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(54) Device for taking up the cloth on weaving machines.

(57) Device for taking up the cloth on weaving machines, characterized in that it consists essentially of a combination of a drive roller (10) for the cloth (2), and a lever (12), mounted on the frame (11) of the weaving machine, at one end of which is a pressure roller (13) which operates on the drive roller (10) and at the other end of which is a guide (14), past which the cloth (2) is led to the drive roller (10).

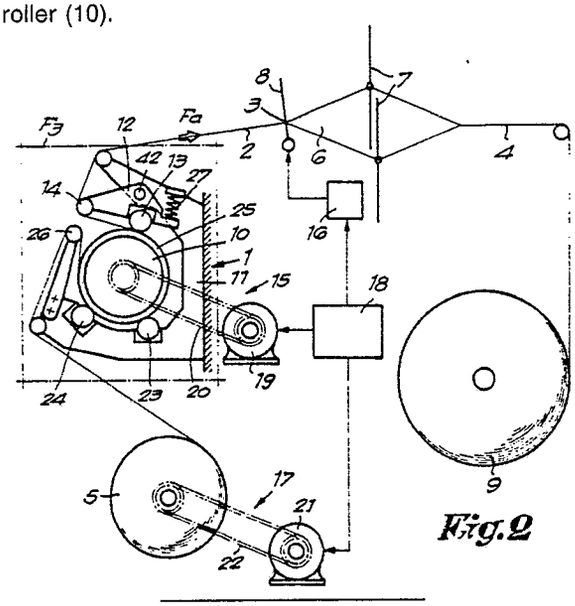


Fig.2

EP 0 340 824 A1

Device for taking up the cloth on weaving machines

This invention concerns a device for taking up the cloth on weaving machines, more particularly a cloth take-up device for taking up the cloth under tension.

Conventional devices for taking up the cloth under tension from the fell line consist of a drive roller mounted at a fixed place, past which the cloth is led, and a pressure roller which by means of springs operates on the drive roller and the cloth. In such devices, the pressure between the pressure roller and the drive roller can never be greater than the spring pressure.

From EP 234.646 a device is known in which the pressure between the pressure roller and the drive roller is supplied by means of the tension in the cloth, possibly in combination with the pressure supplied by the spring. Although according to EP 234.646 greater pressures can be achieved than in the former case, the pressure between the driving and pressure rollers will never be greater than the pressure exercised by the cloth, increased by the pressure of the above-mentioned spring.

The present invention has as its aim a device by means of which the pressure between the pressure rollers and the drive roller can be in any desired relation to the force in the cloth. In a particular embodiment, the pressure can even be significantly greater than on known devices, without requiring a construction that takes lots of space.

In a particular embodiment, the device has a mechanism by means of which it is possible to adjust the relation between, on the one hand, the pressure between the drive roller and the support rollers, and on the other hand the cloth tension, either manually or automatically, as a function of the weaving parameters and/or measured values.

The invention also has as its aim a device which optimally prevents the cloth from slipping, such that the evenness of the cloth is assured, both in the normal weaving process and in circumstances in which the warp threads are relaxed and/or in which the tension at the cloth roll end disappears.

The device also enables a large tension force to be exerted on smooth cloths, without the risk of damaging the cloths.

The device according to the invention also enables great stiffness in bend of the whole structure to be obtained while taking a minimum amount of space in the machine, so that the pressure exerted on the cloth is the same over the whole weaving width, so avoiding creases or deformations.

The device according to the invention consists essentially of the combination of a drive roller for the cloth and a lever attached to the frame of the weaving machine, on one end of which there is a pressure roller which operates on the drive roller and on the other end of which there is a guide, past which the cloth is led to the drive roller. The drive roller preferably rests freely between two support rollers on the one hand and the above-mentioned pressure roller on the other hand. By using a lever, optimum use is made of the tension in the cloth in order to supply a pressure between on the one hand said pressure roller and the two support rollers and on the other hand the drive roller.

In order to better explain the characteristics of the invention, the following prefered embodiments are described, by way of example only and without being limitative in any way, with reference to the accompanying drawings, where:

- fig. 1 shows a weaving machine which uses a device according to the invention;
- fig. 2 is a schematic cross-section along line II-II in fig. 1;
- fig. 3 is a detailed drawing of an embodiment of the part indicated by F3 in fig. 2;
- fig. 4 is a perspective drawing of a part of the device shown in fig. 3;
- fig. 5 shows the guide indicated by F5 in fig. 4;
- figs. 6 to 8 are schematic diagrams illustrating the operation of the device and the forces thus produced;
- fig. 9 shows a variant of the device;
- fig. 10 shows another variant;
- fig. 11 shows a cross-section along line XI-XI in fig. 10;
- fig. 12 shows the above-mentioned lever for another variant of the invention;
- fig. 13 shows a cross-section along line XIII-XIII in fig. 12;
- fig. 14 shows the lever in fig. 12 in another position.

Fig. 1 shows a weaving machine which uses a device 1 according to the invention for taking up the cloth 2 under tension.

As shown schematically in fig. 2, the device 1 has as its aim to keep the cloth 2 taut between said device and the fell line 3 and to keep taut the warp threads and to take up the cloth efficiently towards the cloth beam 5. For the sake of clarity, the shed 6, the heddles 7, the sley 8 and the warp beam 9 are also shown schematically.

The device 1 according to the invention essentially consists of a drive roller 10 round which the cloth 2 is led, and a lever 12 mounted on the frame

11 of the weaving machine, on one end of which is a pressure roller 13 which operates on the drive roller 10, and on the other end of which is a guide 14 past which the cloth 2 is led to the drive roller 10.

The drive roller 10 is driven by means of a drive 15, which together with the drive 16 of the sley 8 and the drive 17 of the cloth beam 5 is controlled by the control unit 18 of the weaving machine. The drive 15 consists of a drive motor 19 and a toothed belt 20, such that there is perfect synchronization between the drive roller 10 and the motor 19. The drive 17 preferably comprises a controlled motor 21 and a transmission 21 consisting of an ordinary belt 22, such that slippage can occur between the cloth beam 5 and the motor 21 if a certain torque is exceeded.

The drive roller 10 lies freely, without any other pivot mounting, between at least two support rollers 23 and 24 on the one hand and the above-mentioned pressure roller 13 on the other. In order to achieve optimum gripping force between the cloth 2 and the surface of the drive roller 10, the latter has a dressing 25 in rubber or suchlike.

The cloth 2 is preferably led directly from the above-mentioned guide 14 onto the drive roller 10, i.e. without the cloth being bent round the pressure roller 13. Down-cloth of the drive roller 10 there is a guide 26, situated free of the drive roller 10, so that the cloth 2 is led directly from the drive roller 10 to said guide 26.

The guide 14 has as much frictional resistance as possible, and consists preferably of a spreader bar. As will be seen from the description of the operation below, it is necessary for the guide 14 to offer optimum resistance to the cloth. The angle of contact between the cloth 2 and the guide 14 should preferably be at least 90 degrees.

The tension Fa in the cloth 2 ensures that the pressure roller 13 is pressed against the drive roller 10 via the lever 12 with a great force. In order to prevent the pressure roller 10 coming away from the drive roller 13 if the tension Fa in the cloth disappears, pressure springs 27 also act on the end of the lever 12 on which the pressure roller 13 is mounted. During the normal weaving process, the pressure springs 27 provide a supplementary pressure to the pressure already supplied by the lever 12.

A more detailed embodiment is shown in figs. 3 and 4. The special feature here is that the support roller 24 is mounted on a pivoting part 28 which swivels on an axis 29 attached solidly to the frame 11. Thus by swivelling away the part 28 the drive roller 10 together with the cloth 2 can be simply brought between the support rollers 23 and 24 and the pressure roller 13. The pivoting part 28 of course has a suitable locking mechanism 30, for example a tensioned component which can operate on the fixed axis 29, in order to hold the pivoting part 28 in the raised position during normal operation of the weaving machine. The fixed support 31 ensures that the drive roller 10 is supported when the pivoting part 28 is swivelled away.

As shown in fig. 4, the pressure roller 13 together with the guide 14, the support rollers 23 and 24 and the guide 26 are supported over the whole weaving width by sections, 32 to 35 respectively, in order to prevent bending and uneven distribution of forces.

The pressure roller 13 and the supporting roller 24 are held in their seats in the sections 32 and 34 by means of detachable support sections 36, such that they also remain supported when the drive roller 10 is removed.

An adjusting screw 37 which serves as a stop for the section 32 can be provided, such that during replacement of the drive roller 10 the pivoting part 28 can be locked in the most suitable position.

The pressure roller 13 and possibly also the support rollers 23 and 24 may or may not be driven.

Finally, in the figure there are also a number of smooth guides 38, 39 and 40 for bending the cloth 2.

For the sake of illustration, fig. 5 shows the guide 14 in the form of a spreader bar. The ends have screw-shaped projections 41 which keep the cloth 2 spread out.

Figs. 6 and 7 illustrate how the forces in the cloth 2 operate on the lever 12. In the position shown in fig. 6, the sley 8 is beating up to the fell line 3. As a result, the fell line 3 is displaced forwards over a distance D. The cloth 2 between the fell line 3 and the drive roller 10 relaxes as a result and slides more easily over the frictional guide 14 and is carried along by the drive roller 10. In the warp 4 there is a high tension Fb.

When the sley 8 is moved back, as in fig. 7, the fell line 3 moves back and a tension Fa arises in the warp 4 and the part of the cloth 2 stretching to the guide 14. This tension Fa is slightly smaller than the previously-mentioned tension Fb, yet due to the great frictional resistance offered by the frictional guide 14 this tension Fa is markedly greater than the tension Fc between the guide 14 and the drive roller 10. The lever 12 ensures that the pressure roller 13 exerts a heavy pressure on the drive roller 10, where the degree of pressure is determined by the mechanical advantage of the lever 12.

Fig. 8 shows the equilibrium of forces for the embodiment according to fig. 3. From this figure it can be seen that if a maximum pressure Fd is required, the distance A must be chosen as great

as possible and the distances B and C as small as possible. Clearly, when choosing the distances A, B and C, a compromise must be made between, on the one hand, the desired effect regarding the amount of pressure between the pressure roller 13 and the drive roller 10, and on the other the construction possibilities.

Fig. 9 shows a variant of the device. Since in this case the support roller 24 is situated above, and the support roller 23 and the pressure roller 13 underneath, the above-mentioned support 31 is not necessary.

The embodiment shown in fig. 9 is more intended for heavy cloths. During sley beat-up the tension Fa falls to practically zero, and the pressure roller 13 is only held against the drive roller 10 by the pressure springs 27. When the sley 8 is not against the fell line 3, the tension in such a heavy cloth is normally very high, so it is not necessary for the lever 12 to supply a multiplication of force any more. As shown in fig. 9, in such a case the pivot 42 can also be located nearer to the guide 14 than the pressure roller 13.

As also shown in the figure, the guide 14, the drive roller 10 and the support roller 24 are preferably arranged so that the plane 43 traversed by the long axes of the support roller 24 and the drive roller 10 is parallel to the plane 44 of the cloth 2 between the guide 14 and the drive roller 10. In this way optimum pressure is achieved between the pressure roller 24 and the drive roller 10.

Fig. 10 shows a particular embodiment in which the device has a mechanism 45 by means of which the lever 12 can be moved radially with respect to its axis of rotation. For this purpose, the mechanism 45 consists of a shaft 47 driven by a motor 46, with on the shaft 47 an excentric pin 48 which is mounted fixed to this shaft 47, on which the lever 12 is swivel-mounted by means of a bearing 49. As shown in fig. 11, the motor 46 and the shaft 47 are coupled to each other by means of a worm 50 and wormwheel 51.

Clearly, by turning the shaft 47 the lever 12 can be moved in the X and Y directions. By selecting a suitable angle of rotation of the shaft 47, the guide 14 can be made to carry out a displacement V such that the cloth 2 is tensioned to a greater or less extent. Thus for example when the weaving machine is started up, by placing the cloth 2 under greater tension starting marks can be avoided.

As also shown in fig. 10, the motor 46 is preferably coupled to a control unit 52 which in turn receives signals from a number of detectors, such as a detector 53 in order to measure the position of the fell line 3 and a detector 54 to measure the tension in the cloth, so that the displacement of the excentric pin 48 can be automatically regulated in order to avoid starting marks. Clearly, the control unit 18 can also make adjustments according to certain weaving parameters such as the start/stop signals and the type of cloth.

The motor 46 can also turn with a particular rhythm, in order to obtain special effects in the cloth.

Figs. 12 and 13 show yet another embodiment in which the above-mentioned lever 12 has a mechanism 55 which not only enables the guide 14 to be moved, but also enables the transmission ratio of the lever 12 to be altered at the same time. To this end, the mechanism 55 consists of a shaft 47 attached to the weaving machine frame, with on it an excentric pin 48 which is movable round the shaft, around which pin 48 the lever 12 can pivot by means of a bearing 49, and a motor 56 which in this case does not drive the shaft 47 but rather the excentric pin 48, such that any desired angular displacement can be set between the pin 48 and the lever 12. The motor 56 can for instance be mounted on the lever 12, while pin 48 is driven by means of a wormwheel 57 and a worm 58.

Fig. 14 shows the lever according to fig. 12 for a different position of the excentric pin 48. Clearly, the mechanical advantage of the lever with respect to its pivot 42 is different for the positions shown in figs. 12 and 14 respectively. For a particular type of cloth, the transmission ratio can be set to a maximum. The mechanism for rotating the pin 48 with respect to the lever 12 can of course be of any desired type. Setting can also be done manually.

The present invention is not limited to the embodiments described by way of example and shown in the accompanying diagrams; on the contrary, such a device for taking up the cloth on weaving machines can be made in all forms and dimensions while still remaining within the scope of the invention.

Claims

1. Device for taking up the cloth on weaving machines, characterized in that it consists essentially of a combination of a drive roller (10) for the cloth (2), and a lever (12), mounted on the frame (11) of the weaving machine, at one end of which is a pressure roller (13) which operates on the drive roller (10) and at the other end of which is a guide (14), past which the cloth (2) is led to the drive roller (10).

2. Device according to claim 1, characterized in that the drive roller (10) lies freely between at least two support rollers (23-24) on the one hand and the above-mentioned pressure roller (13) on the other.

3. Device according to claim 1 or 2, characterized in that the above-mentioned guide (14) is fixed-mounted on the lever (12) and has a high frictional resistance.

4. Device according to claim 3, characterized in that the guide (14) consists of a spreader bar.

5. Device according to claim 3 or 4, characterized in that the cloth (2) is bent through at least 90 degrees over the above-mentioned guide (14).

6. Device according to any of the above claims, characterized in that the lever (12) is loaded by means of pressure springs (27) at the end where the pressure roller (13) is located.

7. Device according to claim 2, characterized in that at least one support roller (24) is mounted in a pivoting part (28) of the frame (11), such that the drive roller (10) can be freely removed once the pivoting part (28) has been swung aside.

8. Device according to claim 7, characterized in that underneath the drive roller (10) there is a fixed support (31), which provides a support for the drive roller (10) when the above-mentioned part (28) is swung open.

9. Device according to claim 7, characterized in that the drive roller (10) is supported by means of one support roller (23) and the pressure roller (13), and that the support roller (24) which is mounted in the pivoting part (28) operates on the upper side of the drive roller (10).

10. Device according to any of the above claims, characterized in that the cloth (2) is led directly onto the drive roller (10) from the above-mentioned guide (14) of the lever (12).

11. Device according to any of the above claims, characterized in that after the drive roller (10) the cloth (2) passes a guide (26) which is freely situated with respect to the drive roller (10), such that the cloth (2) is led directly to said guide (26) from the drive roller (10).

12. Device according to any of the above claims, characterized in that the pressure roller (13) is supported over its full length.

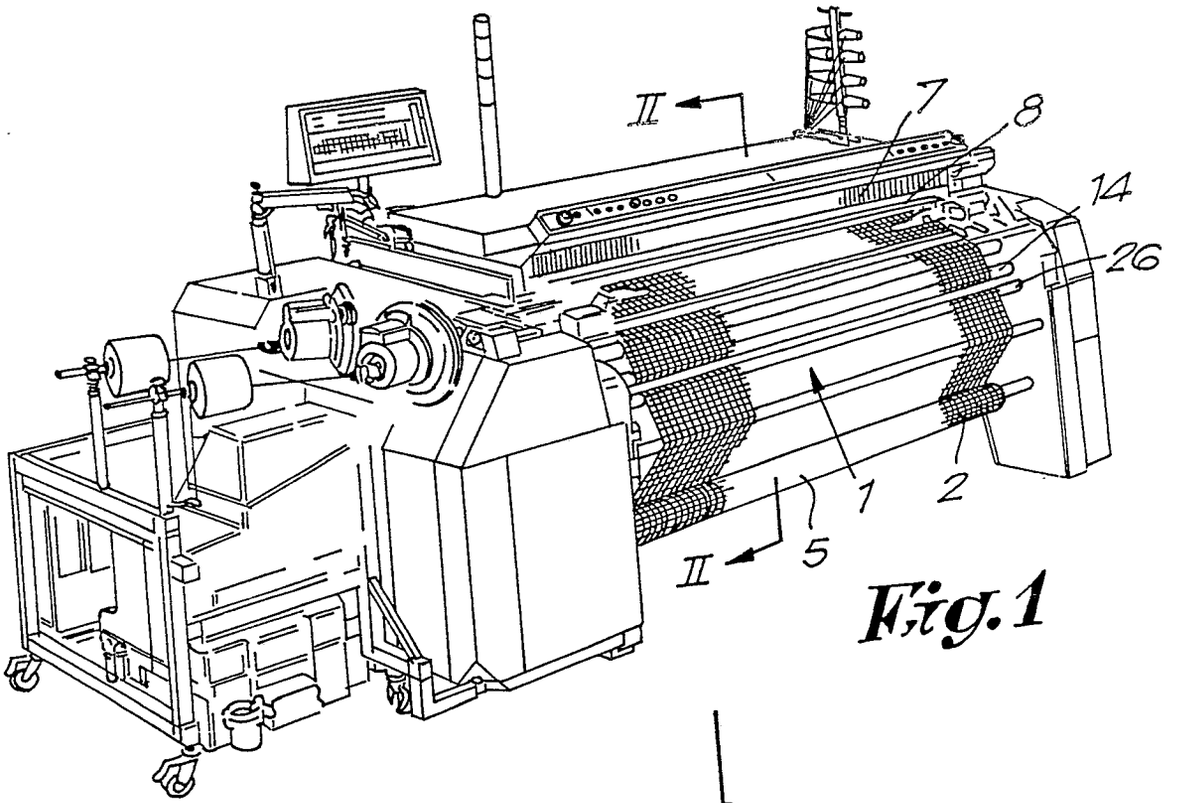
13. Device according to any of the above claims, characterized in that it is provided with a mechanism (45, 55) which permits radial displacement of the lever (12).

14. Device according to claim 13, characterized in that the mechanism (45) which permits the radial displacement of the lever (12) essentially consists of an excentric pin (48) fixed-mounted on a shaft (47) driven by a motor (46), with the lever (12) swivel-mounted on the pin (48).

15. Device according to claim 14, characterized in that the motor (46) is connected to a control unit (52) which controls the motor (46) according to the weaving parameters and weaving data.

16. Device according to any of the claims 1 to 13, characterized in that it is provided with a mechanism (55) which enables the mechanical advantage of the above-mentioned lever (12) to be altered.

17. Device according to claim 16, characterized in that the mechanism (55) which enables the mechanical advantage of the lever (12) to be altered consists essentially of a pivoting pin (48) mounted excentrically on a shaft 47 attached to the frame of the weaving machine, on which pin (48) the above-mentioned lever (12) is swivel-mounted, together with a mechanism (56, 57, 58) by means of which a certain angular displacement between said pin (48) and the lever (12) can be set.


II
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8
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26
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II

Fig.1

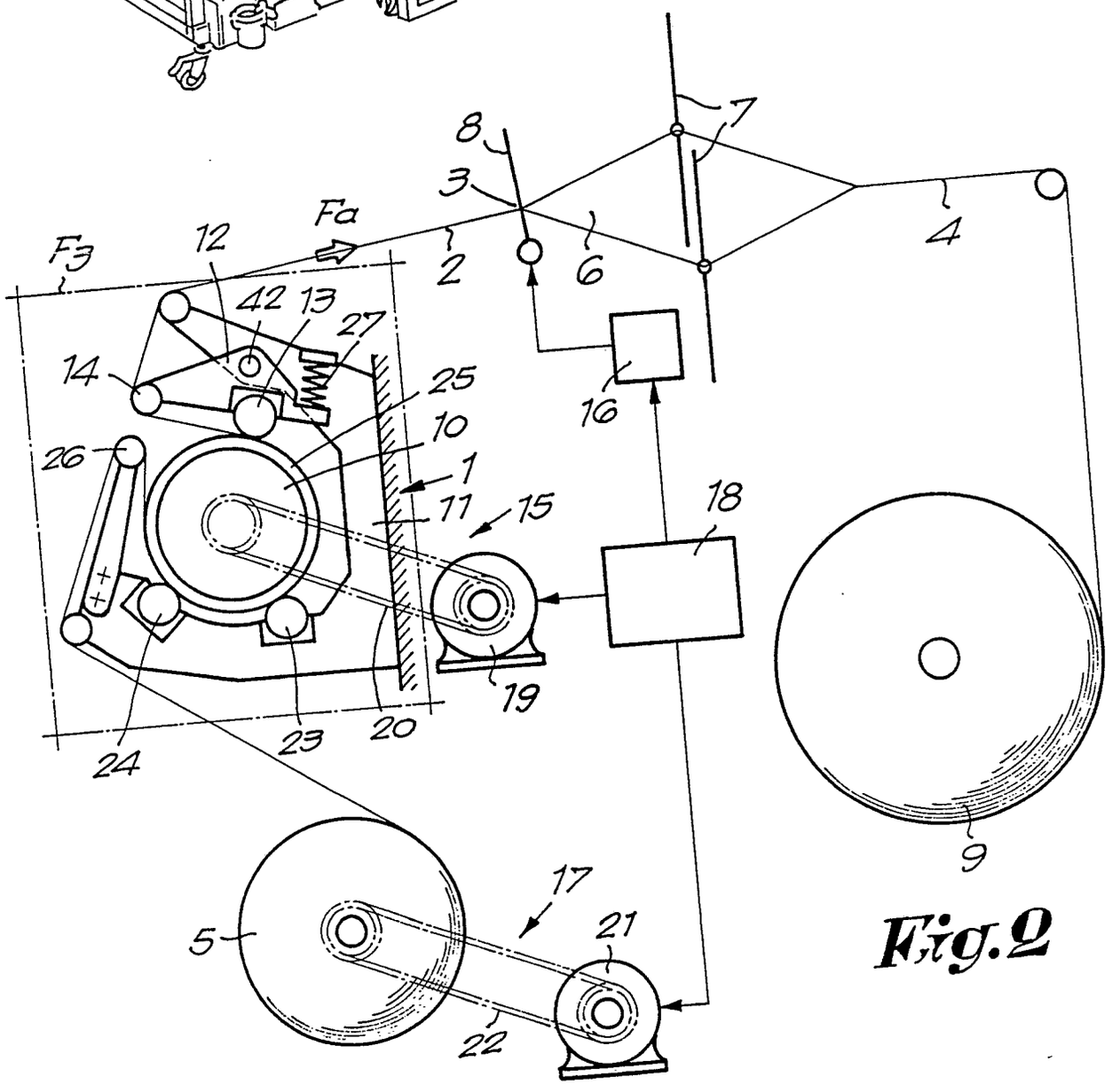
8
7
3
Fa
F3
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Fig.2

Fig.3

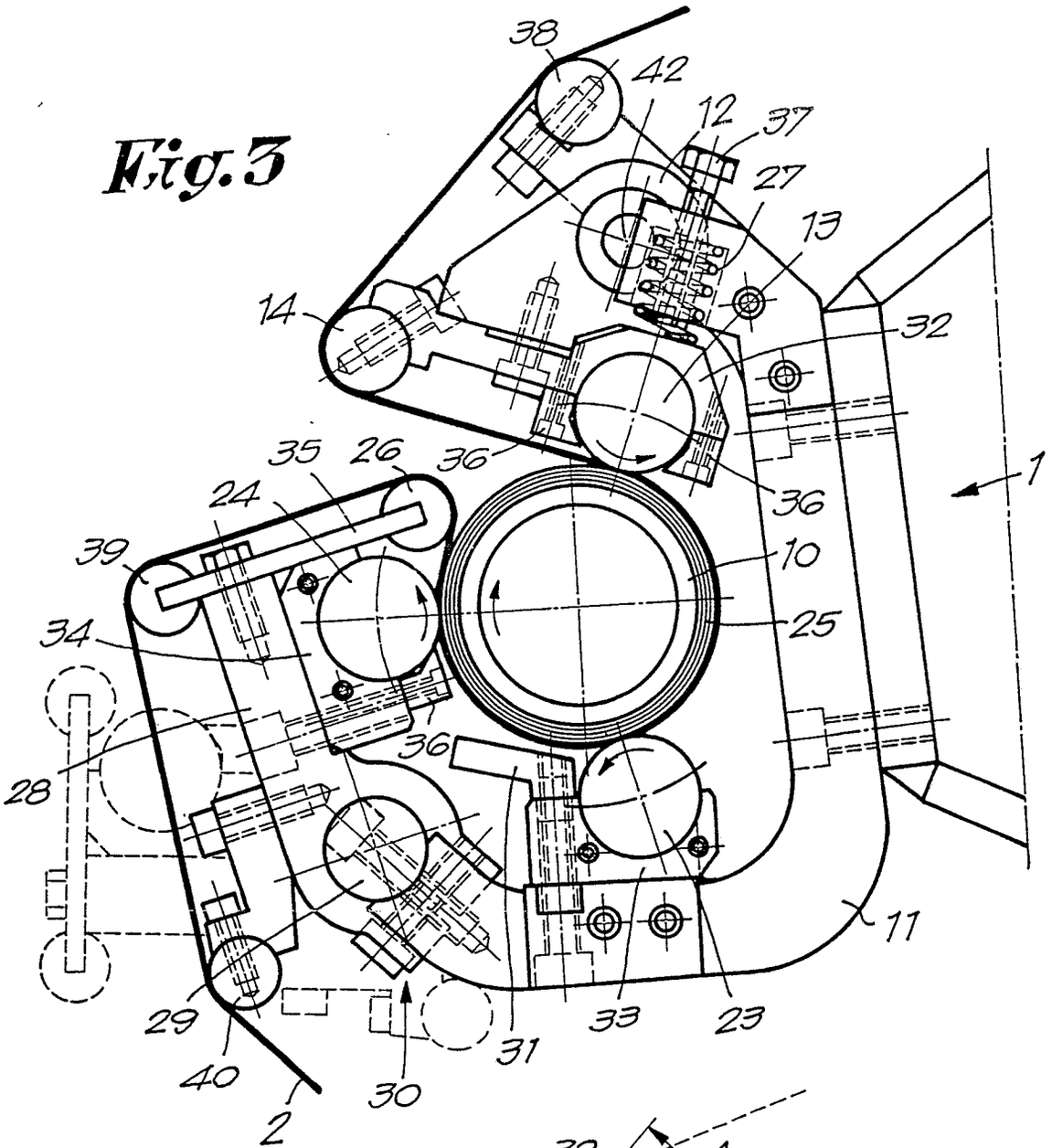
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Fig.8

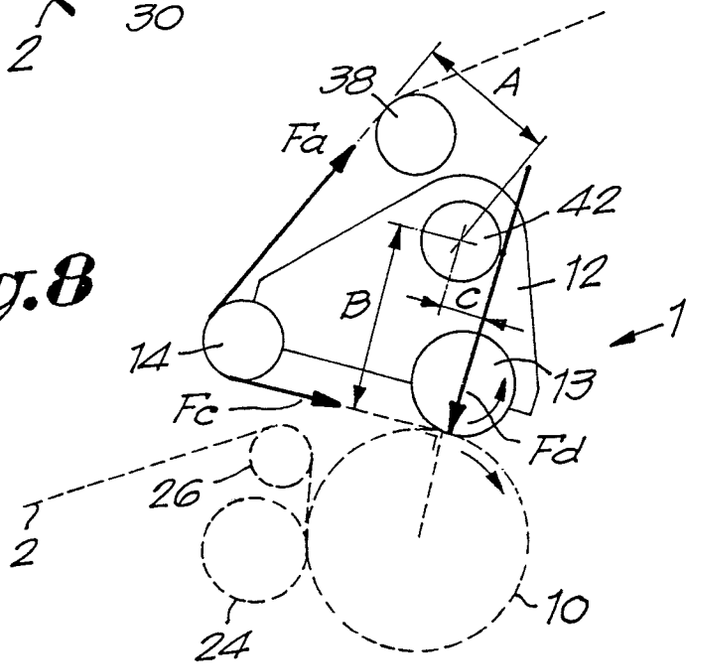
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Fig. 4

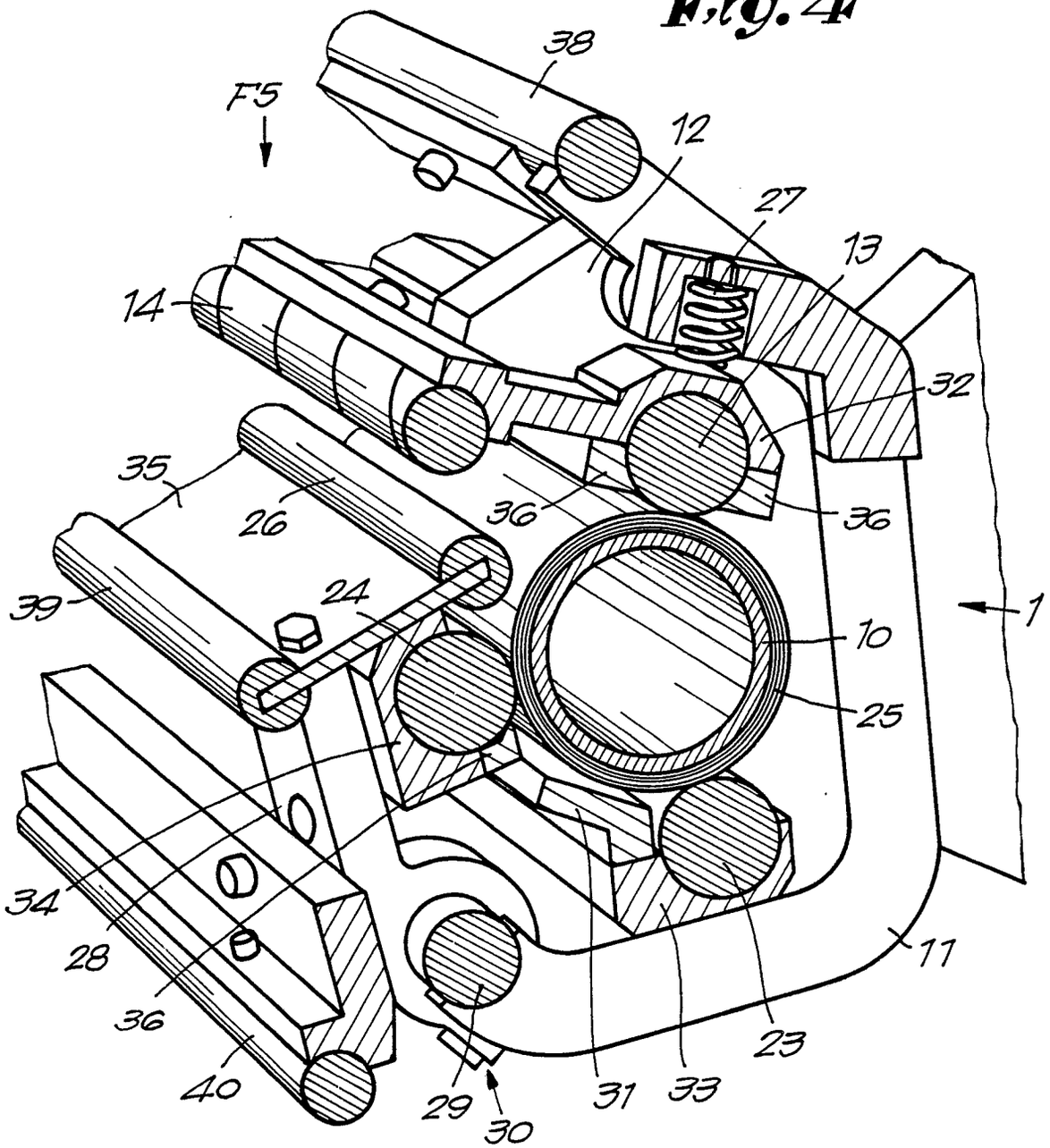
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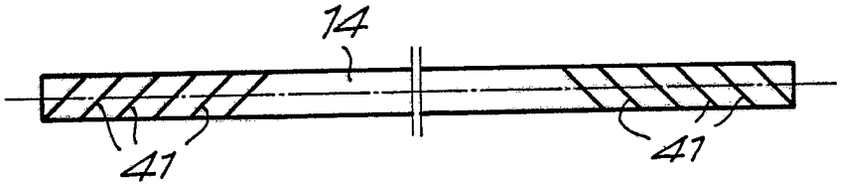
Fig. 5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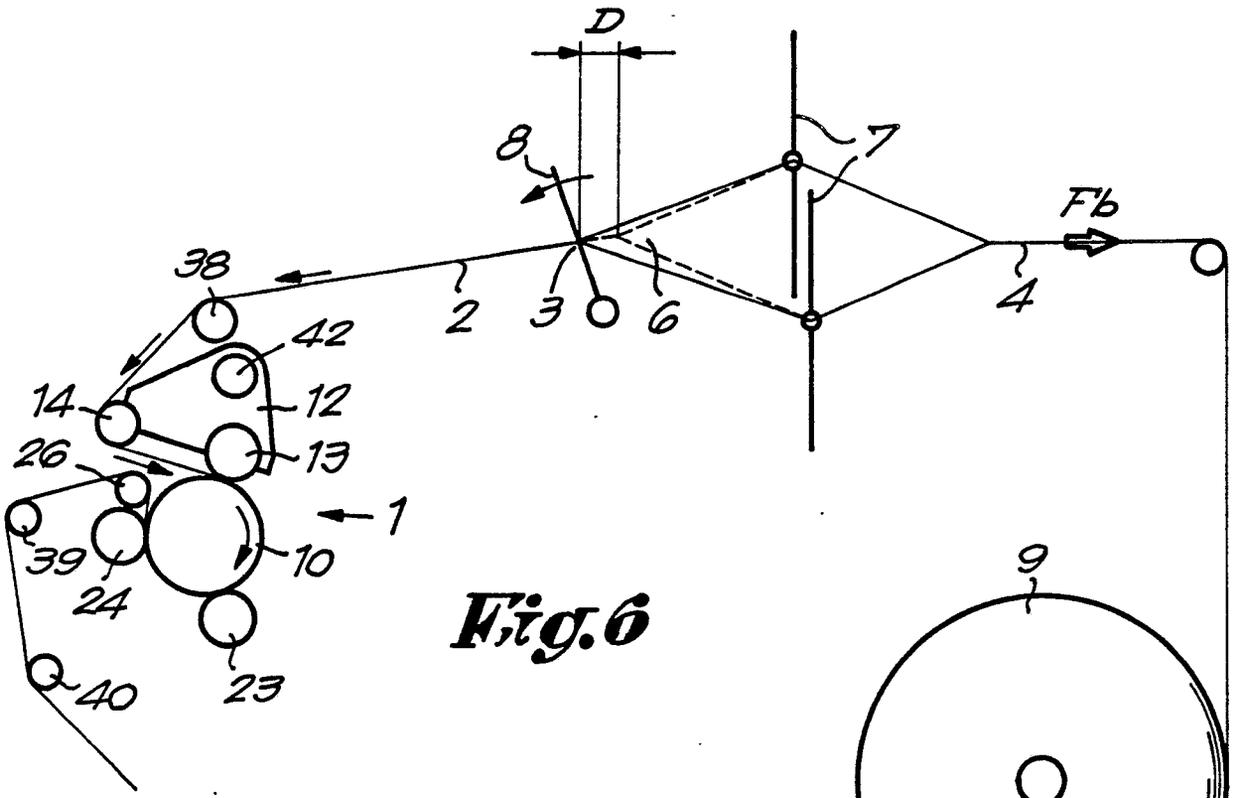
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Fig.6

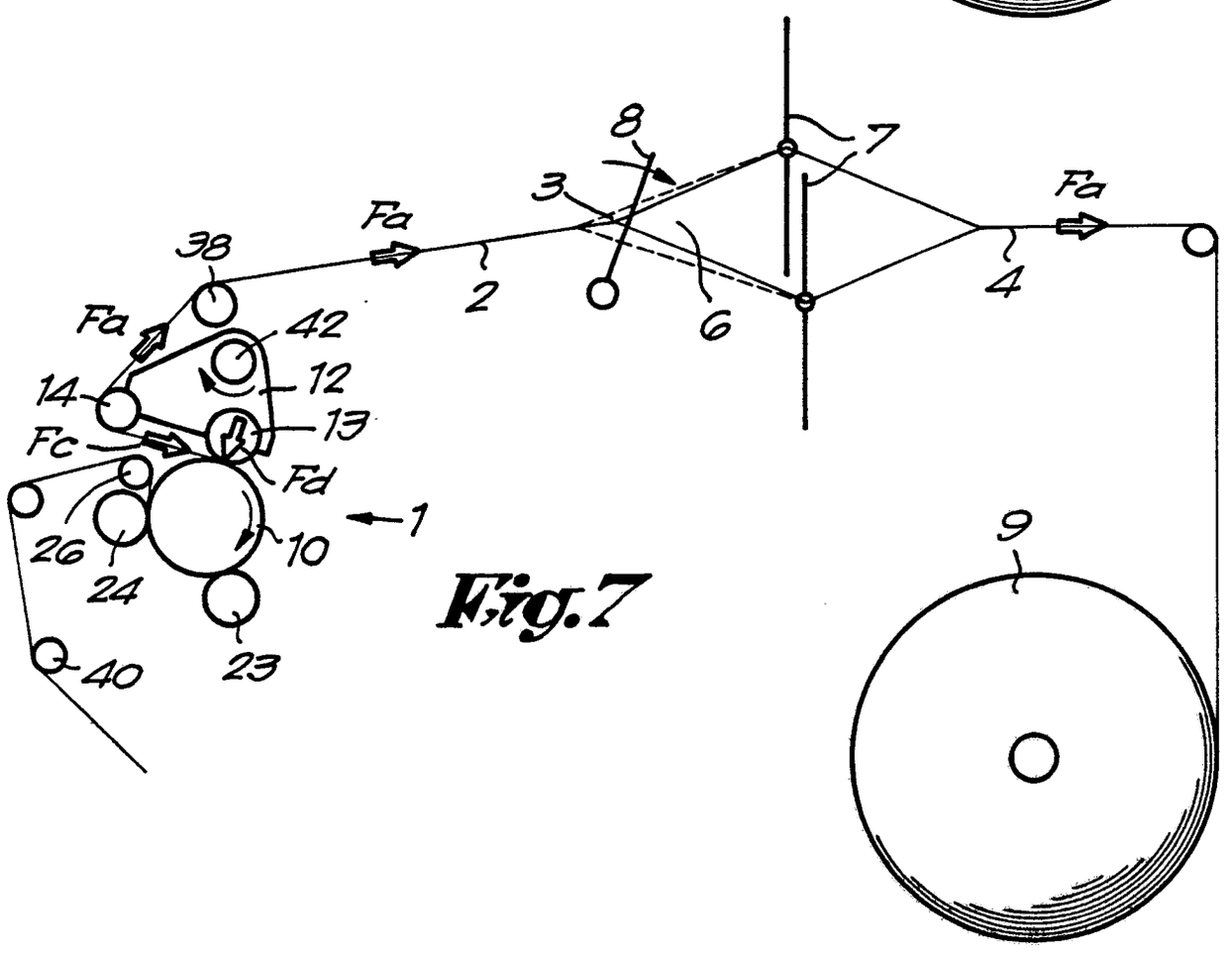
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Fig.7

Fig.9

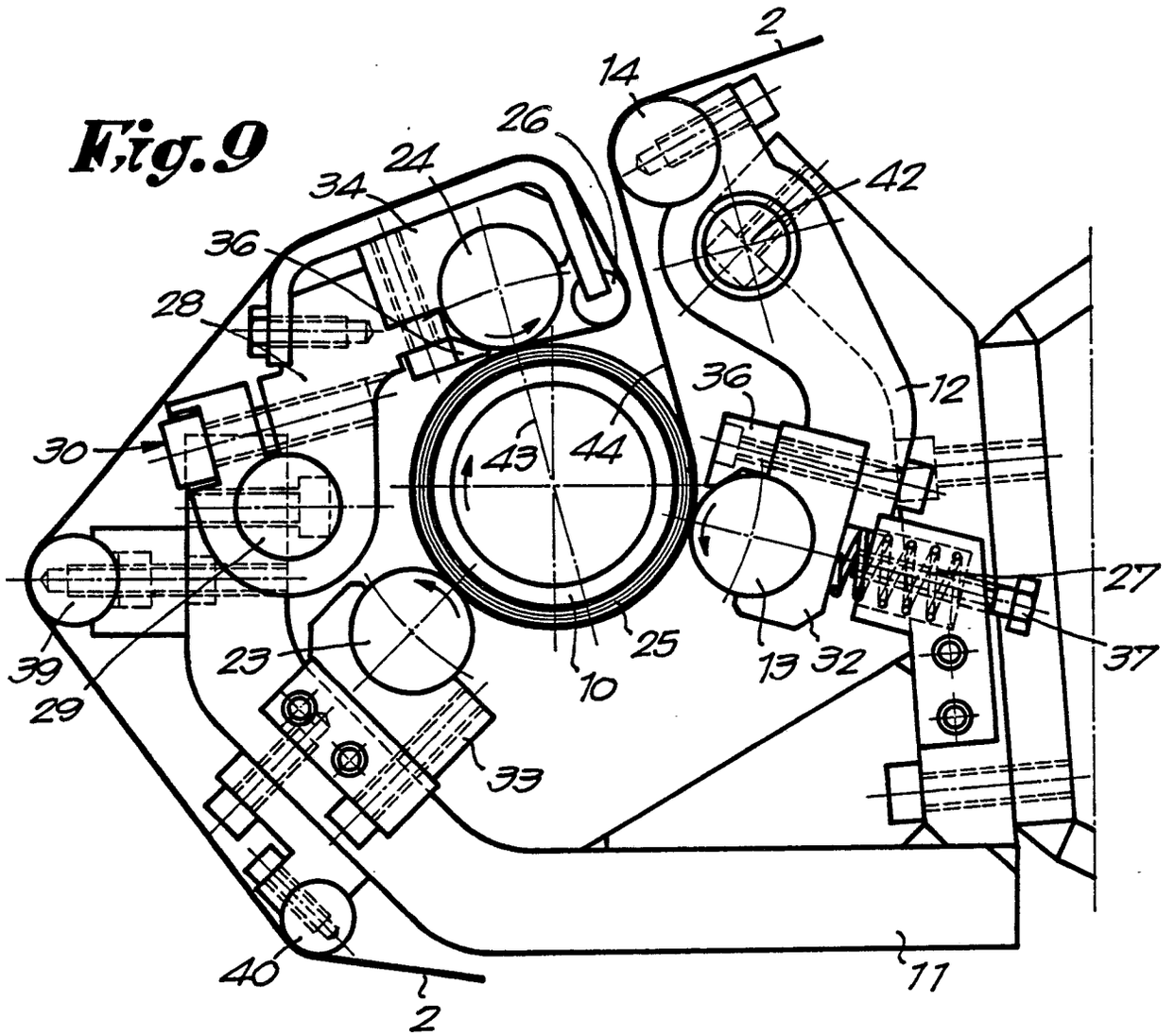


Fig.12

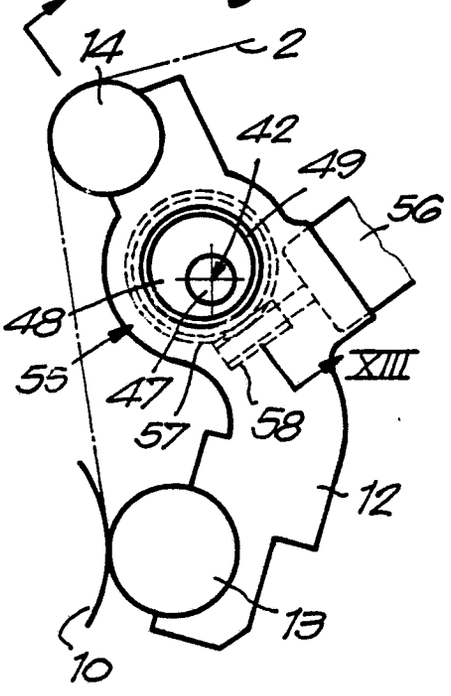


Fig.14

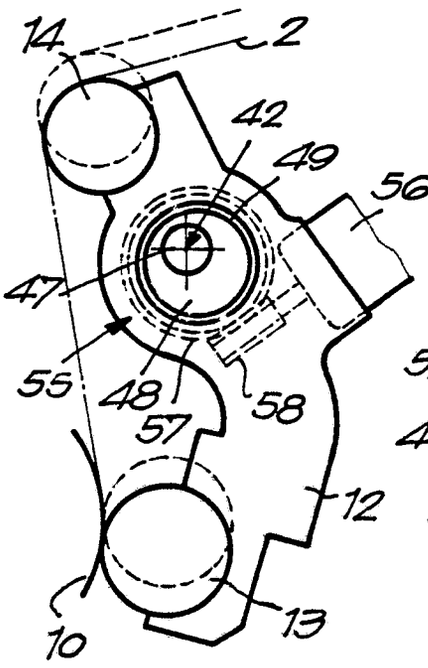
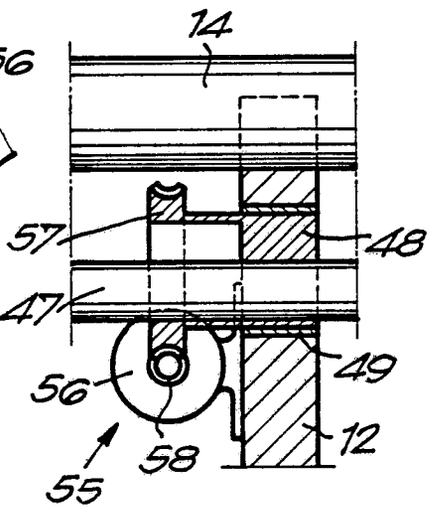


Fig.13



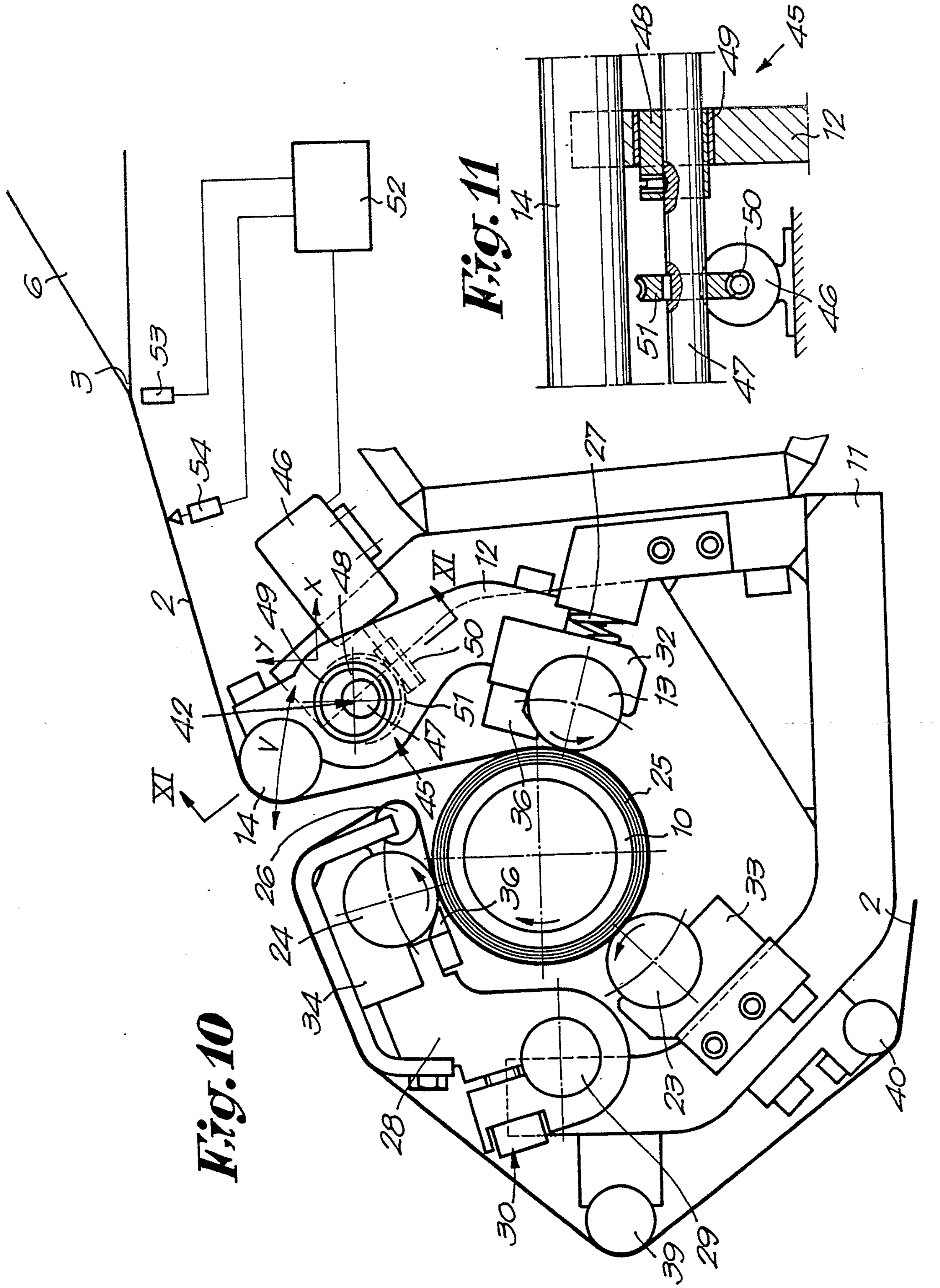

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Fig. 10

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Fig. 11

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 20 0948

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.4)
A	EP-A-0011788 (SULZER) * the whole document *	1, 3, 4, 5	D03D49/20
A,D	EP-A-0234646 (PICANOL)		
A	EP-A-0224850 (SULZER)		
A	DE-A-2015369 (TE STRAKE)		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

D03D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12 JULY 1989	BOUTELEGIER C.H.H.

CATEGORY OF CITED DOCUMENTS

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