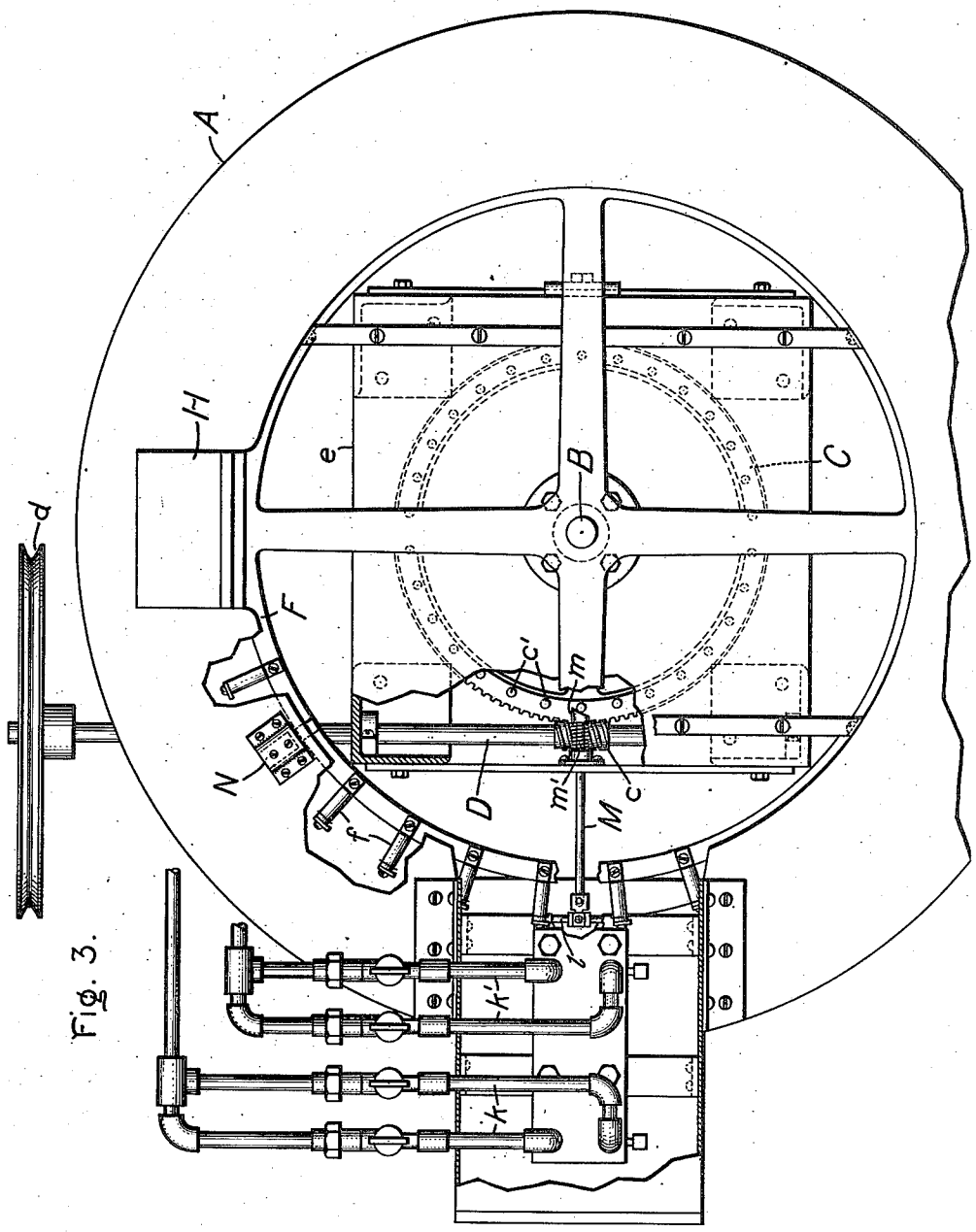


Fig. 3.

Witnesses:

George H. Tilden

J. Ellis Glen

Inventor:

Leonard E. Dempster,

by Albert G. Davis

His Attorney.

UNITED STATES PATENT OFFICE.

LEONARD E. DEMPSTER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

MACHINE FOR FORMING FILAMENTS.

1,024,185. Specification of Letters Patent. Patented Apr. 23, 1912.

Application filed December 18, 1911. Serial No. 666,544.

To all whom it may concern:

Be it known that I, LEONARD E. DEMPSTER, a subject of the King of Great Britain, residing at Schenectady, county of Schenectady; State of New York, have invented certain new and useful Improvements in Machines for Forming Filaments, of which the following is a specification.

My invention relates to the manufacture of incandescent lamp filaments from plastic material such as tungsten powder mixed with a suitable binder or agglomerated by the colloidal process, and its object is to provide an automatic machine for forming the filament loops of proper shape and dimensions from this plastic material.

The novel features of my invention are pointed out with particularity in the appended claims.

My invention will best be understood by reference to the accompanying drawings, showing one embodiment of my invention, in which—

Figure 1 represents a side elevation, with the casing partly broken away, of a machine constructed in accordance with my invention. Fig. 2 shows in a similar manner an elevation at right angles to that of Fig. 1. Fig. 3 shows a plan view with the top of the casing partly broken away. Fig. 4 is a cross-section of the squirting device and Fig. 5 is a detail view of the filament and its carrier.

In the drawings A represents an inclosing casing within which is mounted the vertical shaft B. This shaft is driven by a gear C which is engaged by a worm *c* on shaft D which is driven through pulley *d* or other means. The shaft B is provided with a suitable bearing E on a fixed support *e*. On the upper end of the shaft is fixed a carrier F which is provided with a series of studs or projections *f*. These studs, as the shaft B revolves, move through a path intersecting the filament as it comes from the squirting device G. This squirting device, which is shown in cross-section in Fig. 4, comprises a cylindrical chamber in which is placed the plastic material which is squirted through a die *g* by the pressure exerted by the plunger *g'*. This device may be mounted above the main casing A in a suitable box H. The plunger *g'* is pressed slowly downward by a screw J which passes through a screw threaded support *j* and is rotated by a grooved pulley or other suitable means *j'*. The box H may be provided with glass windows as indicated.

The plastic material comes from the die in a continuous filament which is picked by the projections *f* on the rotating carrier F. These projections are spaced apart by a distance corresponding approximately to the desired width of the filament loop, and the speed of the carrier is such that during the interval between the passage of successive projections *f* beneath the squirting die a sufficient length of filament is squirted for a single filament loop. I find that satisfactory results may be obtained if the carrier F rotates at such a speed that one projection *f* per second passes the squirting die. By the passage of these successive projections beneath the squirting die, the filament as it comes from the die is looped in zig-zag form on the projections as clearly shown in Fig. 2. The series of loops thus formed are caried around (approximately 270° in the arrangement shown in the drawings) until they come opposite the burners K. A pair of these burners are provided, each supplied with gas and air through pipes *k* and *k'*, and the pair of burners are spaced apart by the width of a filament loop and act to direct blasts of heat simultaneously against the two sides of the loop as it passes the burners and thus to sever the loop from the continuous filament. These burners emit continuous flames and in order to prevent the preceding side of a loop from being severed as it approaches the first burner the arrangement shown in detail in Fig. 5 is employed. The burners are so arranged as to direct their flames at slightly different heights so as to strike the carrier on points as indicated by the circles 1 and 2 in Fig. 5. The carrier F in this figure is supposed to be moving from right to left. On the projection *f* over which the filament is looped are metal plates *f'* which are outside the filament, that is, between the filament and the burners. These plates project below the

point 1 which represents the position of the flame of the burner which is first reached by a loop. It will thus be seen that while the left hand pin *f* was passing the flame at 1 the plate *f'* on that pin shielded the filament from the flame. When, however, the filament reaches the position shown in Fig. 5 the two blasts of heat are directed simultaneously on the two sides of the loop so that the loop drops from the carrier.

At the same time that each loop is severed, a rod L, pivoted at 1, is thrown forward into the position shown in dotted lines in Fig. 2. This rod is actuated by pins or studs *c'* on the gear C, which serially engage a cam *m* (best shown in Fig. 3) on the end of a rod M, so as to move the rod to the left as viewed in Figs. 2 and 3, thereby rocking the rod L into the dotted line position of Fig. 2. When in this position the rod L engages the bight of the loop which sticks to the rod just enough so that when the upper ends of the loop are severed the loop is inverted in falling so that it drops with the bight uppermost on to the support O, and is thus caught by this support. This support may be in the form of a conductor provided with terminals *o*, *o* so that current may be sent through it to heat it sufficiently to soften the loops and cause their bights to conform to the shape of the support O. In this way the natural bend of the loops as they hang from the carrier may be modified as desired. As soon as a pin *c'* passes out of engagement with the cam surface *m* the rods M and L are returned to the full line positions in Fig. 2 by the compression spring *m'*.

As will be seen from Fig. 5, after each loop is severed from the continuous filament a small portion of the filament is left hooked over each support *f*, as it leaves the second burner. To remove this portion, a brush N is provided between the burners and the squirting die so that each pin *f* is cleaned and ready to receive another loop when it again reaches the squirting die.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. An automatic machine for forming filament loops of plastic material, comprising means for squirting said material in a continuous filament, means for forming the continuous filament in a series of loops, and means for severing said continuous filament into separate loops.

2. An automatic machine for forming filament loops of plastic material, comprising means for squirting said material in a continuous filament, means for catching said filament as it is squirted and looping it in zig-zag form, and means for severing the zig-zag filament into separate loops.

3. In a machine for forming filament loops of plastic material, means for squirting said material in a continuous filament, a carrier, and projections on said carrier traveling in a path intersecting the filament as it is squirted and spaced apart by a distance approximately equal to the desired width of the loops.

4. In a machine for forming filament loops of plastic material, a carrier, means for stringing thereon a continuous filament of said material in a series of loops, and means operative when each loop reaches a predetermined point for directing on both sides of the loop simultaneously blasts of heat for severing the loop from the continuous filament.

5. In a machine for forming filament loops of plastic material, a carrier, means for stringing thereon a continuous filament of said material in a series of loops, a pair of burners spaced apart approximately the width of a loop and projecting their flames into the path of the loops, and means for shielding the preceding side of a loop from the flame of the first burner it passes.

6. An automatic machine for forming filament loops of plastic material, comprising means for squirting said material in a continuous filament, means for forming the continuous filament in a series of loops, means for severing said continuous filament into separate loops, and means for catching the severed loops by their bights.

7. An automatic machine for forming filament loops of plastic material, comprising means for squirting said material in a continuous filament, means for forming the continuous filament in a series of loops, means for severing said continuous filament into separate loops, and a member movable into engagement with the bights of successive loops as they are severed.

8. In a machine for forming filament loops of plastic material, means for forming a continuous filament of said material in a series of depending loops, means for severing individual loops near their upper ends, means for inverting the several loops as they fall, and a support for catching the inverted loops by their bights.

9. In a machine for forming filament loops of plastic material, a carrier, projections thereon, means for stringing on said projections a continuous filament of said material in a series of depending loops, and means for severing simultaneously both sides of a loop just below the supporting projections.

10. In a machine for forming filament loops of plastic material, a carrier, projections thereon, means for stringing on said projections a continuous filament of said

material in a series of depending loops, means for severing simultaneously both sides of a loop just below the supporting projections, and means for removing from said projections the remaining portions of the filament after the depending loops have been severed.

In witness whereof, I have hereunto set my hand this 15th day of December, 1911.

LEONARD E. DEMPSTER.

Witnesses:
BENJAMIN B. HULL,
HELEN ORFORD.