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(54) Machine for producing at least one continuous rod of smoking material.

(57) A machine (1) for producing at least one continuous rod (7) of smoking material, the machine (1) presenting a forming beam (10), and at least one folding plate (32) extending facing the beam (10) and movable in relation to the beam (10) by virtue of an adjusting device (18) controlled by a control device (48) having a device (49) for detecting the diameter of the rod (7) produced.

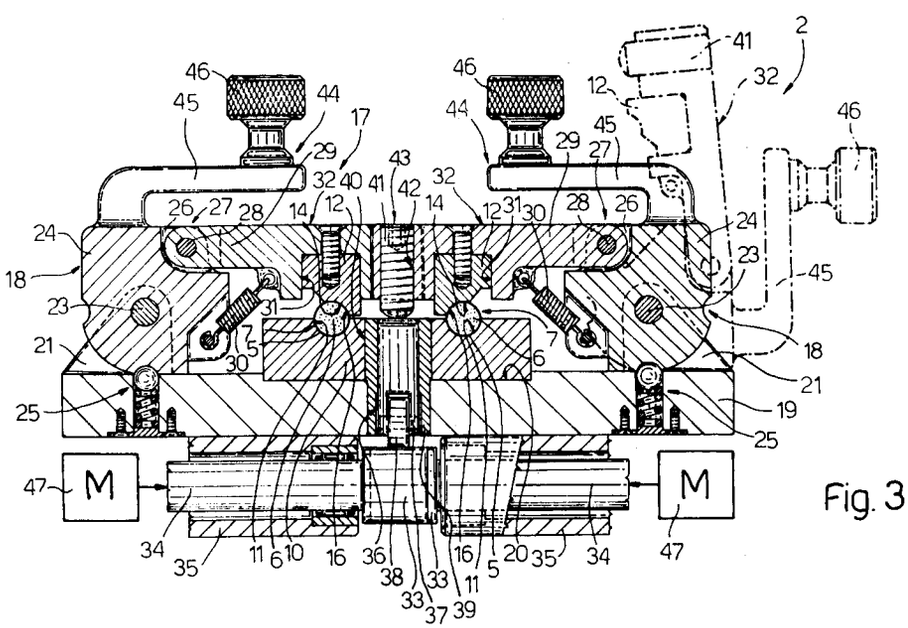

Fig. 3

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The present invention relates to a machine for producing at least one continuous rod of smoking material.

In particular, the present invention relates to a machine for producing at least one continuous cigarette rod, which is subsequently cut transversely into cigarette portions. In the following description, therefore, reference will be made purely by way of example to a machine for producing at least one continuous rod of tobacco.

It is an object of the present invention to provide a machine of the aforementioned type enabling straightforward, effective, automatic control of the rod diameter, for maintaining it substantially constant and equal to a predetermined value.

According to the present invention, there is provided a machine for producing at least one continuous rod of smoking material of a given diameter, the machine comprising a forming beam having at least one longitudinal groove; and a folding plate mating with said beam and positioned facing the groove; the plate being located a given distance from the beam so as to define, with the groove, a channel for forming a continuous rod; characterized by the fact that it comprises means for detecting said diameter; and an adjusting device interposed between the beam and the plate, for adjusting said distance in response to a signal emitted by said detecting means.

According to a preferred embodiment of the above machine, hinge means are provided between the beam and the plate for enabling the plate to rotate in relation to the beam and about an axis parallel to said groove; the adjusting device comprising adjustable supporting means interposed between the beam and at least one plate supporting point, and the supporting point being located a given distance from said axis.

Said axis and said supporting point are preferably located on either side of said groove.

Also preferably, the adjusting device comprises a cam rotating in relation to the beam and about an axis fixed in relation to the same; said supporting means comprising a tappet associated with said cam and movable by the same in a direction perpendicular to the beam.

A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Fig.1 shows a block diagram of a unit for producing cigarette portions;

Fig.2 shows a partial plan view of a detail on the Fig.1 unit;

Fig.3 shows a section along line III-III in Fig.2.

Number 1 in Fig.1 indicates a machine for producing cigarette portions (not shown) and comprising a forming unit 2 supplied by two known feed units 3 and 4 with two paper strips 5 and, respectively, two streams of tobacco 6 for simultaneously forming two continuous cigarette rods 7 (Fig.s 2 and 3). Machine 1 also comprises a known cutting device 8 located downstream from unit 2 in the traveling direction 9 of rods 7, and which provides for cutting rods 7 into portions (not shown) of given length.

As shown in Fig.s 2 and 3, unit 2 comprises a forming beam 10 having a pair of substantially semicircular-section grooves 11 extending parallel to direction 9 and each designed to receive a respective paper strip 5 and a respective stream of tobacco 6. Unit 2 also comprises a pair of known folding elements 12 extending facing respective grooves 11, and each having a laterally helical-shaped input portion 13, and, on the side facing respective groove 11, a curved-section groove 14 defining, with respective groove 11, the end portion 15 of a channel 16 for forming respective rod 7.

The width of end portions 15 of channels 16 and, consequently, the diameters of respective rods 7 are adjustable automatically by means of an adjusting unit 17 comprising, for each rod 7, an adjusting device 18 associated with a plate 19 common to both devices 18.

Plate 19 supports beam 10, and presents a central longitudinal seat 20 engaged by the bottom portion of beam 10. From the opposite longitudinal ends of plate 19, there project upwards two pairs of lateral appendixes 21 (Fig.s 2 and 3) extending perpendicularly to plate 19 on either side of beam 10 and defining respective forks 22. By means of a pin 23 parallel to direction 9, each fork 22 is hinged to the longitudinal edge of a respective elongated body 24, which may be fixed selectively, about pin 23 and by means of a spherical lock device 25, in two distinct angular positions substantially 90° apart.

On the end opposite that adjacent to plate 19, each body 24 comprises three spaced appendixes 26 parallel to appendixes 21 and defining a fork device 27 to which is hinged, by means of a pin 28 parallel to pin 23, the longitudinal edge of a plate 29 extending from respective body 24 and over beam 10, and pulled towards beam 10 by a spring 30 stretched between plate 29 and respective body 24. On the side facing beam 10, each plate 29 presents a seat 31 housing a respective element 12 connected in removable manner to plate 29 and defining, with the same, a folding plate 32.

As shown in Fig.2, adjusting devices 18 are mutually spaced along beam 10, and each comprises (Fig.3) a cam 33 fitted on to a respective shaft 34 perpendicular to direction 9 and supported for rotation by two bushes 35 integral with plate 19.

Each cam 33 cooperates with a respective tappet element 36 defined by a cylindrical rod 37 and by a tappet roller 38 contacting the outer

surface of cam 33 and connected to one end of rod 37 so as to rotate in relation to rod 37 and about an axis parallel to shaft 34. Each rod 37 extends perpendicular to respective shaft 34, and engages, in axially-sliding manner, a respective sleeve 39 fitted inside a hole 40 formed through plate 19 and beam 10 and between grooves 11. At the opposite end to that fitted with roller 38, each rod 37 cooperates with a respective pin 41 for manually adjusting the zero position of respective plate 32 about respective pin 28. Each pin 41 engages a threaded hole 42 formed in an end portion 43 of respective plate 29 located on the opposite side of respective groove 14 as compared with pin 28 and aligned with the corresponding end portion 43 of the other plate 29 in a direction parallel to direction 9, and is maintained contacting respective tappet element 36 by respective spring 30.

Each device 18 also comprises a device 44 for manually raising respective plate 32. Each device 44 comprises an L-shaped lever 45 having one end integral with a respective elongated body 24 and adjacent to respective appendixes 26, and the free end of which is fitted with a knob 46. Devices 44 provide for rotating respective elongated bodies 24 between said positions, and, consequently, for rotating respective plates 32 between a lowered operating position, wherein plates 32 cooperate with forming beam 10 to define said channels 16, and a raised position wherein plates 32 are positioned clear of beam 10.

Again with reference to Fig.3, each shaft 34 is angularly connected to the output shaft of a respective electric step motor 47 controlled by a respective control device 48 designed to emit a control signal for electric motor 47 as a function of a signal emitted by a respective device 49 for detecting the diameter of rod 7 and preferably of the type known commercially as a "SOLEX 48931 diameter gauge" manufactured by Métrologie Solex M.S.E.

As shown in Fig.1, each control device 48 comprises a comparing unit 50 supplied with a first input signal from detecting device 49, and a second input signal from a known emitter 51 for emitting a reference signal proportional to the required diameter of respective rod 7. Comparing unit 50 determines, in known manner, the difference between the two input signals, and, if this exceeds a given threshold, supplies an enabling signal, proportional in value and sign to said difference, to a known unit 52 for controlling respective electric motor 47.

On receiving said enabling signal, unit 52 activates respective motor 47 in known manner and in one direction or the other, so as to adjust the angular position of respective plate 32 about respective pin 28 and, consequently, the diameter of respective channel 16 and respective rod 7 until the enabling signal is annulled, thus maintaining the diameter of respective rod 7 substantially equal at all times to a predetermined value.

Claims

1. A machine (1) for producing at least one continuous rod (7) of smoking material of a given diameter, the machine (1) comprising a forming beam (10) having at least one longitudinal groove (11); and a folding plate (32) mating with said beam (10) and positioned facing the groove (11); the plate (32) being located a given distance from the beam (10) so as to define, with the groove (11), a channel (16) for forming a continuous rod (7); characterized by the fact that it comprises means (49) for detecting said diameter; and an adjusting device (17) interposed between the beam (10) and the plate (32), for adjusting said distance in response to a signal emitted by said detecting means (49).

2. A machine as claimed in Claim 1, characterized by the fact that hinge means (27) are provided between the beam (10) and the plate (32) for enabling the plate (32) to rotate in relation to the beam (10) and about an axis (28) parallel to said groove (11); said adjusting device (17) comprising adjustable supporting means (36) interposed between the beam (10) and at least one supporting point of the plate (32); said supporting point being located a given distance from said axis (28).

3. A machine as claimed in Claim 2, characterized by the fact that said axis (28) and said supporting point are located on either side of said groove (11).

4. A machine as claimed in Claim 3, characterized by the fact that the adjusting device (17) comprises a cam (33) rotating in relation to the beam (10) and about an axis (34) fixed in relation to the beam (10); said supporting means (36) comprising a tappet element (36) associated with said cam (33) and moving, by virtue of said cam (33), in a direction perpendicular to the beam (10).

5. A machine as claimed in Claim 4, characterized by the fact that elastic means (30) are provided for maintaining said tappet element (36) permanently compressed between the plate (32) and the cam (33).

6. A machine as claimed in Claim 4 or 5, characterized by the fact that a motor (47) is connected angularly integral with said cam (33); the adjusting device (17) comprising control means (48) in turn comprising reference means (51) for emitting a reference signal proportional to a given diameter of said rod (7), comparing means (50) for comparing said reference value with a value measured by said detecting means (49), and a control unit (52) for emitting a control signal for said electric motor (47) in response to a signal emitted by said comparing means (50).

7. A machine as claimed in any one of the foregoing Claims from 2 to 6, characterized by the fact that said plate (32) presents a threaded pin (41) fitted to the plate (32) and axially adjustable in a direction substantially perpendicular to said beam (10); one end of said pin defining said supporting point.

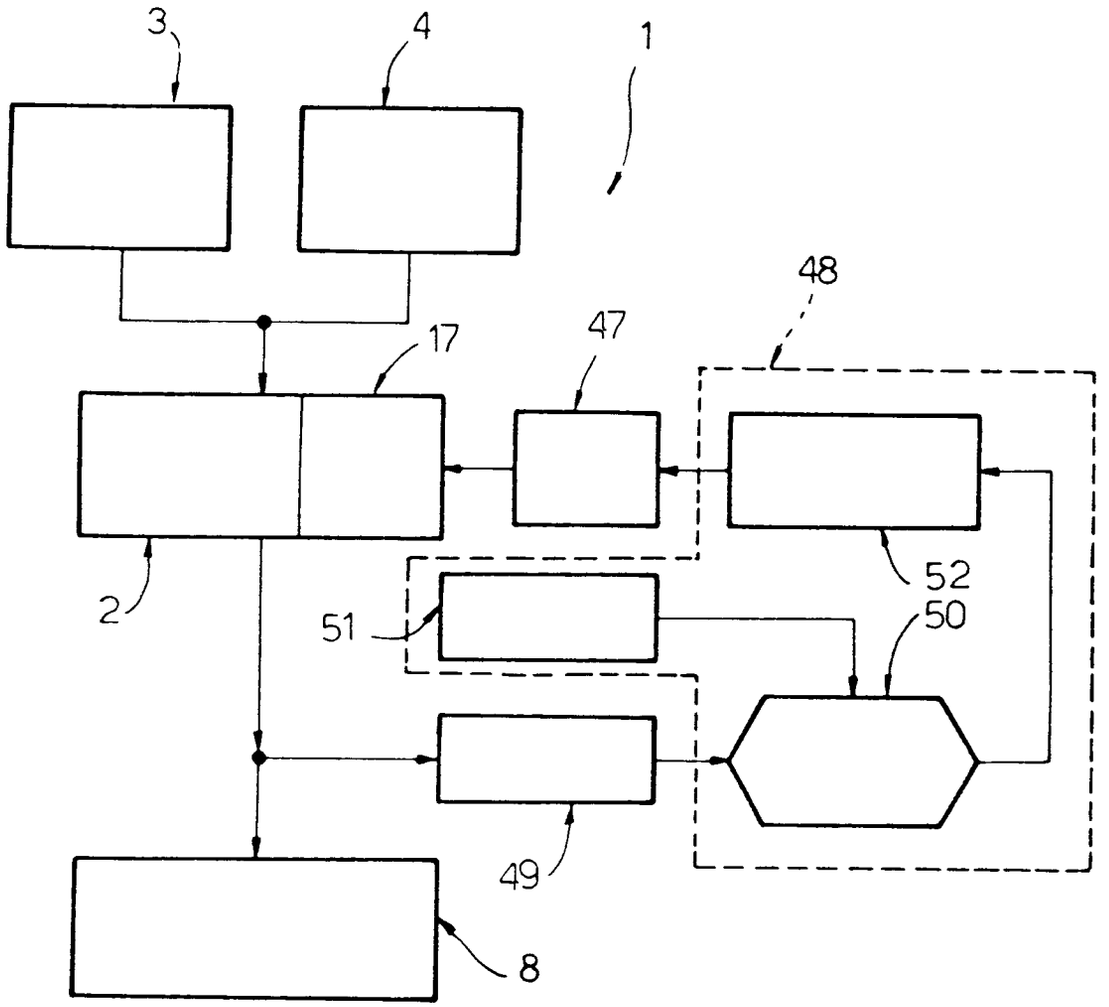

Fig. 1

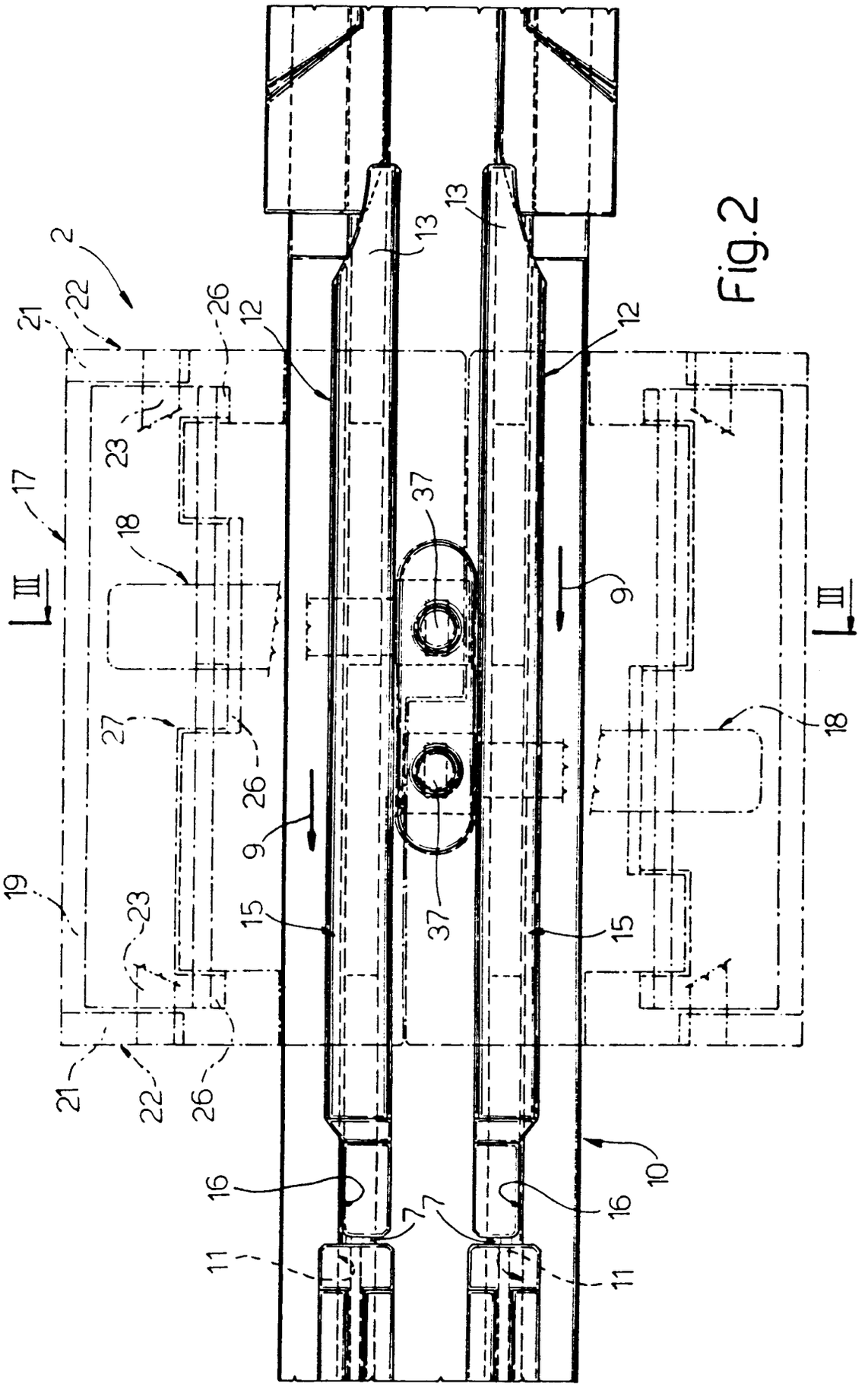

Fig.2

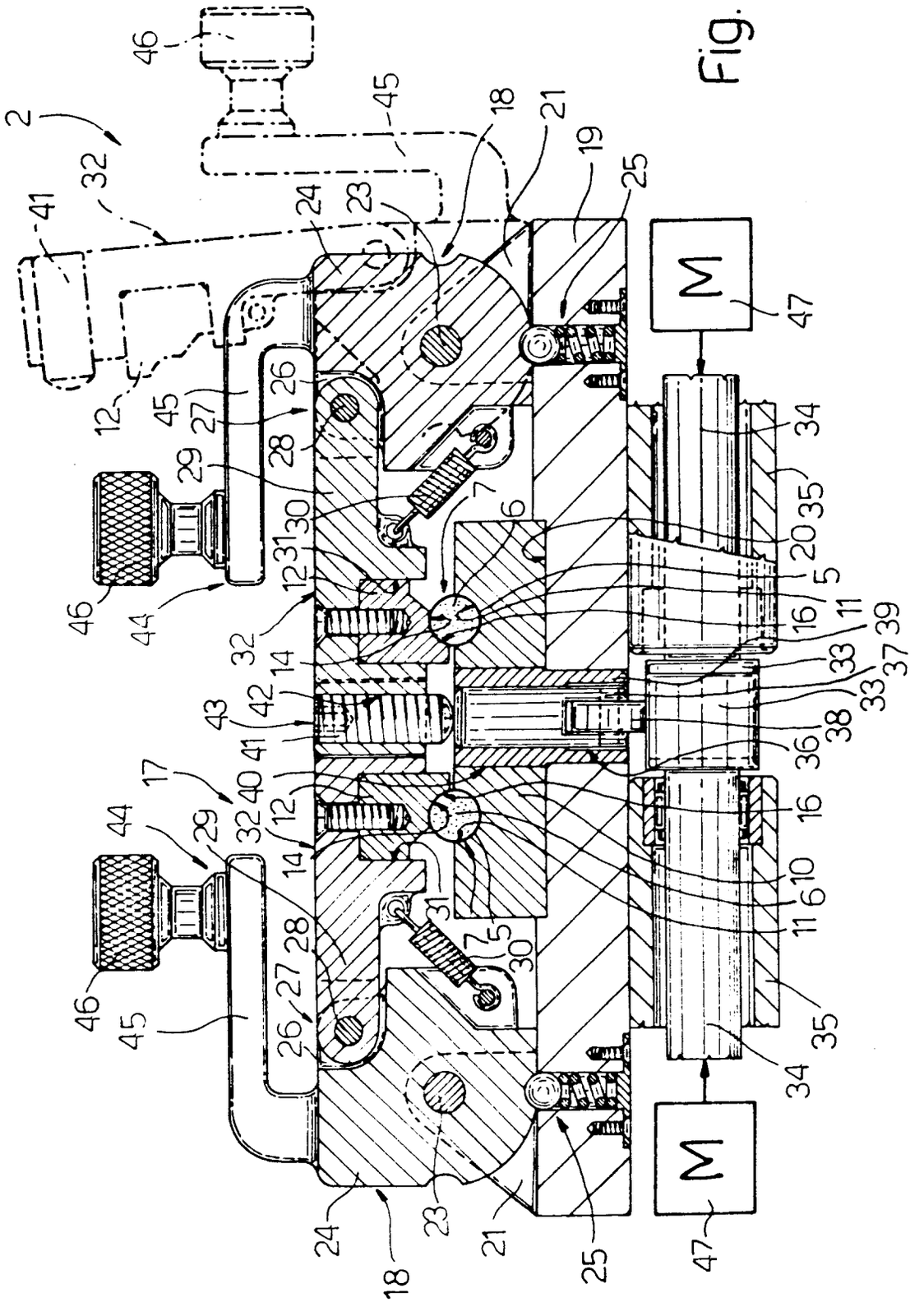

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number

EP 93 10 7169

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	DE-B-1 101 253 (H.F. & PH. F. REEMTSMA) * the whole document *	1	A24C5/18 A24C5/34
X	EP-A-0 294 211 (CELANESE FIBERS) * column 5, line 22 - column 6, line 38; figure 1 *	1	
A		6	
A	DE-A-3 541 142 (G.D.S.P.A.) * page 6 - page 19; figures 1-3 *	1,6	
A	DE-A-2 717 473 (HAUNI-WERKE KORBER) * the whole document *	1	
A	US-A-3 485 144 (WILLIS) * the whole document *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A24C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	06 AUGUST 1993	RIEGEL R.E.

CATEGORY OF CITED DOCUMENTS

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