June 5, 1951 P. LEBRUN 2,555,893

GLASS BEAD FORMING MACHINE

Filed April 30, 1948 2 Sheets-Sheet 1

Fig. 1.

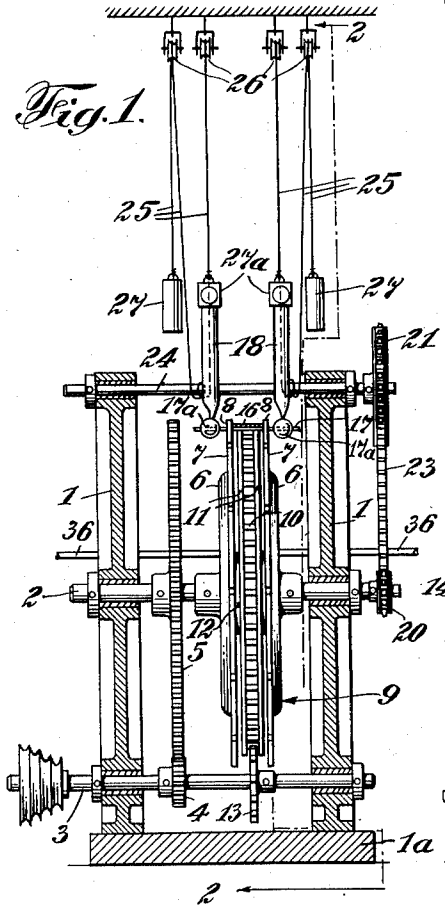


Fig. 2.

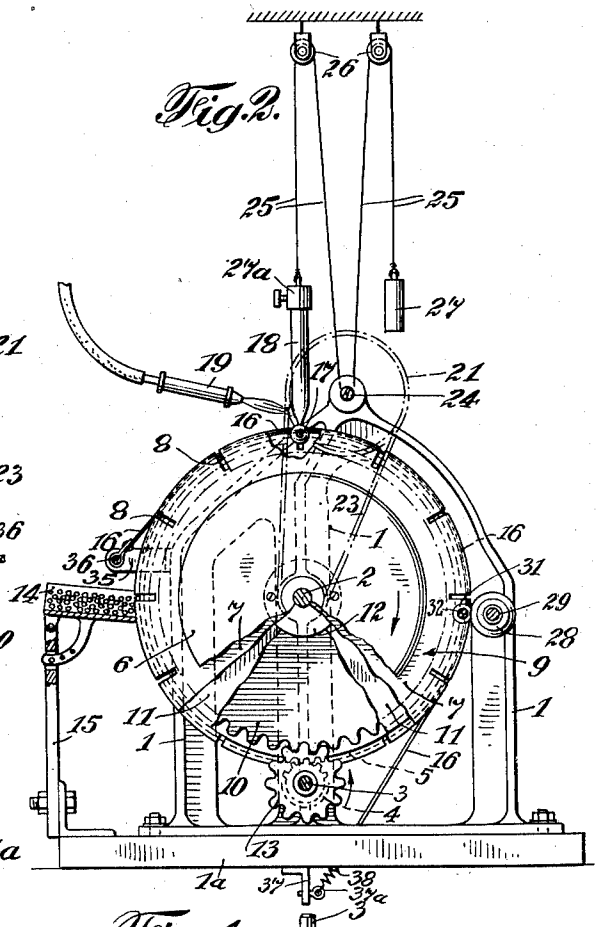


Fig. 3.

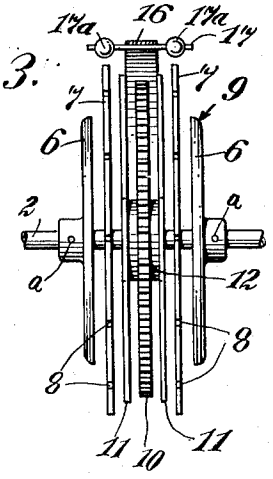
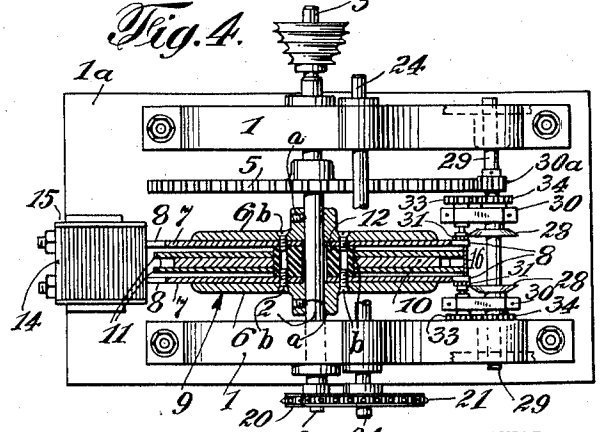


Fig. 4.



INVENTOR.
Paul Lebrun
BY
C. P. Goepel
his ATTORNEY

June 5, 1951 P. LEBRUN 2,555,893

GLASS BEAD FORMING MACHINE

Filed April 30, 1948 2 Sheets-Sheet 2

Fig. 5.

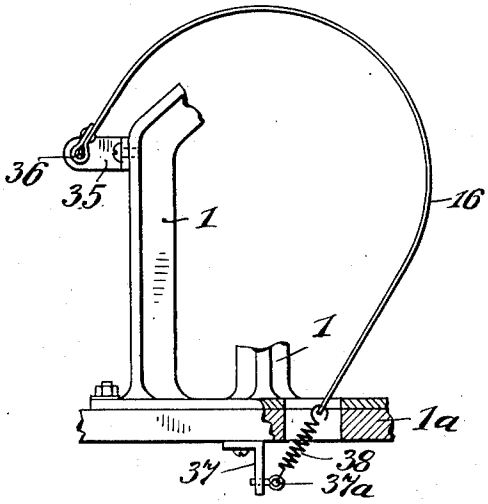


Fig. 6.

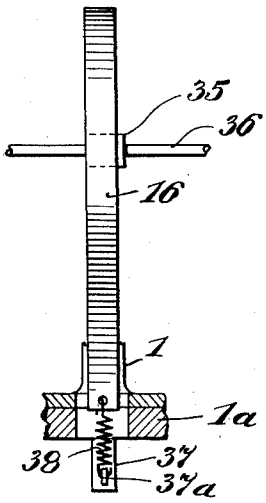


Fig. 7.

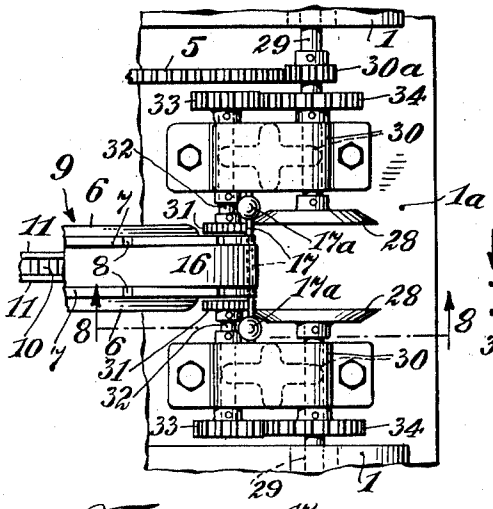


Fig. 8.

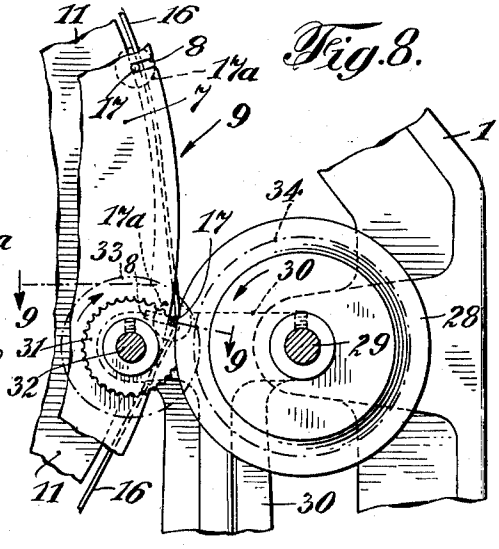


Fig. 9.

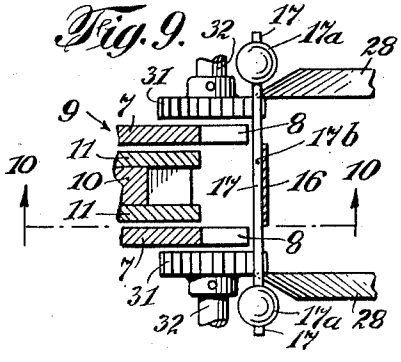
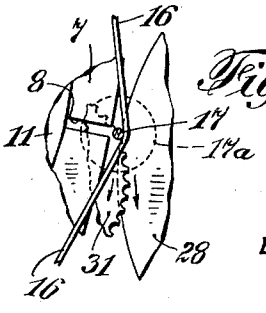


Fig. 10.



INVENTOR.
Paul Lebrun
BY C. P. Goepel
his ATTORNEY

Patented June 5, 1951 2,555,893

UNITED STATES PATENT OFFICE

2,555,893

GLASS BEAD FORMING MACHINE

Paul Lebrun, Long Island City, N. Y.

Application April 30, 1948, Serial No. 24,150

2 Claims. (Cl. 49—7)

1

This invention relates to glass bead forming machines.

The object of the invention is to form a glass bead from a heated glass rod in a continuous operation, substantially unaided by the hand of man, save for periodic adjustment of the glass rod heating flame due to variations in gas pressure.

The invention consists in means for supporting a metal wire, as copper, in a rotating disc, means for rotating the wire while moving with the disc, a regulated band for holding the wire against said last named means for rotating it, said band extending around a substantial portion of the disc, and being fastened to the frame of the machine exterior to the disc, means applying molten glass to the metal wire during its rotation, and means cutting off the wire close to the bead.

The invention consists also in the novel features of the band, and in the cutting device.

The invention will be further described, embodiments thereof shown in the drawings, and the invention will be finally pointed out in the claims.

In the accompanying drawings,

Fig. 1 is an end view partly in section;

Fig. 2 is a side view taken on line 2—2 of Fig. 1 seen in the direction of its arrows;

Fig. 3 is a spaced view of parts of the mechanism shown in Figs. 1 and 2;

Fig. 4 is a plan view partly in section of Fig. 2;

Fig. 5 is a side view of the band separate from the wheel to show its manner of being supported;

Fig. 6 is a front view of Fig. 5;

Fig. 7 is a fragmentary top view showing the wire cutting device;

Fig. 8 is a vertical section of Fig. 7, taken on line 8—8;

Fig. 9 is a detail top view somewhat enlarged over the scale used in Fig. 7, and taken on the line 9—9 of Fig. 8; and

Fig. 10 is a detail view taken on line 10—10 of Fig. 9, to show the operation of the grooved wheel carrying the wire.

Similar characters of reference indicate corresponding parts throughout the various views.

Referring to the drawings, the frame 1 consists of two vertical parallel spaced members, which support the driving shaft 3 and the shaft 2 above it. The shaft 2 is driven by the driving shaft 3, by the gears 4 and 5. On the shaft 2 is a main wheel 9 composed of these parts: a pair of cast jaws 6 in reverse form, on each of which is fastened a disk 7 of heat resisting metal having

2

a certain number of slots 8 circumferentially spaced. The shaft 2, the jaws 6 and the disks 7 rotate together. Adjacent the inner surface of each disk 7 is a disk 11 of a diameter larger than the diameter of the adjacent disk 7 measured at the bottom of the slots 8. Within the two disks 11 is a gear 10 (Fig. 3), arranged to rotate together, the disks 11 being of heat resisting metal. The disks 11 with the gear 10 between the same form a unit free of the shaft 2 and of the sleeve 12. The disks 11 and gear 10 have central openings for the passage of the sleeve 12.

A box 14 is mounted on a support 15. In this box 14 are placed a certain number of wires cut the proper length. The box 14 is set to allow an angular adjustment and spacing relative to the disk 7, so that one wire at a time may drop into and be picked up by a pair of opposed slots 8 of the two disks 7. Wires 17 of predetermined and even lengths held in the slots 8 travel with the disks 7. As soon as the said wire contacts a ribbon or band spring 16 it starts turning, and when it reaches its highest position, it receives on both ends a certain amount of glass from the glass rods 18 which glass is melted by a torch or burner 19 seen in Fig. 2. The amount of glass distributed on both ends of the wire 17 is accurately controlled by the rotation of the shaft 24. The cable or appropriate chain 25 seen in Fig. 2 is twisted around the shaft 24 and being guided from the top by the pulleys 26 gives, in its descending movement, an even distribution of glass on the wire. Weight and counterweight 27 assures a soft and perfect motion. After both beads are formed on a single piece of wire, by the rotary movement of the wire, they travel circumferentially with the discs 7 and cool off during their travel until they reach two circular cutting wheels 28.

On the shaft 2, is secured a sprocket 20 over which a chain 23 passes, which also passes over sprocket 21 on a shaft 24 rotatable in the upper ends of the frames 1. A cable 25 passes over the shaft 24 preferably with one convolution, and the cable 25 passes over two pulleys 26. One free end of the cable 25 is provided with a weight 27. The other free end of the cable 25 is provided with a co-balancing counterweight 27*a*, in the form of a sleeve holding glass rods 18. The glass rods 18 are suspended vertically and in a vertical plane. The weight of the rods 18 and the counterweight, are adjusted to the weight 27, and the rods 18 are given an even downward movement.

At each of the perimeters of the disks 7, a cutting device is applied to cut the wire at two

points, just where the wire extends laterally of the disks 7, and as close to the beads as possible. The intermediate piece of wire without a bead, is collected, and may be sold as metal. The two short pieces of wire each with a bead thereon is subjected to an acid bath to dissolve the metal and leave the bead free of any portion of the wire.

In Fig. 4 is shown generally and diagrammatically the wire cutting attachment, which is shown in detail in Figs. 7 to 10.

Referring to larger views, in Figs. 7 to 10, the bed plate 1*a* supports two spaced bearing supports 30. In each, a shaft 29 rotates, which has a pinion 30*a* keyed thereto, and has an adjacent gear wheel 34, at one side of the support 30 and a cutter 28 at its other side. This cutter 28 is a rotary cutter and bevelled, the sharpened edge of which is adapted to cut the wire 17, holding the beads 17*a*. The wire 17 is cut about the same distance from the bead, as the length of the wire extends out of the other side of the bead.

A gear wheel 5 meshes with the pinion 30*a* to drive the shaft 29. A pinion 33 meshes with the gear wheel 34 and a shaft 32 secured to the gear wheel 33 is supported in bearings in the support 30. The shaft 32 extends through the support 30, and has secured to it a grooved wheel 31. This grooved wheel 31 extends at its periphery beyond the periphery of the wheel 9. The grooved wheel 31 is so placed that the wire 17 with its pair of beads may drop from its slot 8 upon a transverse groove in the grooved portion, so that the wire is conveyed to the cutting edge of the disc knife 28. The side of the grooved wheel is close to the side of the cutting wheel as seen in Fig. 9. The band 16 yields by the pressure of the wire 17 when moved by the grooved wheel, as shown in Fig. 10. At the other side of the wheel 9, a similar structure is provided, so that the wire 17 is cut twice simultaneously. The intervening part 17*b* of the wire 17, drops down, as also the two beads 17*a*, with a minimum of wire therein. This small amount of wire is then dissolved by a suitable acid, and the beads are assorted and are ready for sale. Preferably the shaft 29 runs the whole length of a batttery of wheels, if present.

The grooved wheel is placed in such a way that the cutting of the wire is done outside of the diameter of the main slotted disk 7. This is for the purpose to eject the wire out of the slot, and also to slightly bend the wire, so it can pass easily between the cutting wheels 28.

The band 16 has one end secured to a bracket 35 by a rod 36, on which one end of the band is preferably looped. The other end of the band is secured to a helical spring 38, the other end of which is secured to a fastener 37*a*, supported by a bracket 37. This band may be adjusted to give a gentle yielding pressure to the wires 17 to hold them in the slots, and to act as a resistance, to assure rotation of the wires while the bead is being formed.

The rod 36 preferably passes along a battery of wheels, if present. This arrangement has the purpose to regulate the proper tension of the band 16 on the main wheel, and at the same time allow some flexibility to the band, especially in case two or three wires are picked up in a slot.

The operation is as follows:

When the driving shaft 3 is rotated by a suitable power pulley, it communicates its rotation to the shaft 2 by the intermediary of the gears 4 and 5 and the jaws 6 and disks 7 follow the same rotation, as jaws 6 and disks 7 are keyed to the

shaft 3. In the meantime, the gear 13, which is also driven by shaft 3, gives a rotary movement to the gear 10 and to the disks 11, which gearing 10 and disks 7 are freely rotatable on sleeve 12 of the shaft 2, independent of the jaws 6 and disks 7. The gears 4 and 5 and also 10 and 13 are so related to each other that the gear 10 and disks 11 turn slightly faster than the jaws 6 and disks 7. The purpose of this is to create a differential speed, so that when a wire is held in the bottom of the slots 8, and held by the band 16, and reaches its uppermost or highest position, it is rotated by the plates 11, and thus rotates at the proper speed pre-determined by the requirements of bead formation. The wire is held in contact with the disks 11 by the band 16 arranged over a certain arc of about 180° of the disks 11. The band 16 has such a rigidity and inherent resiliency, as shown in Fig. 5, as to stay in its initial position around the wheel to prevent it from collapsing against any part of the wheel. However, the metal bead wire acts to press against the band, and slightly displace it or give it a tension, whereby the band presses against the wire. By bringing the non-stretchable metal band over that part of the wheel after the molten glass has been applied to the wire, and have it extend close to the locality of the cutting device, the wire is rotated to complete the configuration of the bead, and the continued rotation tends to cool the bead until it reaches the cutter.

The wires 17 with their partially formed beads thereon, continue their rotation, while being carried along by their slotted discs 7, the beads gradually shaping themselves into final shape, and gradually cooling. When they reach the cutting device, the cutting operation takes place as described.

The important improvement is the regulated band action, and the cutting device, both combined with the wheel as described.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. In a glass bead forming machine having a driving shaft, the combination of a pair of disks rotatable circumferentially in a vertical plane having wire receiving slots open at the peripheries of the disks, a second pair of disks intermediary said first pair having smooth peripheries for contact with the wires in the slots for rotating the wires on their axes and having equal diameters and larger than the diameter at the bottoms of the slots in the first pair so that the wires rest on said second pair, means connected with the driving shaft for rotating the first pair, means connected with the driving shaft for rotating the second pair faster than the first pair, a band for holding the wires while in the slots of the first pair, against the peripheries of the second pair, said band having a span of more than 180° extending around the circumferences of the second pair, and a spring for said band for providing an elastic pressing action against the wires, said band extending circumferentially from the highest point of said second pair, with means for supplying a gob to the highest wire including means for suspending a pair of glass rods, spaced laterally from each other a distance larger than the width of said first pair of disks but within the length of the wires, a stationary burner, and means actuated by said driving shaft for moving the rod suspending means to lower

the ends of the rods, to the burner for heating the ends of the rods and moving the heated ends of the glass rods to the highest wire for forming a gob on the wire, said heating taking place when the next wire moves to its highest position.

2. In a glass bead forming machine having a driving shaft, the combination of a pair of disks rotatable circumferentially in a vertical plane having wire receiving slots open at the peripheries of the disks, a second pair of disks intermediary said first pair having smooth peripheries for contact with the wires in the slots for rotating the wires on their axes and having equal diameters and larger than the diameters at the bottoms of the slots in the first pair so that the wires rest on said second pair, means connected with the driving shaft for rotating the first pair, means connected with the driving shaft for rotating the second pair faster than the first pair, a band for holding the wires while in the slots of the first pair, against the peripheries of the second pair, said band having a span of more than 180° extending around the circumferences of the second pair, and a spring for said band for providing an elastic pressing action against the wires, said band extending circumferentially from the highest point of said second pair, with means for supplying a gob to the highest wire including a stationary burner, and means for sopporting a pair of glass rods spaced laterally from each other a distance larger than the width of said first pair of disks but within the length of the wires, and means actuated by said driving shaft for moving the lower ends of said glass rods to the burner for heating the ends and moving the heated ends of the glass rods to the highest wire for forming a gob on the wire, said heating taking place when the next wire moves to its highest position, a pair of cutting devices within said 180° span of the band for cutting the beaded wires within the beads thereon and exterior to the width of the band, and means connected with the driving shaft, for actuating said pair of cutting devices.

PAUL LEBRUN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
601,062	Neuss	Mar. 22, 1898
1,580,076	Paisseau	Apr. 6, 1926
1,643,215	Koenig	Sept. 20, 1927
1,709,524	Demers	Apr. 16, 1929
2,234,976	Muntwyler	Mar. 18, 1941

FOREIGN PATENTS

Number	Country	Date
152,762	Germany	June 22, 1904
630,452	France	Dec. 3, 1927