Aug. 31, 1937. H. H. SNYDER 2,091,494

GLASS WORKING MACHINE

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Fig. 1

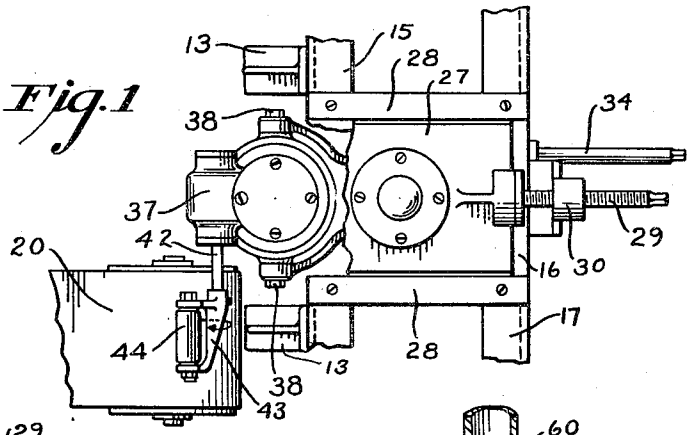


Fig. 2

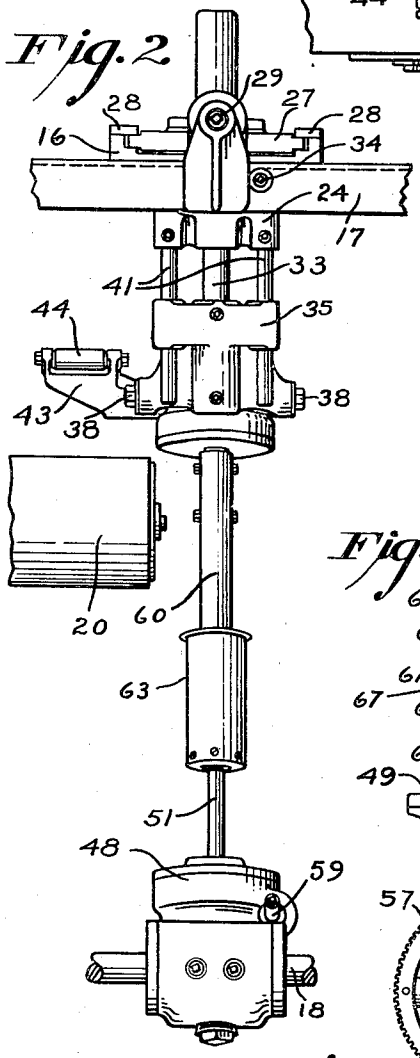


Fig. 8

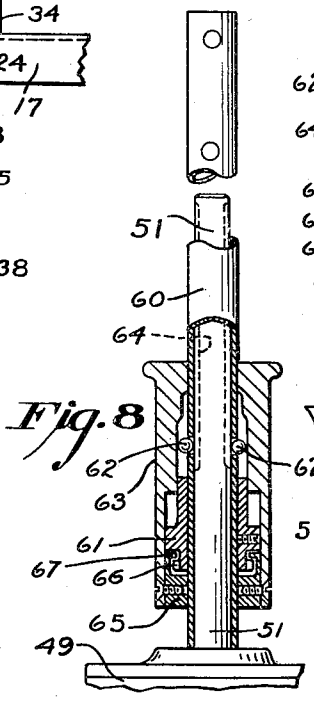


Fig. 7

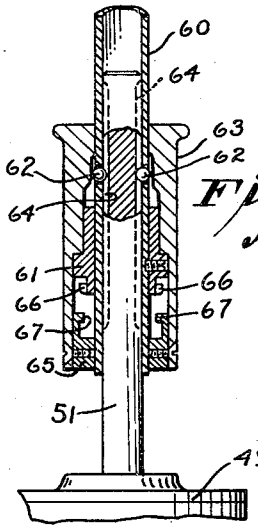


Fig. 10

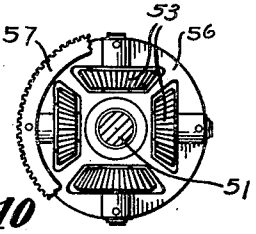
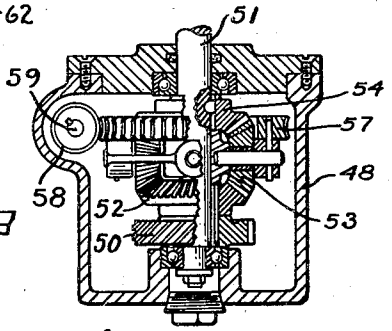


Fig. 9



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Fig. 3

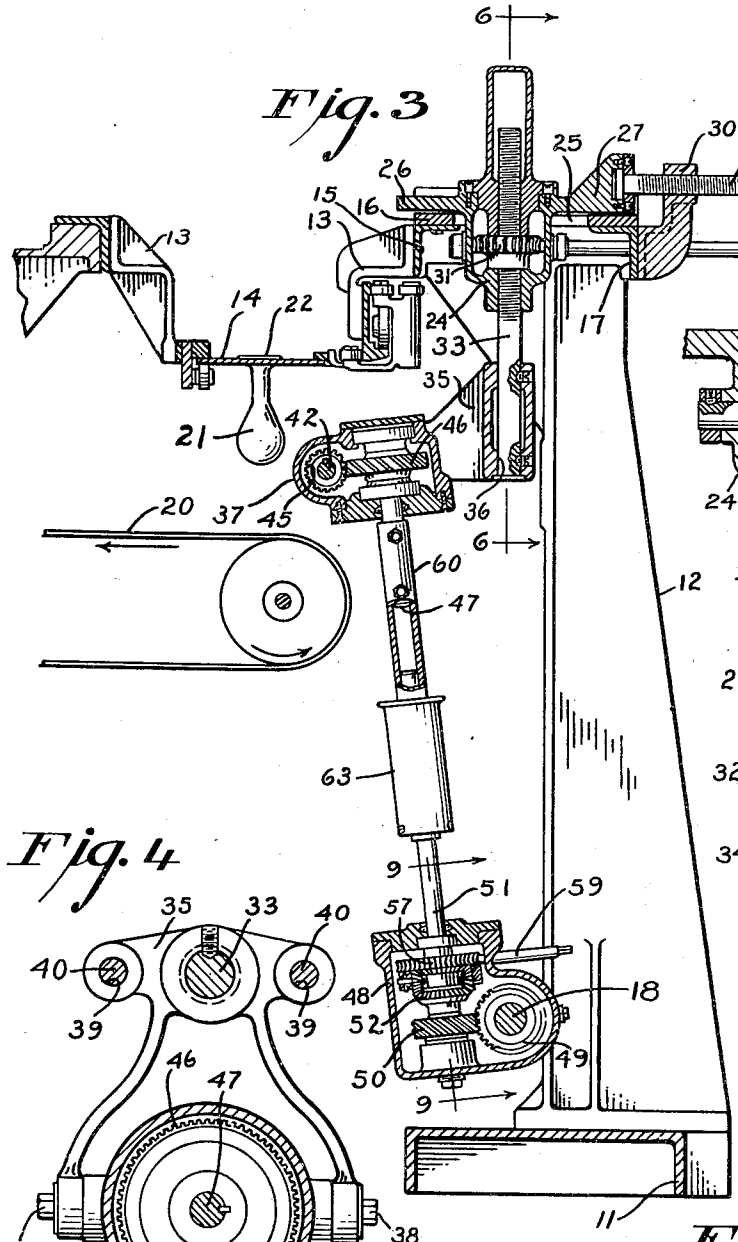


Fig. 5

Fig. 6

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Patented Aug. 31, 1937 2,091,494

UNITED STATES PATENT OFFICE

2,091,494

GLASS WORKING MACHINE

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Application May 23, 1936, Serial No. 81,488

14 Claims. (Cl. 49—48)

This invention relates to glass working machines and more particularly to the improvement of machines of the type wherein the separation of finished articles from a travelling ribbon of glass is effected by an ejector mechanism which strikes the articles as they reach a predetermined point in their travel.

In the instant disclosure the invention embodies the provision of an improved type of ejector mechanism as well as its application to a glass blowing machine of the general type disclosed in Woods et al. Patent No. 1,790,397, granted January 27, 1931, although not necessarily limited to such a machine.

An object of the invention is to provide a striking mechanism which performs the article severing operation in a more positive and effective manner than heretofore possible.

Another object of the invention is to provide a striking mechanism which is continuously driven in the same direction and strikes the articles to be severed a glancing blow which gives the articles a combination horizontal and downward movement.

A still further object of the invention is to provide a machine which has facilities for making precision adjustment of the timing of the striking action with respect to the glass ribbon and the articles to be severed from it, as well as facilities for the adjustment of the vertical and horizontal positions of the striking mechanism with respect to the ribbon.

Other objects and features have to do with the provision of a mechanical arrangement wherein the striking action is uniform and positive at all speeds of operation of the machine, and is substantially free from vibration irrespective of its speed of operation.

In the drawings:

Fig. 1 is a plan view of a portion of a bulb blowing machine provided with a striking mechanism constructed in accordance with this invention, and its relation to an article receiving conveyor;

Fig. 2 is a rear elevation of Fig. 1;

Fig. 3 is a side elevation of Fig. 1, partly in section, and also showing a sectional view of part of the article carrier of the machine, not illustrated in Fig. 1;

Figs. 4 and 5 are enlarged sections of certain of the parts not clearly illustrated in the other views;

Fig. 6 is an enlarged sectional view of part of the striker mechanism taken on the line 6—6 of Fig. 3;

Fig. 7 is an enlarged sectional elevational view of the striker drive shaft and coupling assembly;

Fig. 8 is a view similar to Fig. 7, but shows an alternative position of the coupling with respect to the drive shaft of the striker assembly;

Fig. 9 is an enlarged sectional elevation of the transmission unit of the striker assembly, taken on the line 9—9 of Fig. 3; and

Fig. 10 is a plan view of certain of the parts within the transmission casing.

Referring to the drawings in detail, the bulb blowing machine includes a bed 11 (Fig. 3) to which standards such as 12 are secured. These standards support, at their upper ends, rails 15 and 17 on which a plate 16 is carried. The usual travelling article carrier 14 is suspended from brackets 13. A main drive shaft 18 extends longitudinally of the machine near the lower ends of the standards 12 and serves to transmit power to the article carrier and other moving parts of the machine, only those driving connections having to do with the present invention being shown.

A receiving conveyor, designated 20, of any well known form is so positioned with respect to the article carrier 14 as to receive the formed articles 21 as they are severed from the ribbon of glass 22 supported on the carrier 14.

A casing 24 depends through a hole 25 in the previously mentioned plate 16 and has extension members 26 and 27 which slide in channels formed jointly by parts of plate 16 at points opposite hole 25 therein and members 26, as best illustrated in Figs. 1 and 2. An adjusting screw 29 is threaded into a bracket 30 secured to rail 17 and has a flanged end fixed to, but rotatable in, the sidewall of extension 27 of the casing 24. Within the casing 24 there is a worm wheel 31 having its bore threaded to receive the threaded end of a vertically disposed shaft 33, having its unthreaded portion extending through the bottom of the casing for a purpose which will hereinafter be made clear. A worm 32 within casing 24 (see Fig. 5) and in mesh with worm wheel 31 is secured on an adjusting shaft 34 appropriately journalled in the sides of casing 24. By examination of Figs. 1, 2, and 3, it will therefore become apparent that by turning adjusting screw 29 the casing 24 and shaft 33 may be moved toward or away from the article carrier 14; and that, similarly, by rotation of worm 32 by means of its associated shaft 34, the worm wheel 31 may be rotated to raise or lower the shaft 33 with respect to the article carrier 14. The purpose of providing the vertical and horizontal ad-

justment of the position of shaft 33 with respect to the article carrier will be explained subsequently.

The lower end of shaft 33 is introduced into a bore 36 of a bifurcated bracket 35 and is held in place by suitable set screws. The bifurcated parts of bracket 35 partially surround a striker assembly casing 37 and are pierced to receive studs 38 threaded into the walls of this casing and on which the casing may rotate a limited extent. The bracket 35 is also provided with bores 39 for receiving guide rods 40 (Fig. 4) which are secured in appropriate sockets 41 (Fig. 5) depending from the lower portion of casing 24. These rods serve to prevent rotary movement of bracket 35 and its supporting shaft 33.

The casing 37 (Fig. 3), which supports the striker mechanism proper, is provided with a horizontally disposed striker shaft 42 journalled in suitable bearings in the walls of casing 37. One end of this shaft extends outside the casing and has fixed thereto a striker arm 43 carrying a roller 44 for severing the articles 21 from their supporting ribbon 22 as such articles are successively presented at a predetermined point in their travel. In the present instance, the severing operation is arranged to occur as the articles 21 are successively positioned over the moving conveyor 20. It will therefore be appreciated that the purpose of providing for vertical and horizontal adjustment of shaft 33 is to enable the proper positioning of the striker mechanism with respect to the articles carried by ribbon 22. Within the casing 37 a gear 45 is fixed to striker shaft 42 and meshes with a similar gear 46 carried by a shaft 47 also journalled in suitable bearings in the casing walls and having its lower end extending downward through the casing. Motion is transmitted to the shaft 47 by the main drive shaft 18 of the machine through the medium of a transmission within a casing 48 (Figs. 3 and 9) and a suitable striker drive shaft assembly which will be described later.

The transmission assembly includes a gear 49 (Fig. 3) within the transmission casing 48 secured for rotation with main shaft 18. The gear 49 meshes with a similar gear 50 mounted for free rotation on a drive shaft 51 extending upwardly in axial alignment with shaft 47 also journalled in suitable bearings in the casing 48 (Fig. 9). The gear 50 is in turn connected to a bevel gear 52 and through the medium of a set of bevel gears 53 and a cooperating bevel gear 54 transmits motion to the shaft 51 to which the latter gear is fixed. The bevel gears 53, it will be observed (Fig. 10), are arranged to rotate in bearings carried by a spider 56 and which also has fixed thereto a worm wheel 57 which, as illustrated in Fig. 9, meshes with a worm 58 secured to a shaft 59 mounted in suitable bearings in the casing 48. The worm 58 and its cooperating worm wheel 57 are provided to enable the rotary position of shaft 51 to be varied with respect to that of shaft 18 for a reason which will be subsequently made clear.

It will be appreciated that the vertical as well as the horizontal adjustment of the striker arm 43 will result in a variation in the distance between casing 37 and the transmission casing 48 and that, therefore, the driving connection between these casings must be arranged to take care of these variations. It is also desirable that the driving connection be relatively easily removed from the shaft 51 so as to enable easy removal of the unit carried by casing 37. These features as incorporated in the instant structure are best illustrated in Figs. 7 and 8 and include a tubular shaft 60, the top end of which slips over and is bolted to shaft 47 and the lower end of which slips over the shaft 51. Surrounding and fixed to the lower end of shaft 60 is a bushing 61 a short distance above which are balls 62 introduced into holes in the tubular shaft 60. A cylindrical casing 63 is slid over the shaft 60 and, when in the position shown in Figs. 3 and 7, forces the balls 62 into channels 64 in shaft 51. These channels run lengthwise along the shaft 51, and while the balls and channels prevent rotary movement of the shaft 60 with respect to shaft 51 they permit the necessary endwise movement which occurs during adjustment of the position of casing 37 with respect to articles such as 21. A bushing 65 closes the space between the bottom of casing 63 and shaft 60.

When occasion requires, the removal of the casing 37 and the associated striker mechanism may be readily accomplished by moving the casing 63 upward on tubular shaft 60 to the position in which it is illustrated in Fig. 8, thereby permitting the balls 62 to move clear of the channels 64 so that by removing the studs 38 the casing 37 and that part of the assembly also including shaft 60 may be withdrawn from association with shaft 51. As a convenience in holding the casing 63 in the position just described, the lower portion of the bushing 61 and the upper portion of bushing 65 are provided with cooperative bayonet members 66 and 67 which when rotated slightly with respect to each other hold the casing 63 locked in the position with respect to the shaft 60 in which they are shown in Fig. 8.

In preparing for the operation of the glass working machine, adjusting screw 29 and adjusting shaft 34 are rotated as required to bring the striker mechanism proper, carried by casing 37, in the appropriate vertical and horizontal position with respect to ribbon 22 which is determined as the best position for effecting the article severing operation. As these adjustments are being made, a slight necessary rotation of casing 37 occurs on the studs 38, while the transmission casing 48 is similarly slightly rotated about main shaft 18.

After the necessary adjustments in the position of striker mechanism proper with respect to the articles 21 have been made, due to the slight rotation of the casing 37 thereof, the position of striker arm 43 in the arc traversed by it may not be that best suited to the effective severing of the articles. The proper positioning of this arm may however be readily obtained by its rotation with respect to main shaft 18 simply by rotating spider 56 of the transmission assembly, through the medium of the hereinbefore mentioned worm wheel 57 and the cooperating worm 58 on its shaft 59.

In the operation of the glass working machine, the main drive shaft 18 rotates and through the medium of equipment, not shown, causes the carrier 14 to successively present articles, such as bulbs 21, to the receiving conveyor 20. At the same time the roller 44, carried by arm 43 and also rotated by power transmitted to it through the medium of the shaft 18, strikes the article a sharp glancing blow, thus separating it from the ribbon 22 by imparting a downward and rotating or horizontal motion to the article. The motion transmitted to the article is such that it accurately directs the severed articles onto the conveyor 22.

While in the foregoing there has been shown and described the preferred embodiment of my invention, it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be made without departing from the spirit and scope of the invention.

I claim:

1. The combination with a travelling carrier supporting a glass ribbon from which articles are suspended, of means having a single direction of rotation arranged to strike and sever the articles from the ribbon.

2. The combination with a travelling carrier supporting a glass ribbon from which articles are suspended, of means rotating in one direction only and arranged to move through a path intersected by the articles so as to sever the articles from the ribbon and discharge them transversely of the direction of travel of the carrier.

3. The combination with a travelling carrier supporting a glass ribbon from which articles are suspended, of a continuously rotating element arranged to strike and sever the articles from the ribbon, and means to regulate the movements of the element relative to the ribbon.

4. The combination with an article receiving conveyor and a travelling carrier supporting a glass ribbon from which articles are suspended, said carrier successively presenting the articles to said conveyor, of continuously rotating means for severing the articles from the ribbon, ejecting the articles as they are presented to the conveyor, and simultaneously transmitting a turning motion to them.

5. The combination with an article receiving conveyor and a travelling carrier supporting a glass ribbon from which articles are suspended, said carrier successively presenting the articles to said conveyor, of rotating means for severing the articles from the ribbon as they are presented to the conveyor, and means to adjust the position of said rotating means vertically and horizontally.

6. The combination with an article receiving conveyor and a travelling carrier supporting a glass ribbon from which articles are suspended, said carrier successively presenting the articles to said conveyor, of rotating means for severing the articles from the ribbon as they are presented to the conveyor, means to adjust the position of said rotating means vertically and horizontally and means for adjusting the timing of the severing operation with respect to the instant position of the articles.

7. The combination with an article receiving conveyor and a travelling carrier supporting a glass ribbon from which articles are suspended, said carrier successively presenting the articles to the conveyor; of rotating means for severing the articles from the ribbon and ejecting them transversely of the direction of movement of the article carrier as they are presented by it to the receiving conveyor, and means to regulate the movements of the rotating means with respect to the articles.

8. The combination with an article receiving conveyor, and a travelling carrier supporting a glass ribbon from which articles are suspended and successively presented to the conveyor, of a rotating striker for severing the articles from the ribbon and ejecting them as they are presented to the conveyor.

9. The combination with an article receiving conveyor, a travelling carrier supporting a glass ribbon from which articles are suspended and successively presented to the conveyor, and of driving means for the carrier, a rotary striker for severing the articles from the ribbon and ejecting them as they are presented to the conveyor, and means associated with the carrier driving means for rotating the striker.

10. The combination with an article receiving conveyor, a travelling carrier supporting a glass ribbon from which articles are suspended and successively presented to the conveyor, and of driving means for the carrier, a rotating striker for severing the articles from the ribbon, means associated with the carrier driving means for continuously rotating the striker, and means for synchronizing the operation of the striker with the presentation of the articles to the conveyor by the carrier.

11. In a glass working apparatus having a travelling carrier supporting a glass ribbon from which articles are suspended, a rotating striker arranged to pass through an arc intersected by the articles to sever them from the ribbon as they are presented at a given point, means for adjusting the position of the striker with respect to the article, and means for timing the movement of the striker.

12. The combination with a travelling carrier supporting a glass ribbon from which articles are suspended, of an ejector mechanism arranged to sever the articles from the ribbon, a drive shaft for transmitting operating power to said ejector mechanism, and means providing a telescopic action of said drive shaft so as to enable the position of said ejector mechanism to be varied with respect to the ribbon.

13. The combination with a travelling carrier supporting a glass ribbon from which articles are suspended, of an ejector mechanism arranged to sever the articles from the ribbon, and means providing a telescopic action of said drive shaft so as to enable the height and horizontal position of said ejector mechanism to be varied with respect to the ribbon.

14. The combination with a travelling carrier supporting a glass ribbon from which articles are suspended and successively presented to an ejector, of means for transmitting a continuous rotary motion to such ejector to successively sever the articles from the ribbon.

HAROLD H. SNYDER.