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(54) **Industrial sewing machine for simultaneously performing a plurality of improved seaming lines.**

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CH-A- 665 229
DE-A- 3 407 271
DE-C- 72 258
FR-A- 691 277
GB-A- 2 188 951
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EP 0 353 208 B1

Description

BACKGROUND OF THE INVENTION

The present invention relates to a sewing machine,for industrial use,which has been specifically designed for simultaneously performing a plurality of different seaming lines.

As is known,in the garment industry frequently arises the need of performing several seaming lines which can be,for example,of the overlock or chain stitch type.

Also known is the fact that the mentioned main stitches must frequently be performed on a given portion of the same cloth or garment.

For example,for seaming a shirt sleeve,it is necessary to provide overlock stitches and then this seaming arrangement must be "stopped" by means of a chain stitch.

These different types of stitches,in particular, must be made on different sewing machines,with different working passes,which,as it should be apparent,in addition to requiring long operating times, frequently provides not perfectly finished products, because of the difficulty of holding the several seaming lines in a properly aligned condition.

SUMMARY OF THE INVENTION

The document GB-A-2 188 951 relates to a seaming machine having two needle bars which are parallel to one another and perform on a same fabric piece two separated seamings, parallel and with the same type of stitch. The machine disclosed in this document, accordingly, is not adapted to carry out two consecutive seamings of different types as those which can be performed by Applicant's seaming machine disclosed in the new main claim.

The document DE-C-72258 discloses a seaming machine which is tilted on a side and enclosed in a casing in order to prevent possible lubricating materials from contacting the fabrics being seamed. This is a machine including a single needle bar and which, accordingly, can not perform simultaneously different seaming operations Practically, the machine of this document operates as a conventional seaming machine in order to perform a single type of stitch at a time.

The document US-A-2 238 796 relates to a seaming machine which does not comprise any needle bar, since the needle of this machine is controlled by a lever and can perform exclusively a type of stitch. The seaming machine of this document has been designed for facilitating the operation of seaming the edge portions of the fabrics, in particular a tubular fabric piece. The machine disclosed in this patent can not perform simultaneously two types of seaming operations.

The documents DE-O-3 407 271 and CH-O-665229 relate substantially to the same machine. In fact, the document CH-O-665229 is an improvement of the document DE-O-3407271. These documents relate to a seaming machine which can simultaneously perform seaming operations on the opposite edges of a half-finished product. Practically there is herein disclosed a seaming machine having two symmetrical and opposite seaming heads which perform separately two equal seams on opposite flaps of a same fabric piece. The type of machine disclosed in these patents is not adapted to perform simultaneously two different types of seams.

The document FR-O-691277 relates to a seaming machine having two needle bars in a single block. Thus, the positions of the control mechanisms and several control members are fixed Because of this reason, this machine can perform exclusively a type of work. More specifically, in this machine, the control unit of the several control mechanism consists of a single shaft which drives a horizontal needle bar parallel to the shaft and a vertical needle bar perpendicular to the preceding one, operating the single provided crochet. Because of this reason, the seaming machine of this document can exclusively form a chain stitch with the horizontal needle, since this needle bar is parallel to the shaft driving it and since the crochet discloses during its stroke an ellipsoidal configuration perpendicular to the needle. The vertical needle bar, on the other hand, can form exclusively an ornamental stitch since in order to carry out a different type of stitch there are necessary two crochets. In fact, as is known, in forming an overlock stitch, the lower or bottom crochet is used for latching the yarn of the needle in the bottom portion of the seam, whereas the top crochet is used for latching the yarn of the bottom crochet so as to bring it under the needle on the top portion of the seam.

Moreover, the machine disclosed in this FR-A-691277 document has a single drive for the fabric, perpendicular to the vertical needle bar and is arranged bridging the vertical needles. The horizontal needle bar does not include any drive for the fabric. None of these two needle bars is associated with a differential drive and accordingly the fabric, between the two needle bars, can not be spread or caused to shrink depending on the requirements.

Accordingly, the main object of the present invention is to overcome the above mentioned drawbacks, by providing a sewing machine,for industrial use,which is specifically designed and arranged to perform,in a single pass, two or more seaming lines, either of the like or different type.

Another object of the present invention is to provide such a sewing machine in which the fabric being sewn can also be fed or transported with different angles.

Another object of the present invention is to provide such a sewing machine in which the fabric flaps or portions to be sewn can be oriented in all of the working orienting directions,independently from the fact that said fabric portions are in a loose condition or in a partially assembled condition.

According to one aspect of the present invention,the above mentioned objects,as well as yet other objects,which will become more apparent hereinafter,are achieved by a sewing machine for industrial use, according to the main claim.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the industrial use sewing machine according to the present invention will become more apparent from the following detailed description of a preferred embodiment thereof,which is illustrated,by way of an indicative but not limitative example in the figures of the accompanying drawings,where:

Figures 1,2 and 3 are respectively elevation, side and top plan schematic views illustrating the industrial use sewing machine according to the present invention;

Figure 5 is a vertical cross- section view of the subject sewing machine,taken along the line V-V of figure 4;

Figure 6 is a vertical cross-section view of the subject sewing machine,taken along the line VI-VI of figure 4;

Figure 7 is a cross-sectional view of figure 6;

Figure 8 shows an embodiment of the operating assembly for driving hook members included in the sewing machine;

and

Figure 9 shows several guide members for properly guiding edge portions of the cloth being sewn.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the figures of the accompanying drawings,the sewing machine for industrial use according to the present invention comprises a supporting frame which has been specifically designed for supporting at least a main shaft 1 which is driven by an electric motor (not shown).

On this main shaft 1 there are keyed at least two pulleys,indicated respectively at 2 and 3,provided for transmitting a rotary movement to corresponding driven shafts 4 and 5 through corresponding belts 6 and 7.

Said driven shafts can also be driven by other driving sources,in a timed manner.

The driven shaft 4 supports a first cam member 8 which,through a connecting rod 9,a ball joint 10 and a swinging pivot sleeve 11,drives a lever 12 for controlling two or more needle bars 13.

These needle bars can be arranged in different planes,with different angles(with a single and timed driving assembly) and can support,by means of clamp members 14,corresponding or respective needles 15 which can be selectively operatively driven.

On the driven shaft 4 there is moreover keyed a second cam member 16 which,through a connecting rod 17,a ball joint 18,a sleeve 19 and a swinging pivot pin 20 drives a trimming knife 21 supported on a curved supporting arm and the blade of which is indicated at 22.

On the driven shaft 4 there is moreover keyed keyed a third cam member 23 which,through a connecting rod 24,a ball joint 25 and a sleeve 26,drives a first swinging pivot pin 27 which in turn,through a lever,drives a second pivot pin 28.

These pivot pins,in particular,support respective eccentric levers 29 and 30 which can rise gripper bearing sliders,respectively indicated at 31 and 32.

More specifically,the gripper bearing slide 31 fixedly supports the gripper or clamp 33 which operates to feed the fabric to a needle or to the needles.

The slider 32,in turn,supports the gripper or clamp 34 for driving the fabric beyond the first needle assembly.

In this connection it should be pointed out that the gripper 33 can also be called "differential gripper" since it can carry out a different operating stroke from that of the gripper 34 which, in turn,can be called " stitching gripper".

On said driven shaft 4 there is moreover mounted a stitch stretching cam member 35 which, through the connecting rod 36, the ball joint 37 and sleeve 38 can drive a swinging pivot pin 39.

This pivot pin drives rotatively the levers 40 and 41 which are respectively provided with driving pins 42 and 43,which,in operation,drives the respective gripper bearing sliders 31 and 32 so as to bring said sliders in contact with the fabric being sewn and cause said sliders to come back,in a lowered condition,under the control of the mentioned eccentric levers 29 and 30.

It is to be added to the foregoing that the disclosed sewing machine also comprises means for orienting the fabric portions to be sewn in all of the directions,independently from the fact that said portions are loose or assembled.

Thus,the timed operation of the mentioned grippers will provide a simultaneous and timed

"transportation" of two or more seaming lines,owing to the different angles of the two or more seaming lines themselves.

On the mentioned driven shaft 4,moreover, (as shown in fig. 6) there is provided a cam member which,through a connecting rod 45 and a ball joint 46 drives a sleeve 47.

This sleeve,as is shown,restrains a swinging pivot pin 48 thereon there is keyed a lever 49 bearing the lower hook member 50,which can perform a rotary movement.

On the same driven shaft 4 there is moreover keyed a further cam member 51 which,through a connecting rod and a ball joint 53 and sleeve 54 swingably drives a pivot pin 55.

With this latter there is rigidly coupled a lever 56 to which there is articulated an arm 57 which in turn is slidingly coupled to a swinging ball joint 58 and supports,at the free end portion thereof, the upper hook member 59.

A suitable protecting casing 60 is moreover provided,which advantageously also operates as an operating table.

Claims

1. A sewing machine for industrial use, characterized in that said sewing machine comprises a main driving shaft (1), driving at least two driven shafts (4, 5), rotatively driven with timed speeds, on one of said driven shafts (40) at least a cam member (8, 16, 23) being keyed which drives at least a needle bar (13), a top hook (59) and a bottom hook (50) and a first gripper (33) and a second gripper (34) for advancing a fabric to be seamed, said first gripper (33) being arranged before the working region of the needle or needles (15) of said needle bar(s) (13) and said second gripper (34) being arranged after said working region of the needle or needles (15) of said needle bar(s) (13), said first and second grippers (33, 34) being driven with a different stroke for a different transport of said fabric upstream of said working region and downstream of said working region of said needle or needles (15) of said needle bar or bars (13).

2. A sewing machine according to Claim 1, characterized in that on said main driving shaft (1) there are keyed at least two pulleys (2, 3) rotatively driving said driven shafts (4, 5) through driving belts (6, 7).

3. A sewing machine according to Claim 2, characterized in that said one (4) of said driven shafts supports a first cam member (8) which, through a connecting rod (9), a ball joint (10) and a sleeve (11) with a swinging pivot pin, drives a lever (12) in turn driving said needle bars (13), said needle bars (13) being arranged in different planes and with different angles and bearing, through clamp members (14), said selectively controlled needles (15).

4. A sewing machine according to Claim 3, characterized in that on said one driven shaft (4) there is keyed a second cam member (16) which, through a respective connecting rod (17), a ball joint (18), a sleeve (19) and a swinging pin (20) drives a trimming knife (21) supported by a supporting arm.

5. A sewing machine according to Claim 3, characterized in that on said one driven shaft (4) there is keyed a third cam member (23) which, through a respective connecting rod (24), ball joint (25) and sleeve (26) drives a first swinging pin (27) connected, through a lever, to a second swinging pin (28), said swinging pins (27, 28) being respectively connected to two sliders (31, 32) bearing respectively said first gripper (33) and second gripper (34).

6. A sewing machine according to Claim 5, characterized in that said gripper (33) supported on one (31) of said sliders (31, 33) is a fabric feeding gripper, whereas said other gripper (34) supported on the other (33) of said sliders (31, 33) is a gripper (34) for conveying said fabric beyond said needles (15).

7. A sewing machine according to Claim 3, characterized in that on said one driven shaft (4) there is moreover mounted a stitch stretching cam member (35) which, through a connecting rod (36), a ball joint (37) and a sleeve (38) drives a further swinging pin (39) in turn swingably driving two levers (40, 41) having driving pins (42, 43) which drive said gripper sliders (31, 32) so as to cause said sliders (31, 32) to contact said fabric and move back to a lowered position in cooperation with said cam members.

8. A sewing machine according to Claims 1 and 3, characterized in that on said one driven shaft (4) there is moreover provided a further driving cam member (44) which, through a respective connecting rod (45),and a ball joint (46) and a sleeve (47) supporting a pivot pin (48), drives a lever (49) supporting rotatively said bottom hook (50).

9. A sewing machine according to Claims 1 and 3, characterized in that on said one driven

shaft (4) there is keyed yet a further cam member (51) which, through a respective coupling rod (52), ball joint (53) and sleeve (54), drives yet another swinging pin (55) therewith a lever (56) is rigid, said lever rotatively supporting an arm (57) slidingly coupled to a swinging ball joint (58) and supporting, at a free end portion thereof, said top hook (59).

10. A sewing machine according to Claim 1, said sewing machine being so designed and arranged as to simultaneously transport two or more seaming lines, with different mutual transport angles.

Patentansprüche

1. Eine Nähmaschine zur industriellen Verwendung, dadurch gekennzeichnet, daß diese Nähmaschine eine Hauptantriebswelle (1) umfaßt, betreibend mindestens zwei Abtriebswellen (4, 5), rotierend mit zeitgesteuerten Geschwindigkeiten betrieben, auf einer dieser Abtriebswellen (4) mindestens ein Nockenteil (8, 16, 23) befestigt, das mindestens eine Nadelstange (13) betreibt, einen oberen Haken (59) und einen unteren Haken (50) und einen ersten Greifer (33) und einen zweiten Greifer (34), um einen zu nähenden Stoff weiterzuschieben, dieser erste Greifer (33) vor dem Arbeitsbereich der Nadel oder der Nadeln (15) dieser Nadelstange(n) (13) angebracht, und dieser zweite Greifer (34) hinter diesem Arbeitsbereich der Nadel oder Nadeln (15) dieser Nadelstange(n) (13) angebracht, dieser erste und zweite Greifer (33, 34) mit einem unterschiedlichen Hub für einen unterschiedlichen Transport dieses Stoffes oberhalb dieses Arbeitsbereiches und unterhalb dieses Arbeitsbereiches dieser Nadel oder Nadeln (15) dieser Nadelstange oder -Stangen (13) betrieben.

2. Eine Nähmaschine gemäß Anspruch 1, dadurch gekennzeichnet, daß auf dieser Hauptantriebswelle (1) mindestens zwei Riemenscheiben (2, 3) befestigt sind, diese Abtriebswellen (4, 5) durch Treibriemen (6, 7) rotierend betreibend.

3. Eine Nähmaschine gemäß Anspruch 2, dadurch gekennzeichnet, daß diese eine (4) dieser Abtriebswellen ein erstes Nockenteil (8) trägt, das durch eine Zugstange (9), ein Kugelgelenk (10) und eine Muffe (11) mit einem schwingenden Drehzapfen einen Hebel (12) betreibt, seinerseits diese Nadelstangen (13) betreibend, diese Nadelstangen (13) in unterschiedlichen Ebenen und mit unterschiedlichen Winkeln angebracht und durch Klammerteile (14) diese selektiv gesteuerten Nadeln (15) tragend.

4. Eine Nähmaschine gemäß Anspruch 3, dadurch gekennzeichnet, daß auf dieser einen Abtriebswelle (4) ein zweites Nockenteil (16) befestigt ist, das durch eine jeweilige Zugstange (17), ein Kugelgelenk (18), eine Muffe (19) und einen Schwingzapfen (20) ein Schneidemesser (21) betreibt, getragen durch einen Tragearm.

5. Eine Nähmaschine gemäß Anspruch 3, dadurch gekennzeichnet, daß auf dieser einen Abtriebswelle (4) ein drittes Nockenteil (23) befestigt ist, das durch eine jeweilige Zugstange (24), ein Kugelgelenk (25) und eine Muffe (26) einen ersten Schwingzapfen (27) betreibt, durch einen Hebel mit einem zweiten Schwingzapfen (28) verbunden, diese Schwingzapfen (27, 28) jeweils mit zwei Schiebern (31, 32) verbunden, jeweils diesen ersten Greifer (33) und den zweiten Greifer (34) tragend.

6. Eine Nähmaschine gemäß Anspruch 5, dadurch gekennzeichnet, daß dieser Greifer (33), getragen auf einem (31) dieser Schieber (31, 33), ein Zufuhrgreifer für den Stoff ist, wohingegen dieser andere Greifer (34), getragen auf dem anderen (33) dieser Schieber (31, 33), ein Greifer (34) zur Beförderung dieses Stoffes über diese Nadeln (15) hinaus ist.

7. Eine Nähmaschine gemäß Anspruch 3, dadurch gekennzeichnet, daß auf dieser einen angetriebenen Welle (4) außerdem ein Nockenteil (35) zur Stichdehnung angebracht ist, das durch eine Zugstange (36), ein Kugelgelenk (37) und eine Muffe (38) einen weiteren schwingenden Zapfen (39) antreibt, seinerseits schwingend zwei Hebel (40, 41) betreibend, Antriebszapfen (42, 43) besitzend, die diese Greiferschieber (31, 32) betreiben, um so zu bewirken, daß diese Schieber (31, 32) zu diesem Stoff Kontakt haben und sich in eine niedrigere Position, in Zusammenwirkung mit diesen Nockenteilen, zurückbewegen.

8. Eine Nähmaschine gemäß den Ansprüchen 1 und 3, dadurch gekennzeichnet, daß auf dieser einen Abtriebswelle (4) außerdem ein weiteres Antriebsnockenteil (44) bereitgestellt ist, das durch eine jeweilige Zugstange (45) und ein Kugelgelenk (46) und eine Muffe (47), einen Drehzapfen (48) tragend, einen Hebel (49) betreibt, rotierend diesen unteren Haken (50) tragend.

9. Eine Nähmaschine gemäß den Ansprüchen 1 und 3, dadurch gekennzeichnet, daß auf dieser einen Abtriebswelle (4) noch ein weiteres Nockenteil (51) befestigt ist, das durch eine jeweilige Zugstange (52), ein Kugelgelenk (53) und eine Muffe (54) noch einen anderen schwingenden Zapfen (55) betreibt, mit dem ein Hebel (56) fest verbunden ist, dieser Hebel rotierend einen Arm (57) tragend, gleitend mit einem Kugelgelenk (58) verbunden und, an einem freien Endteil davon, diesen oberen Haken (59) tragend.

10. Eine Nähmaschine gemäß Anspruch 1, diese Nähmaschine so entworfen und angeordnet, daß sie gleichzeitig zwei oder mehr Nahtlinien mit zueinander unterschiedlichen Transportwinkeln transportiert.

Revendications

1. Une machine à coudre pour l'usage industriel, caractérisée en ce que ladite machine à coudre comporte un arbre menant principal (1) menant au moins deux arbres menés (4, 5) commandés rotatifs avec des vitesses synchronisées, au moins un élément à cames (8, 16, 23) étant fixé sur l'un desdits arbres menés (4) qui entraîne au moins une barre à aiguilles (13), un crochet supérieur (59) et un crochet inférieur (50) et une première pince (33) et une seconde pince (34) pour avancer un tissu à coudre, ladite première pince (33) étant arrangée devant la zone de travail de l'aiguille ou des aiguilles (15) de ladite (desdites) barre(s) à aiguilles (13) et ladite seconde pince (34) étant arrangée derrière ladite zone de travail de l'aiguille ou des aiguilles (15) de ladite (desdites) barre(s) à aiguilles (13), lesdites première et seconde pinces (33, 34) étant commandées avec des courses différentes pour des transports différents de ladite étoffe en amont de ladite zone de travail et en aval de ladite zone de travail de ladite aiguille ou desdites aiguilles (15) de ladite barre ou desdites barres (13) à aiguilles.

2. Une machine à coudre selon la revendication 1, caractérisée en ce que sur ledit abre mené principal (1) au moins deux poulies (2, 3) sont fixées, qui entraînent en rotation lesdits arbres menés (4, 5) par l'intermédiaire de courroies (6, 7).

3. Une machine à coudre selon la revendication 2, caractérisée en ce qu'un (4) desdits arbres menés porte un premier élément à cames (8) qui entraîne, par l'intermédiaire d'une tige de raccordement (9), d'un joint à rotule (10) et d'une gaine (11) avec un pivot basculant, un levier (12) de sa part entraînant lesdites barres à aiguilles (13), lesdites barres à aiguilles (13) étant arrangées sur des plans différents et avec des angles différents et portant, à l'aide d'agrafes (14), lesdites aiguilles (15) sélectivement commandées.

4. Une machine à coudre selon la revendication 3, caractérisée en ce que sur ledit arbre mené (4) un second élément à cames (16) est fixé qui entraîne, par l'intermédiaire d'une respective tige de raccordement (17), d'un joint à rotule (18), d'une gaine (19) et d'un pivot basculant (20), un couteau de rognage (21) porté par un bras portant.

5. Une machine à coudre selon la revendication 3, caractérisée en ce que sur ledit arbre mené (4) un troisième élément à cames (23) est fixé qui entraîne, par l'intermédiaire d'une respective tige de raccordement (24), d'un joint à rotule (25) et d'une gaine (26) un premier pivot basculant (27) associé, par l'intermédiaire d'un levier, à un second pivot basculant (28), lesdits pivots basculants (27, 28) étant associés respectivement à deux coulisses (31, 32) portant respectivement lesdites première pince (33) et seconde pince (34).

6. Une machine à coudre selon la revendication 5, caractérisée en ce que ladite pince (33) portée par l'une (31) desdites coulisses (31, 33) est une pince pour l'alimentation de l'étoffe, tandis que ladite autre pince (34) portée par l'autre (33) desdites coulisses (31, 33) est une pince (34) pour convoyer ladite étoffe au-delà desdites aiguilles (15).

7. Une machine à coudre selon la revendication 3, caractérisée en ce que sur ledit arbre mené (4) un élément d'étirage de points à cames (35) est en plus monté, qui entraîne, par l'intermédiaire d'une tige de raccordement (36), d'un joint à rotule (37) et d'une gaine (38), un ultérieur pivot basculant (39) à son tour entraînant à basculement deux leviers (40, 41) ayant des goupilles de commande (42, 43) qui commandent lesdites coulisses à pince (31, 32) de manière à causer que lesdites coulisses (31, 32) touchent ladite étoffe et retournent à une position abaissée, aidées par ledits éléments à cames.

8. Une machine à coudre selon les revendications 1 et 3, caractérisée en ce que sur ledit arbre mené (4) un ultérieur élément entraîneur

à cames (44) est en plus prévu qui porte, par l'intermédiaire d'une respective tige de raccordement (45) et d'un joint à rotule (46) et d'une gaine (47) portant un pivot (48), un lever (49) portant rotatif ledit crochet inférieur (50).

9. Une machine à coudre selon les revendications 1 et 3, caractérisée en ce que sur ledit arbre mené (4) il est fixé encore un ultérieur élément à cames (51) qui entraîne, par l'intermédiaire d'une respective tige de raccordement (52), d'un joint à rotule (53) et d'une gaine (54), encore un autre pivot basculant (55) dont un levier (56) est rigide, ledit levier portant rotativement un bras (57) couplé glissant à un joint à rotule basculant (58) et portant à son extrémité libre ledit crochet supérieur (59).

10. Une machine à coudre selon la revendication 1, ladite machine à coudre étant conçue et arrangée de manière à transporter en simultané deux ou plusieurs lignes de couture, avec des angles de transport mutuels différents.

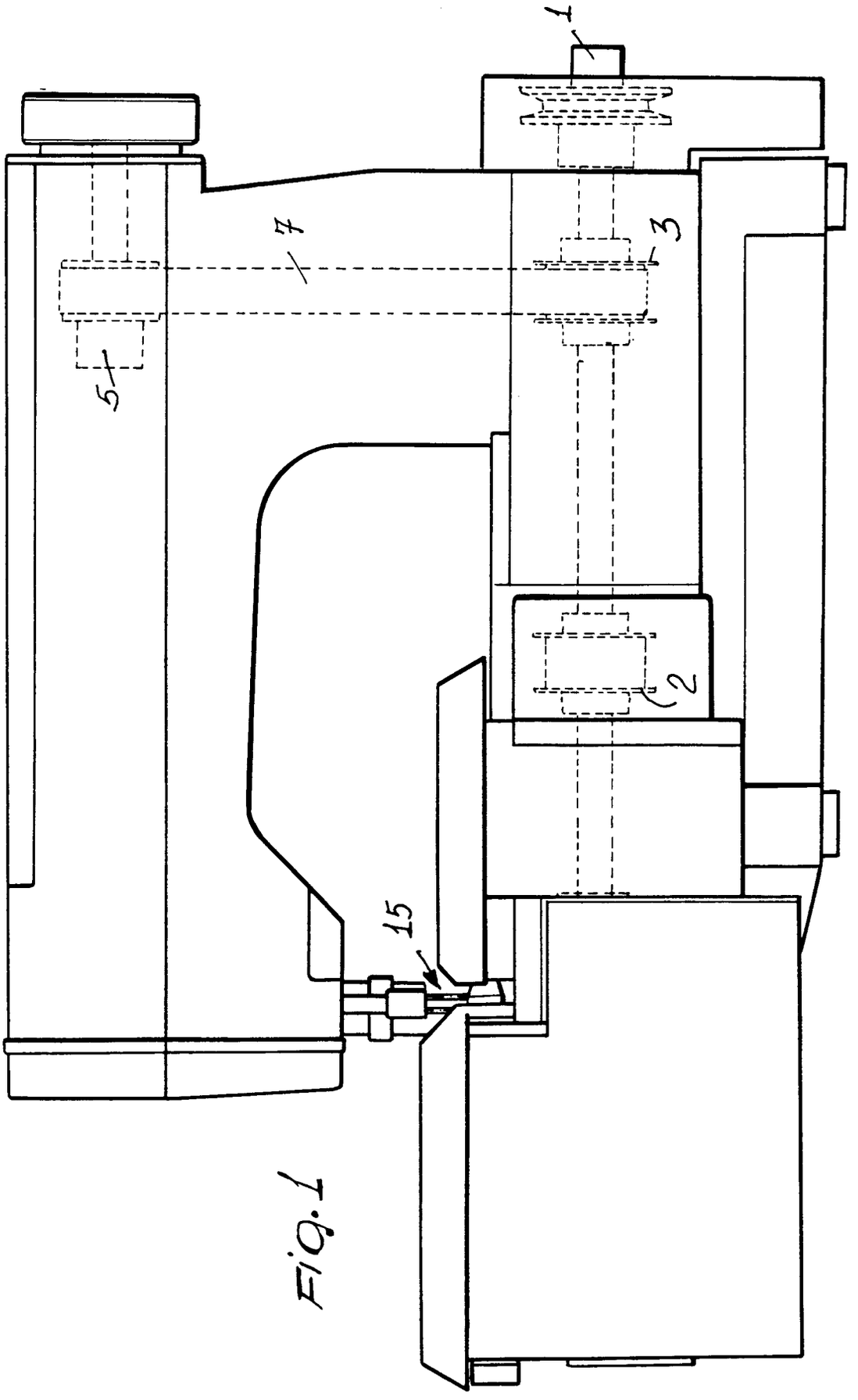
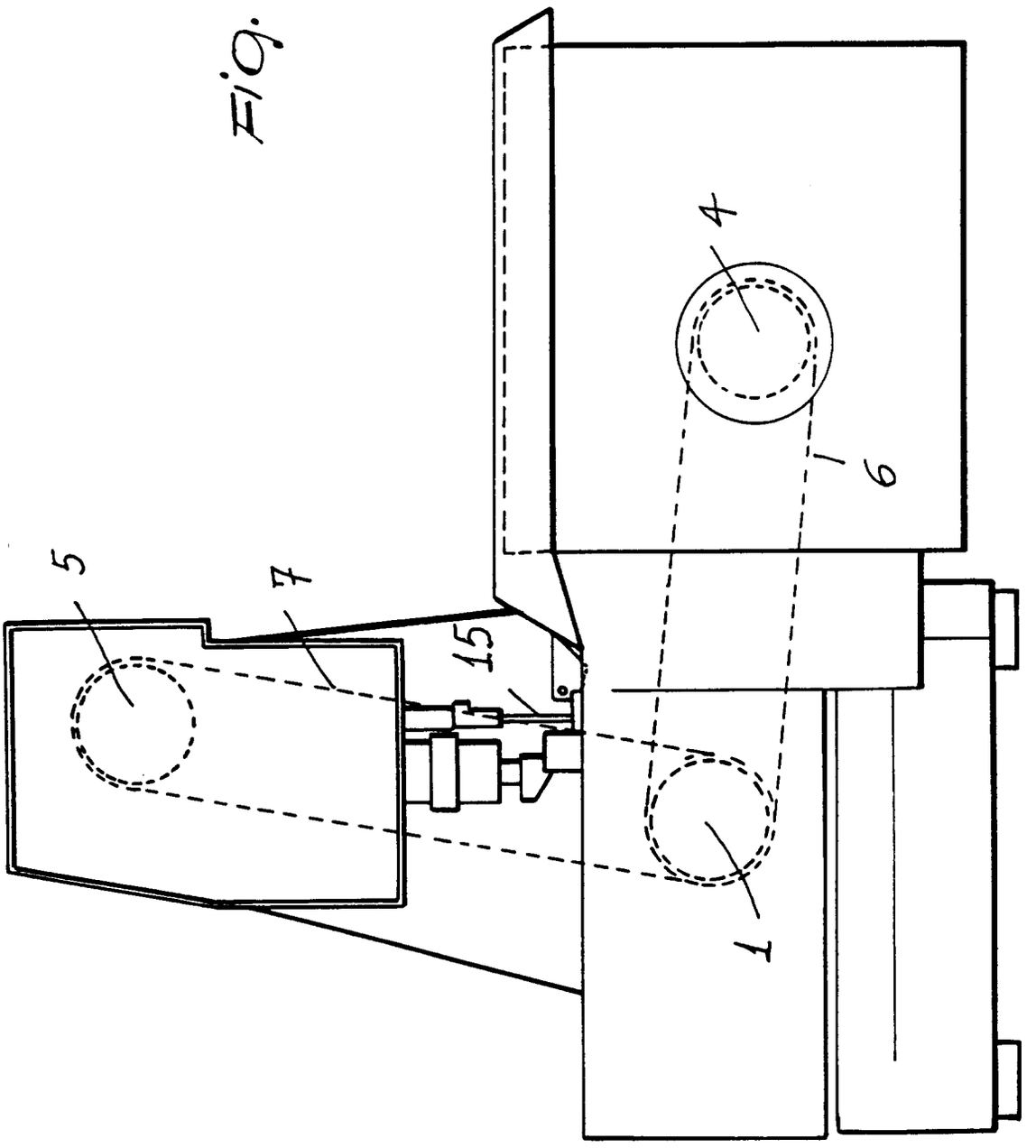


Fig.1

Fig. 2



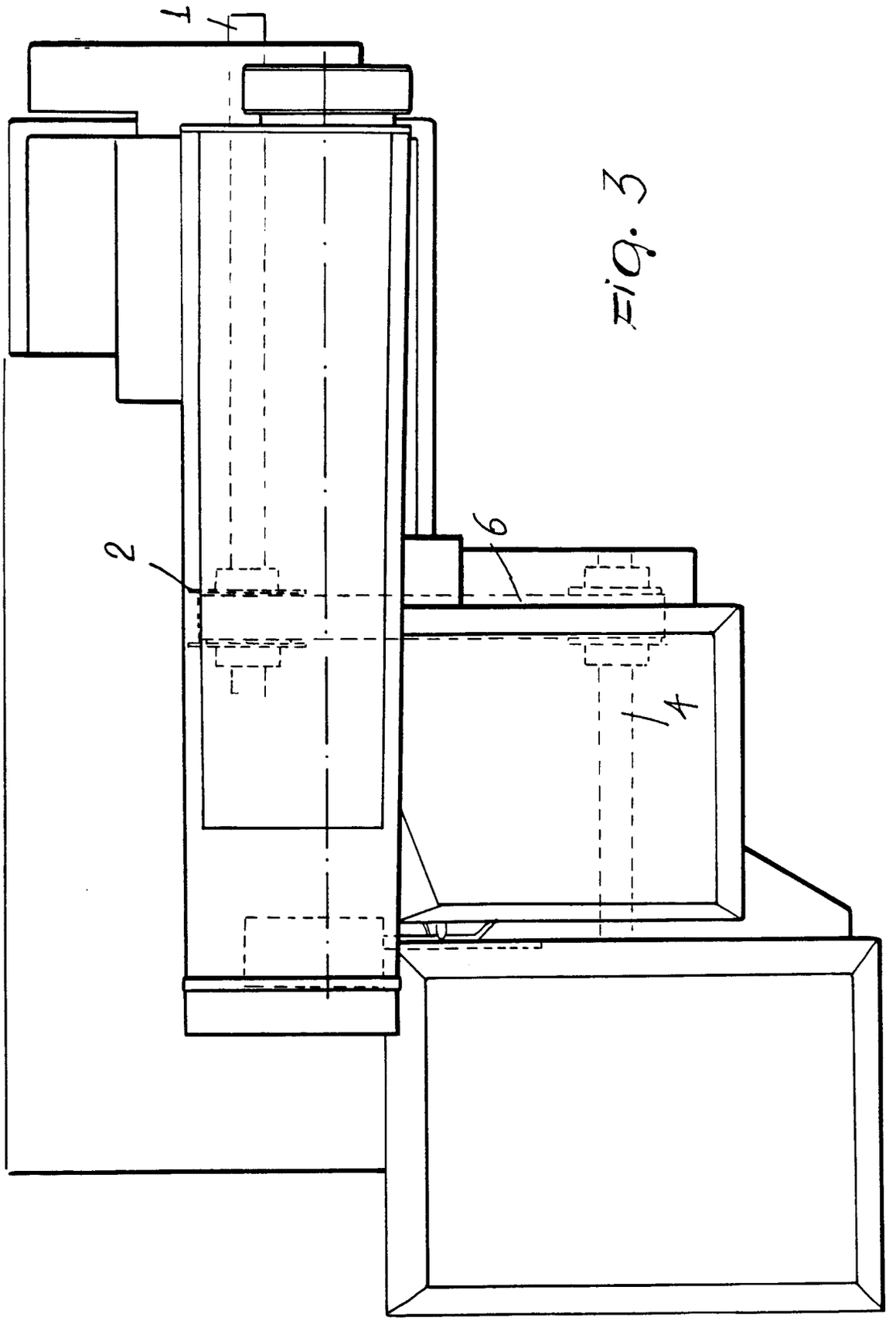


Fig. 3

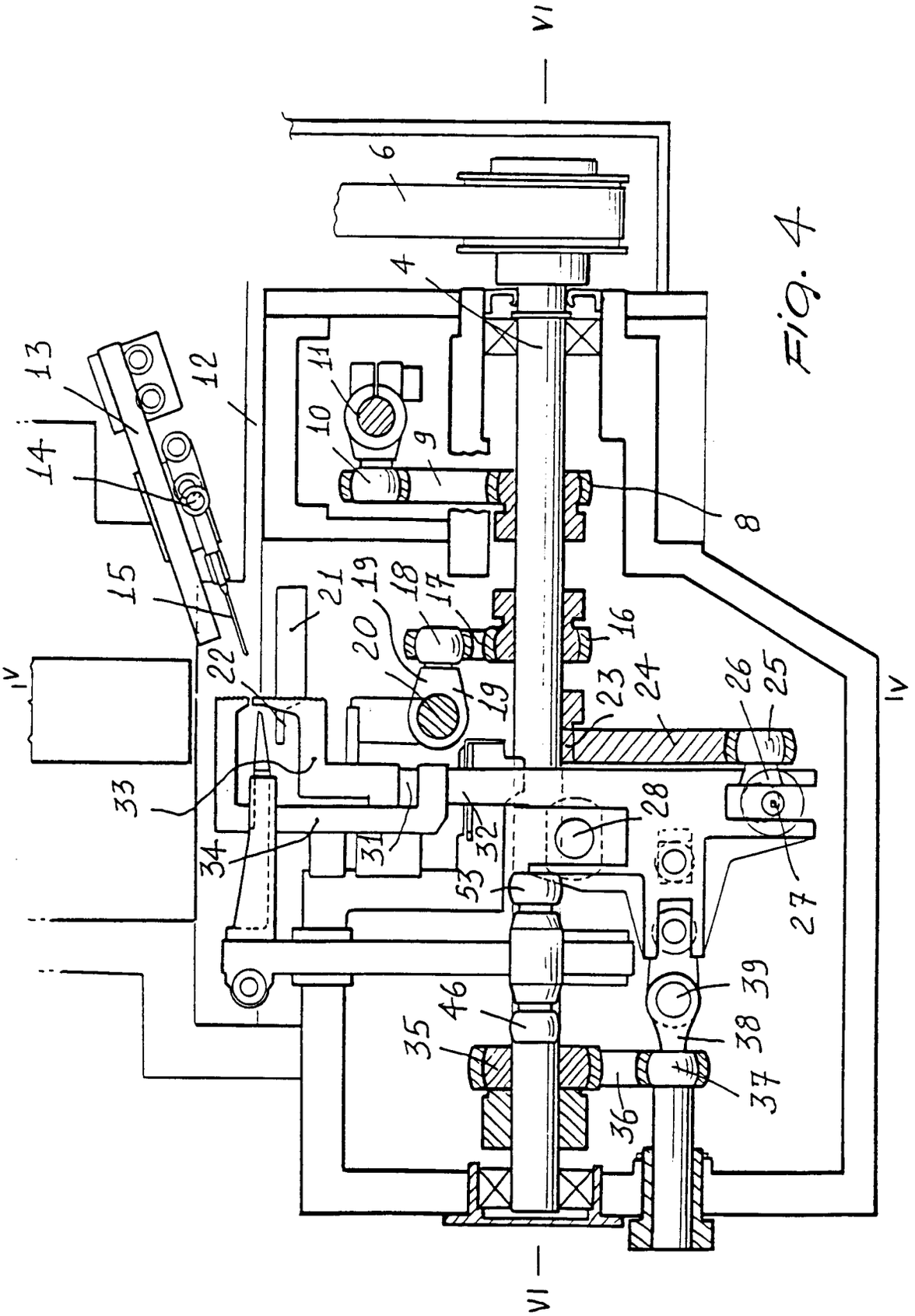

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Fig. 4

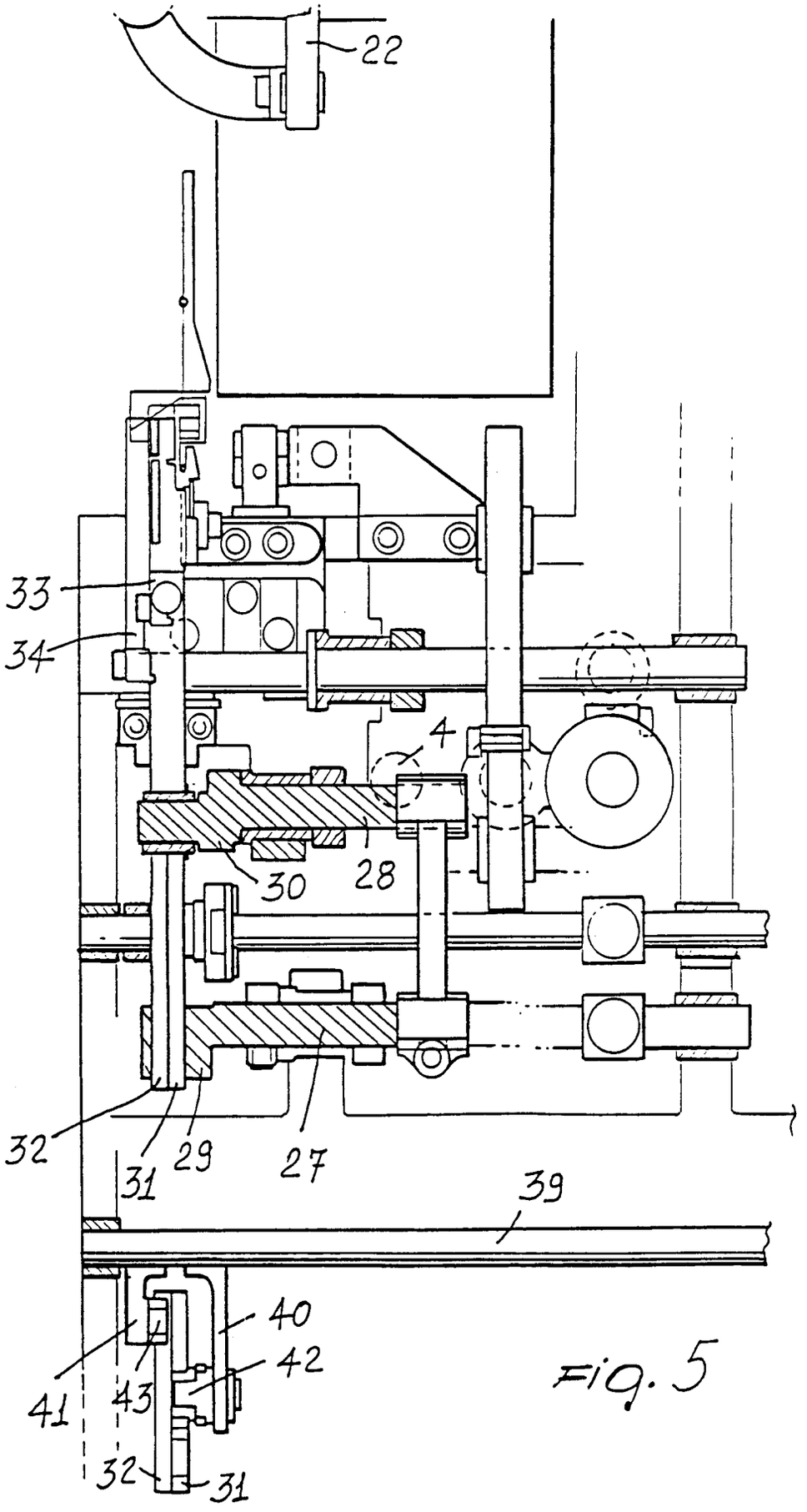

Fig. 5

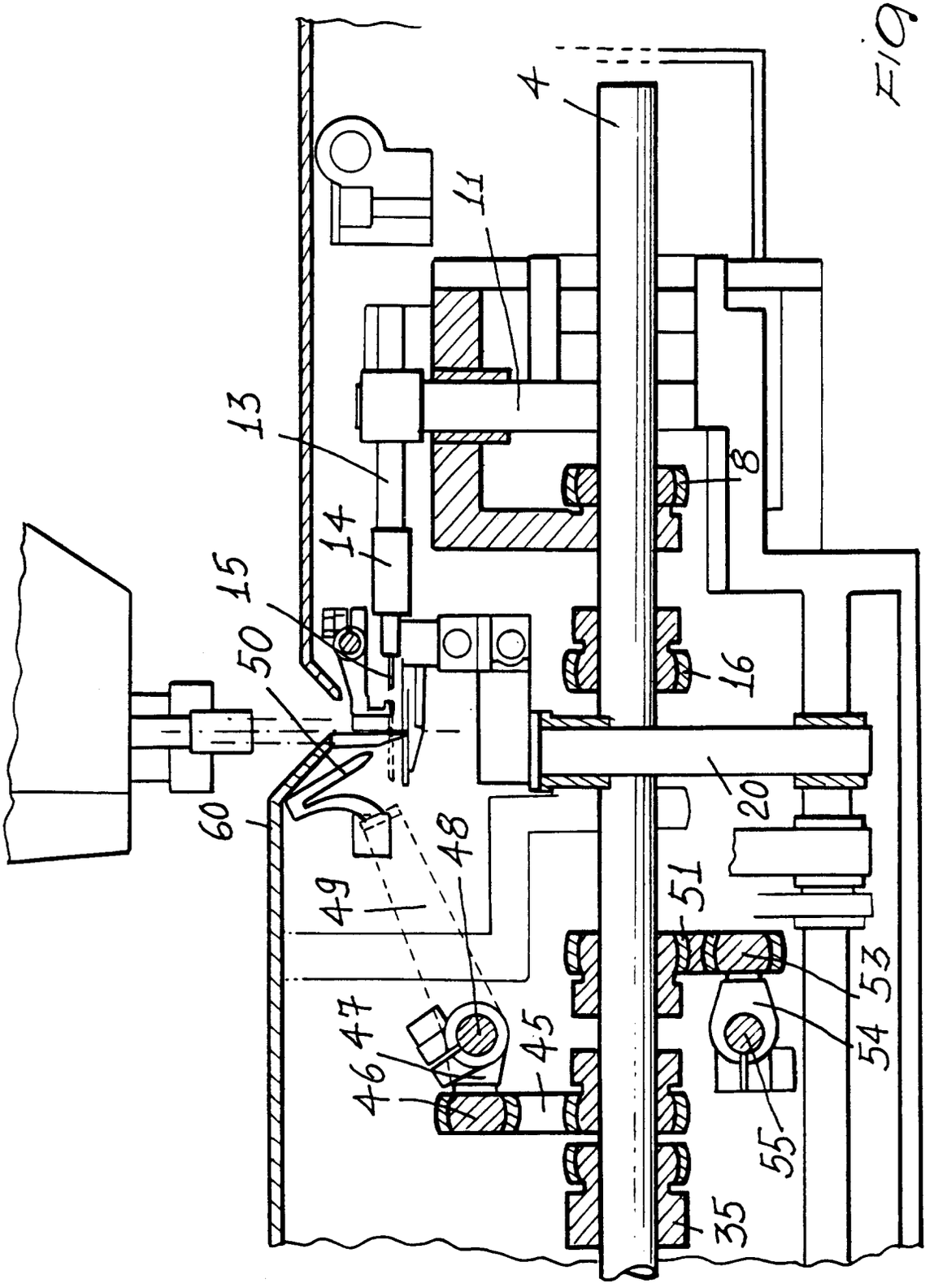

Fig. 6

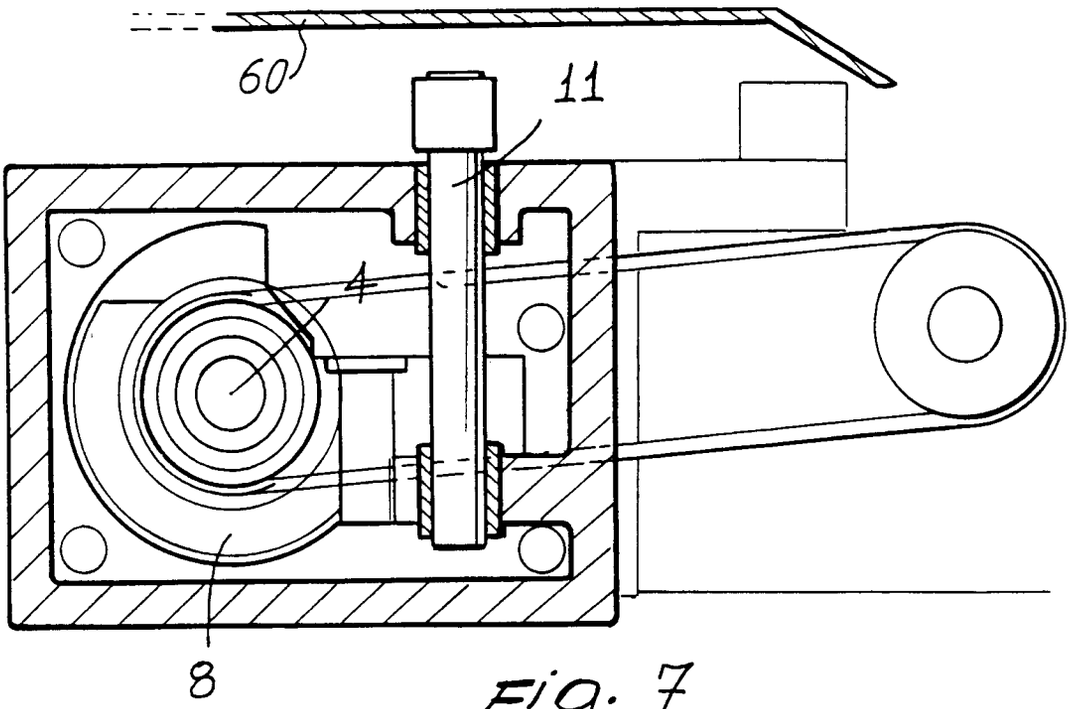

Fig. 7

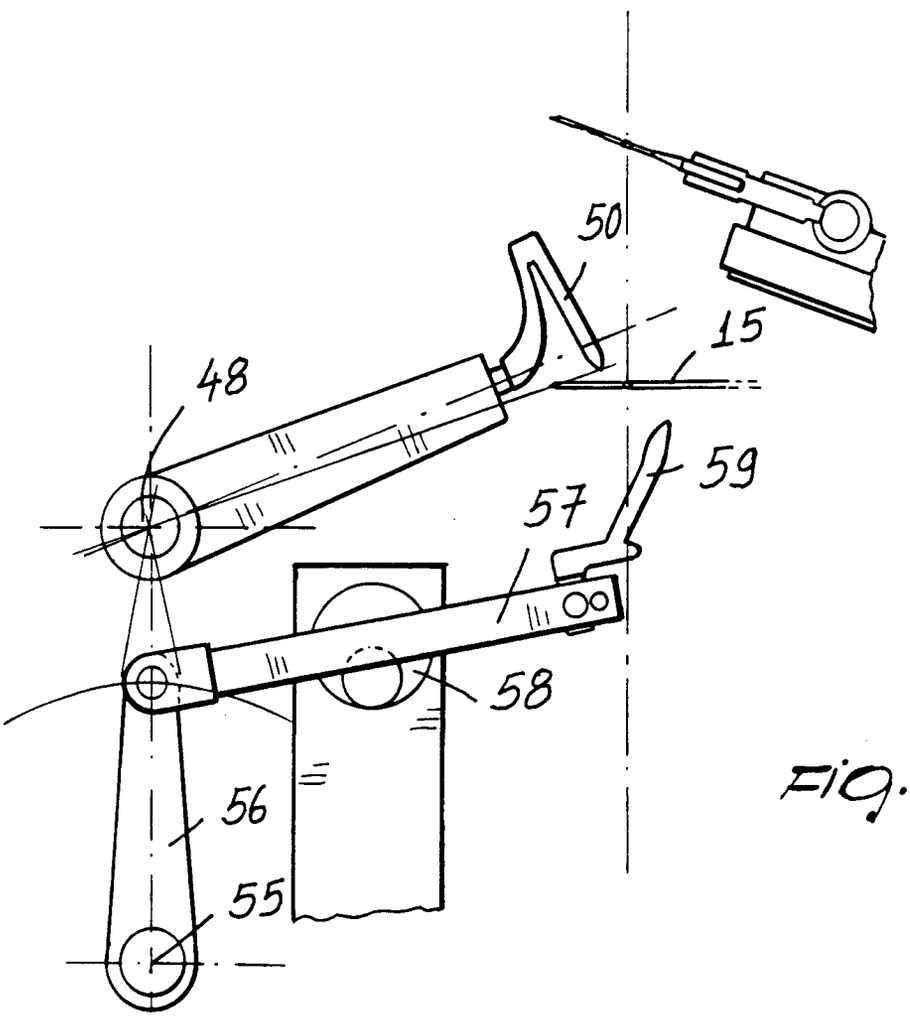

Fig. 8

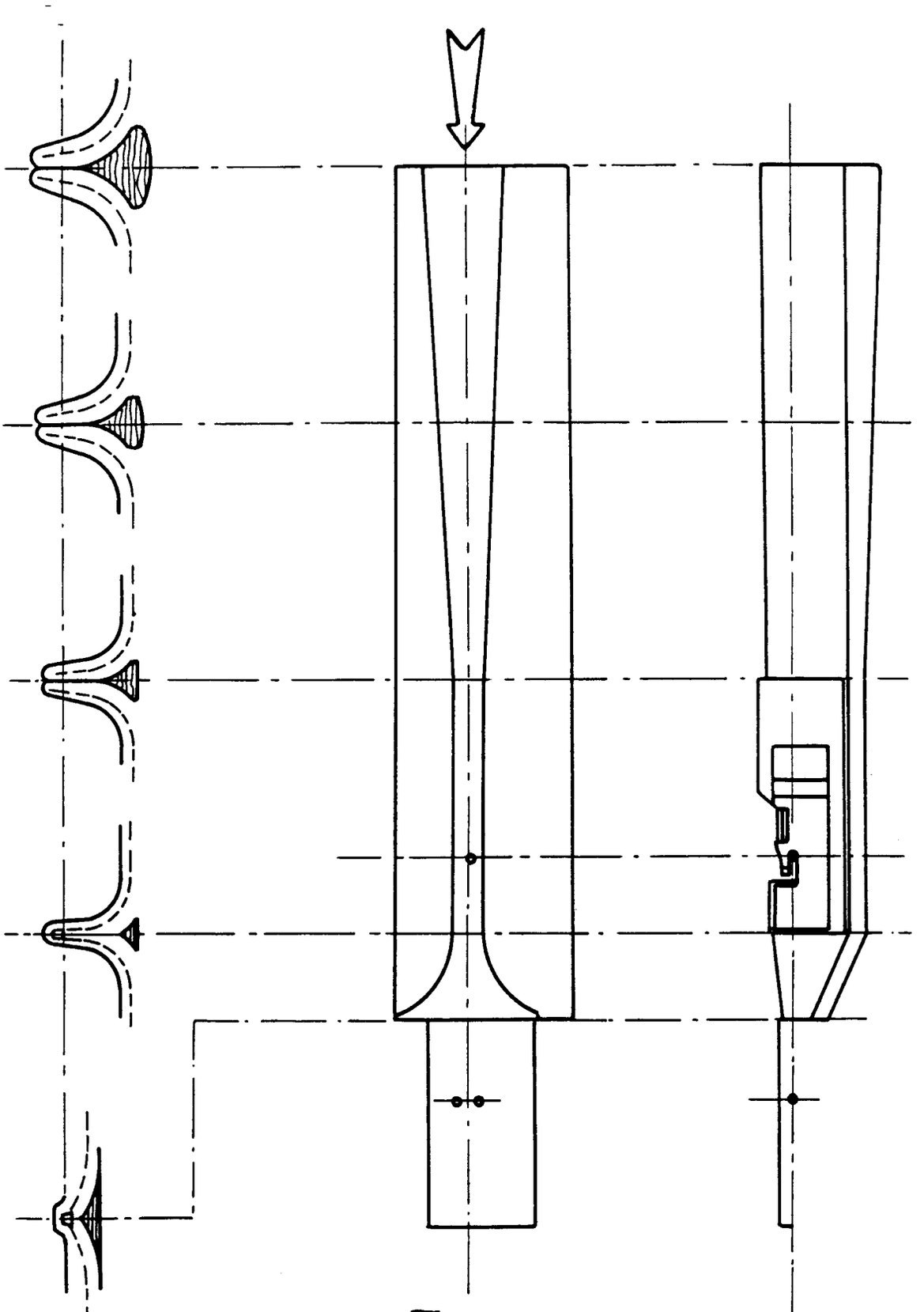

FIG. 9