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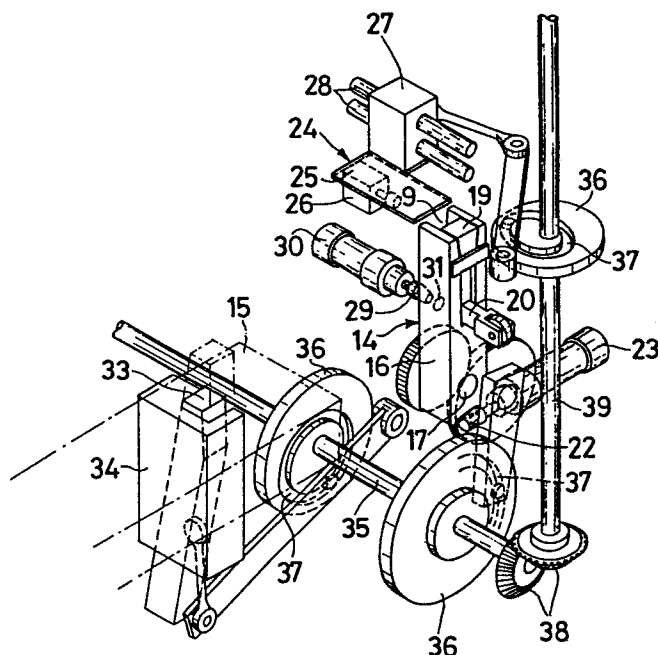
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54 **Device for automatically applying metal delivery mouths to packaging containers for products of fluid behaviour.**

57 This invention relates to a device for automatically applying metal delivery mouths to packaging containers for products of fluid behaviour, in which preformed delivery mouths are fed by gravity into a seat formed in an arm provided with a hammer which applies them.

Said arm is mobile alternately between a vertical position in which the mouth is received, and a horizontal position in which the mouth is applied to the container.

A unit is also provided for positioning the mouths in the arm seat in a correct manner suitable for their subsequent application to the containers.



This invention relates to a device for automatically applying metal delivery mouths to packaging containers for products of fluid behaviour, in particular cardboard containers for powders.

5 A device of this type is described for example in Italian patent 828,966.

In such devices the delivery mouths are formed from a metal strip and fed intermittently to a device, the purpose of which is to apply them to the boxes.

10 Said applicator device is formed structurally from a hammer and an anvil. The hammer comprises a cavity for receiving the formed delivery mouth, and is arranged to be moved, in synchronism with the anvil, into a position corresponding with the container in order to carry out the application of said mouth.

15 Machines of the type described in Italian patent 828,966 are large rotary machines of high productivity, and comprise a turntable carrying a plurality of said applicator devices each capable of successively applying the delivery mouths to the containers, which are continuously fed in an upright position by a suitable conveyor.

20 There is however the practical need for a machine of lower productivity, able to be coupled to packaging machines into which the empty containers are conveyed in a lying position by spindles which move stepwise.

The object of the present invention is to satisfy the aforesaid
25 need, and for this purpose the invention provides a device for automatically applying metal delivery mouths to packaging containers for products of fluid behaviour, of the type in which each mouth is

formed from a metal strip by a forming unit and is fed to a complementary seat in an arm provided with a hammer which is arranged to apply the mouth to a relative container, characterised in that said arm is mobile alternately between a vertical position in which the mouth is received in said seat from said forming unit by gravity, and a horizontal position in which said mouth is applied to a container, there being provided a positioning unit arranged to correctly locate the mouth in the seat, and sequential operating means for said unit and said arm.

10 The structural and operational characteristics of a device according to the present invention and its advantages will be more apparent from the description of one embodiment with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a perspective diagrammatic view showing, with the frame removed, the movement linkages for the device for applying delivery mouths,

15 Figure 2 is a partial sectional elevation showing the loading of the feed mouth into the hammer cavity,

Figure 3 is a view of the device in the direction of the arrow F of Figure 2,

20 Figure 4 is a sectional detail showing the correct positioning of the delivery mouth inside the hammer,

Figure 5 is the same view as Figure 3, showing the hammer disposed at the container, and ready to apply the delivery mouth,

25 Figure 6 is a partly sectional plan view of Figure 5, and Figure 7 is the same view as Figure 6, but showing the delivery mouth positioned on the container.

With reference to the drawings, the device according to the invention is formed from a frame 10 carrying a forming unit indicated diagrammatically by 11 and of known type, arranged to form delivery mouths 12 from a metal strip 13.

5 The formed mouths 12 are fed one at a time to an underlying applicator device, indicated overall by 14, which offers them up to a cardboard container 15 and applies them thereto.

The applicator device 14 comprises a right angular arm 16 which swivels about 17 between the vertical position shown in Figure 3
10 and the horizontal position shown in Figure 5.

At the free end of the arm 16 there is provided a seat or cavity 9 in which a percussion head 19, commonly known as a hammer, slides on suitable guides 18. To provide its movement, said head 19 is articulated to one end of a bell crank lever 20 pivoted at 21 to
15 the arm 16, and maintained in the position of Figure 2 by a spring 8. Said bell crank lever is oscillated by the rod 22 of a cylinder 23 fixed to the machine frame.

A positioning unit indicated overall by 24 cooperates with the described applicator device 14.

20 Said unit 24 is composed of a blade 25 and a pusher 26 which are rigid with each other and are carried by a slide 27 slidable on guides 28.

The blade 25 and relative pusher 26 are mobile horizontally forwards and backwards between the positions shown in Figures 2 and 4.

25 A locking device also cooperates with the applicator device, and consists of the rod 29 of a cylinder 30, said rod becoming inserted into two bores 31 of the arm 16, so as to lock it exactly and securely

in said vertical and horizontal positions.

The containers 15 are mounted in a lying position on spindles 32 of a packaging machine (not shown) mobile stepwise. In moving, said spindles 32 carry each container 15 against a counter-member 33 which is mobile vertically in a guide block 34 between the lowered position of Figure 3 and the raised position of Figure 5.

The oscillation of the arm 16 about 17, the horizontal movement of the positioning unit 24 and the vertical movement of the counter-member 33 are controlled in the correct sequence by means of a single control system.

This control system can for example comprise a drive shaft 35 with which there are rigid two plates 36 in which cam seats 37 are formed in order to provide, by means of lever systems, the abutting movement of the counter-member 33 and the oscillation of the arm 16 about 17 respectively.

By way of a bevel gear pair 38, said shaft 35 drives a second shaft 39 carrying a third plate 36 comprising a cam seat 37 which operates the positioning unit 24 by means of lever systems.

The operation of the device according to the invention is as follows.

The delivery mouths 12, formed by the forming unit 11, are made to fall one at a time into the underlying applicator device 14. More specifically, the mouth 12 falls into the cavity 9 (Figure 2) when the percussion head 19 is in its rest position, in which it is maintained by the action of the spring 8 on the bell crank lever 20.

The positioning unit 24, operated by the combination of that plate

36 with cam seat 37 driven by the shaft 39 and the relative lever systems, moves by virtue of the sliding of the slide 27 on the guides 28 until the blade 25 and the pusher 26, which is provided with elastic means, correctly position the mouth 12 against the percussion head 19 (Figure 4).

At this point the positioning unit returns to its initial position, and, after the cylinder 30 withdraws its rod 29 from the bore 31, the arm 16 rotates into the horizontal position of Figure 5 where it becomes locked by the insertion of the rod 29 of the cylinder 30 into the second bore 31 (Figure 6).

This rotation is operated by the lever systems connected to that plate 36 with cam seat 37 which is driven by the shaft 35.

Before the rotation of the arm 16, the packaging machine (not shown) has already moved one of its spindles 32, on which a container 15 is disposed, into a position corresponding with the mobile counter-member 33 when in its raised position (Figure 5).

The cylinder 23 is operated so that its rod 22 engages against the lever 20 pivoted at 21, to cause the percussion head 19 to slide on the guides 18.

This movement results in the application of the mouth 12 to the container 15, as can be seen from Figure 7.

The counter-member 33 is lowered inside the guide block 34, and the packaging machine rotates its spindle 32, which carries the container 15 to which the mouth 12 has been applied.

Simultaneously, the rod 22 of the cylinder 23 retracts, and the spring 8 returns the arm 20 and the head 19 connected to it into the rest position (Figure 6).

The rod 29 of the cylinder 30 withdraws from the second bore 31 and enables the arm 16 to return to the vertical position under the forming unit 11, where it is locked by the engagement of the rod 29 of the cylinder 30 in the first bore 31 (Figure 2).

- 5 At this point the cycle is repeated in order to apply a mouth 12 to a further container 15.

CLAIMS:

1. A device for automatically applying metal delivery mouths to packaging containers for products of fluid behaviour, of the type in which each mouth is formed from a metal strip by a forming unit and is fed to a complementary seat in an arm provided with a hammer which is arranged to apply the mouth to a relative container, characterised in that said arm is mobile alternately between a vertical position in which the mouth is received in said seat from said forming unit by gravity, and a horizontal position in which said mouth is applied to a container, there being provided a positioning unit arranged to correctly locate the mouth in the seat, and sequential operating means for said unit and said arm.
2. A device as claimed in claim 1, characterised in that said mobile arm comprises at one end a seat in which a percussion head slides in a guided manner under the action of the end of a lever which is pivoted to the arm and is moved by operating means which act on its other end and are separated from this latter.
3. A device as claimed in claim 2, characterised in that said arm is a right angular arm mobile between the vertical position and horizontal position about a pivot, and is locked in said positions by the rod of a cylinder, which becomes inserted into bores provided in the arm portions of the right angular arm.
4. A device as claimed in claim 2, characterised in that said lever is caused to swivel, in the horizontal position, by the rod of a cylinder which is connected to the load-bearing structure.
5. A device as claimed in claim 1, characterised in that said positioning unit is constituted by a blade and pusher which are

rigid with each other and are driven by operating means.

6. A device as claimed in claim 5, characterised in that said blade and said pusher are located on a slide which is slidable on guides rigid with the structure and is driven by operating means.

5 7. A device as claimed in claim 1, characterised by comprising a counter-member mobile vertically in a guide between a raised position and a lowered position and cooperating during the hammer percussion stage with the container, which is carried by a packaging machine spindle.

10 8. A device as claimed in claims 1, 2, 5 and 7, characterised in that said mobile arm, said positioning unit and said counter-member are moved in the correct sequence by a single control system which operates cams for controlling the succession of movements.

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Fig.1

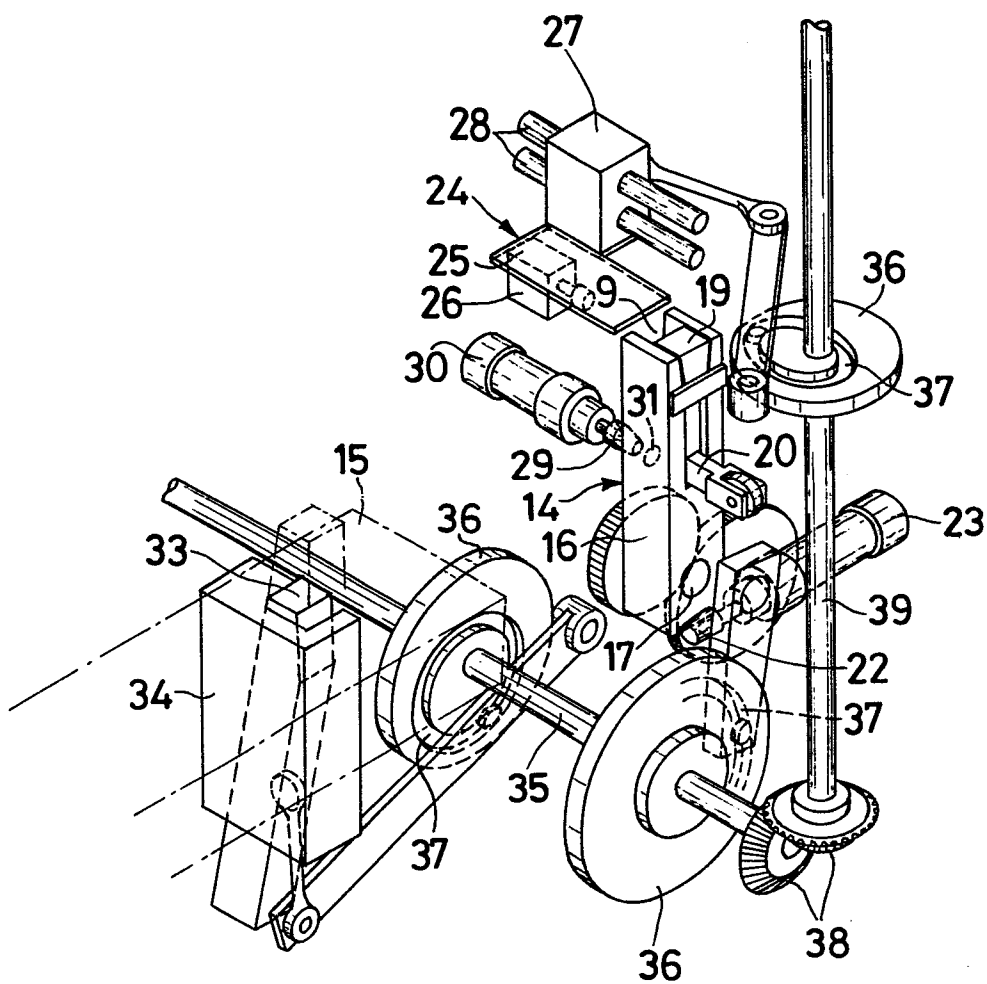


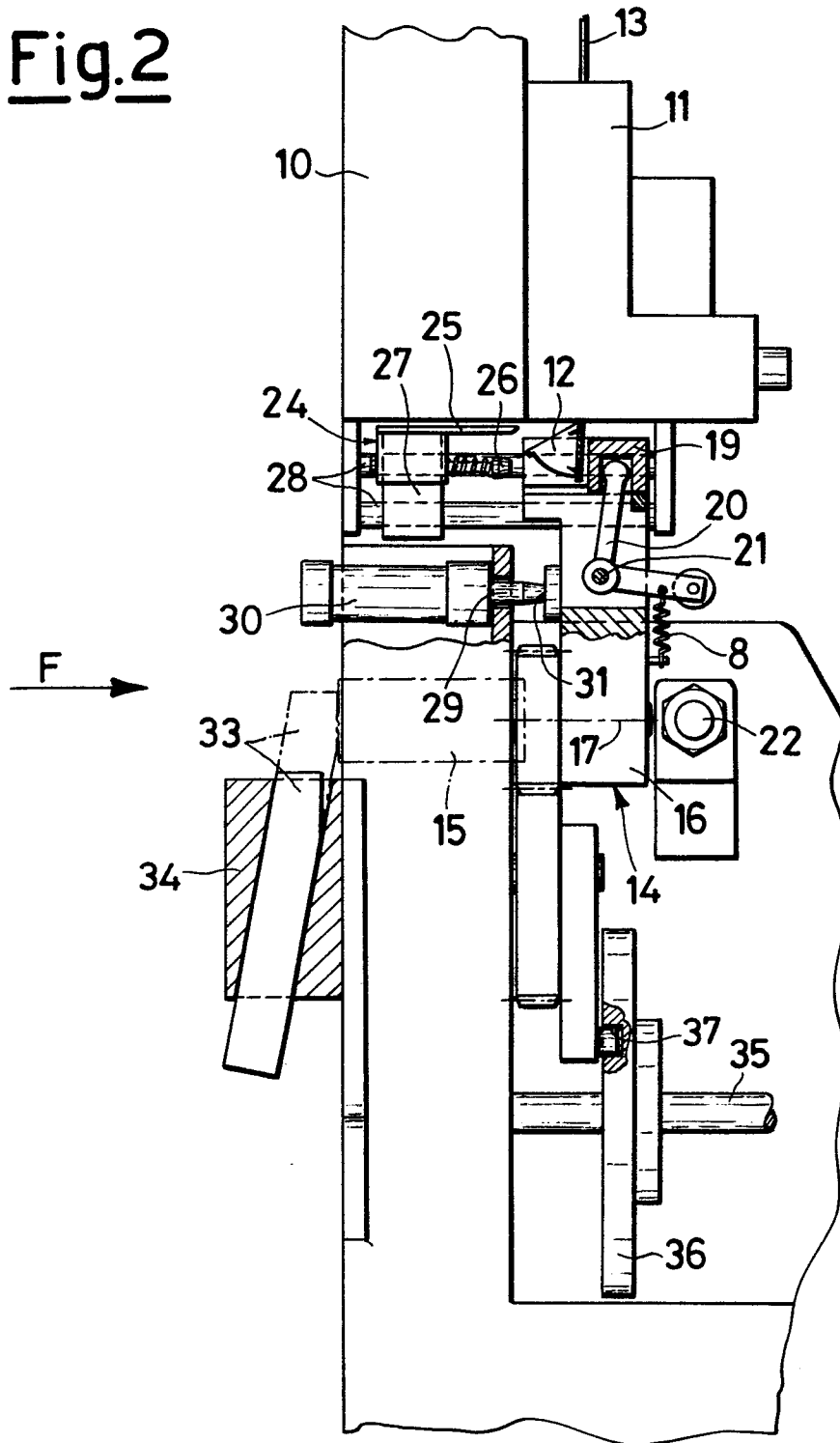
Fig.2

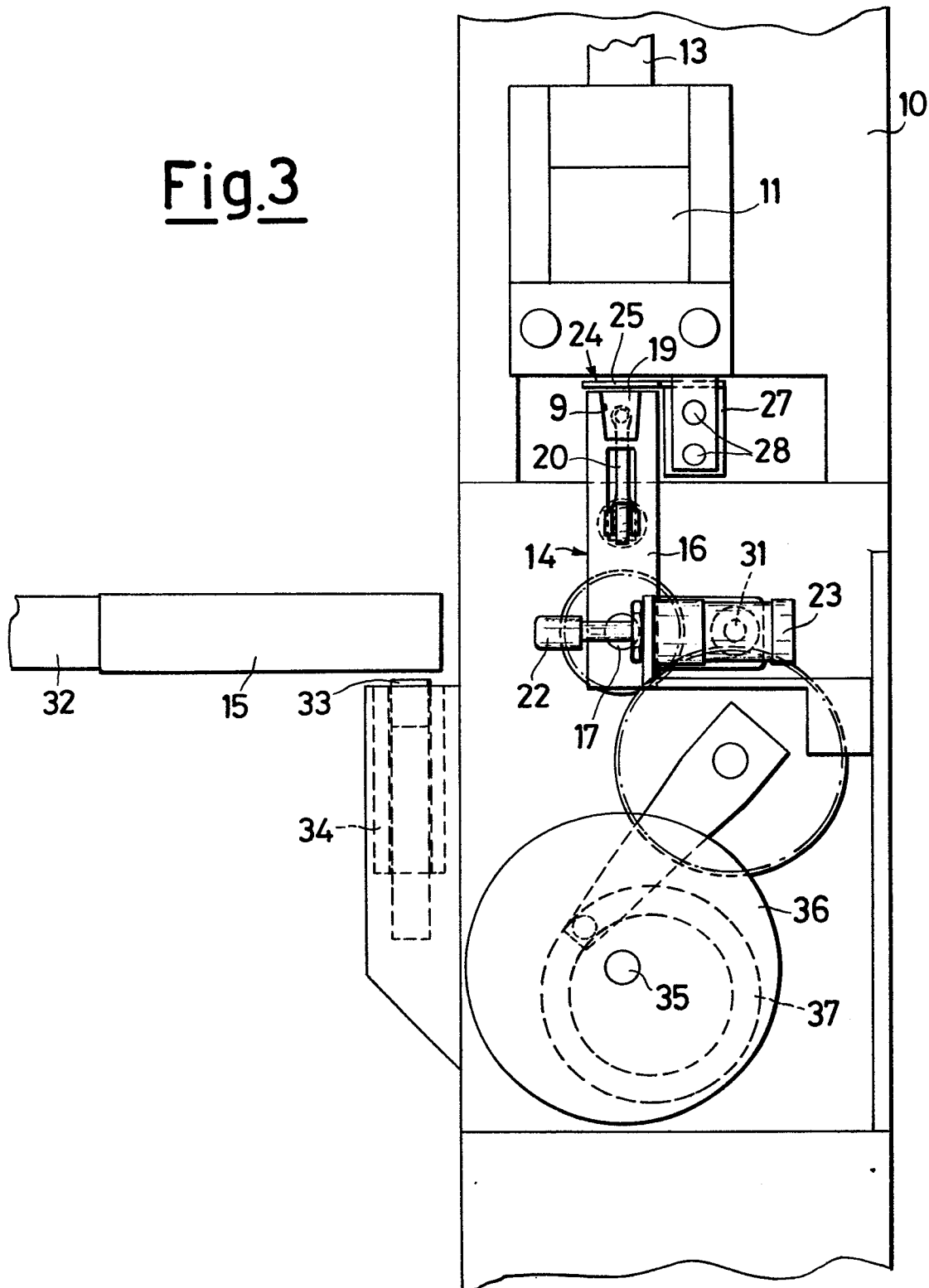
Fig.3

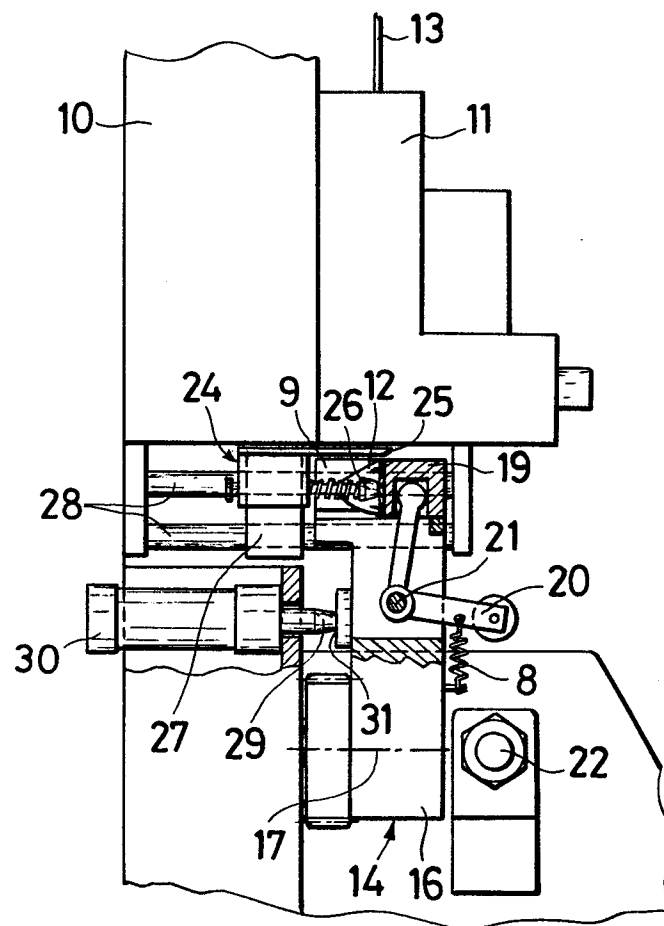
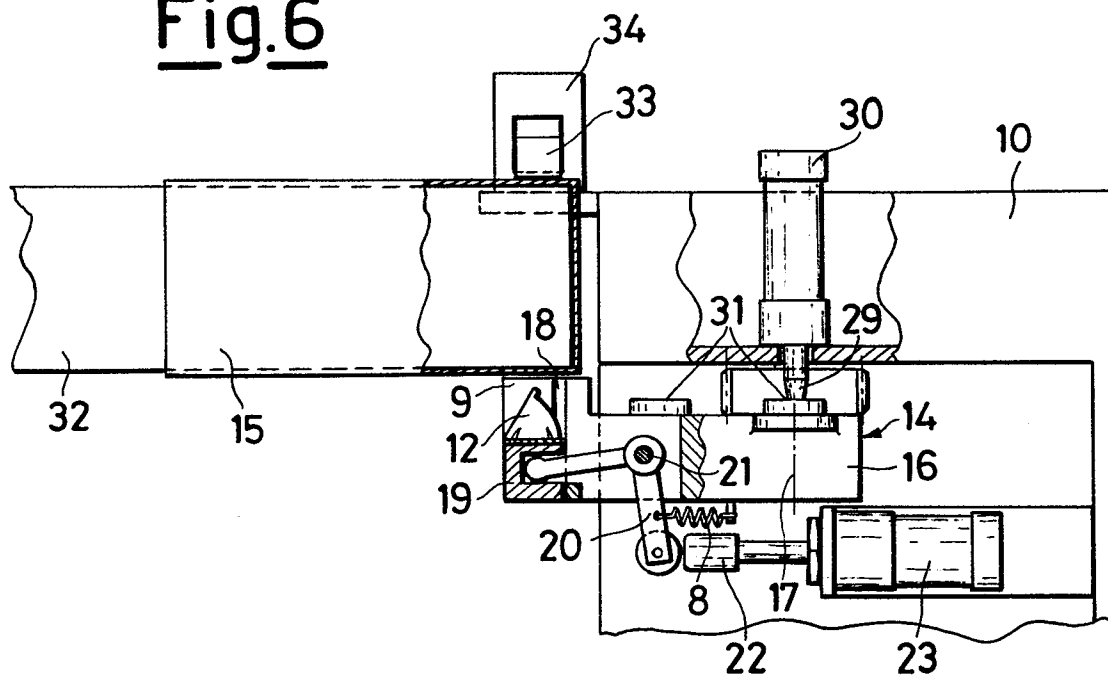
Fig.4

Fig.5

Fig.5 is a schematic diagram of a mechanical assembly. The assembly includes a horizontal shaft (15) with a flange (32) at its left end. This shaft is connected to a vertical assembly (10). The vertical assembly (10) consists of a base (11) with a central shaft (13) and two circular components (25, 26) on either side. A bracket (27) is mounted on the right side of the base (11), containing two circular components (28, 29). A horizontal arm (14) is connected to the base (11) and the shaft (15). The arm (14) has a flange (19) and a central shaft (20). A bracket (23) is mounted on the right side of the arm (14), containing two circular components (31, 32). A large circular component (36) is shown below the arm (14), with a central shaft (35) and a flange (37). A dashed line (33) indicates a vertical component, and a dashed line (34) indicates a horizontal component.

Fig.6Fig.7