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(54) **CHAIN SAW BRAKE ARRANGEMENT**

KETTENSÄGENBREMSANORDNUNG

MECANISME DE FREIN POUR SCIE A CHAINE

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- **DATABASE WPI Section PQ Thomson Scientific, London, GB; Class P63, AN 1982-P7885E XP002711256, -& SU 893 519 A1 (TSNI PK I MEKH ENERGETIKI) 30 December 1981 (1981-12-30)**

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Description

[0001] This invention relates to a motor chain saw with a chain brake arrangement comprising a kick brake and a coasting brake that via a link arm mechanism are acting on a brake lever that is pivotally arranged on a shaft directly or indirectly fixed to a chain saw base structure, said brake lever being connected to a brake band acting on a brake drum which is drivingly connected with the outlet shaft of the motor.

[0002] Chain saws of the type mentioned above are previously known, see for instance US 5813123 A1 and US 5480009: The known devices are usually complicated, expensive and difficult to assemble. The purpose of this invention is to achieve a braking arrangement that is compact and built into the motor such that the braking arrangement takes little space when assembled into the chain. Moreover the arrangement is simple and reliable and well suited for its purpose.

[0003] An embodiment of the invention will now be described with reference to the accompanying drawing on which Fig. 1 is a front view showing the brake arrangement in its disengaged state whereas Fig. 2 and 3 is a plan view and a rear view of the brake in the position shown in Fig. 1, Fig 4 is a front view of the arrangement when the brake is activated by the coasting brake and Fig. 5 and 6 is the corresponding plan view and rear view, Fig. 7 is a front view of the arrangement when it has been activated by the kick brake whereas Fig. 8 and 9 is the corresponding plan view and rear view.

[0004] A chain saw is in a conventional way provided with an electric motor 10 that rotates an outlet shaft 11 that via a transmission and a sprocket wheel (not shown) drives the saw chain around the saw bar. The outlet shaft 11 is also provided with a brake drum 12 that is surrounded by a brake band 13 having one end fixed to a base structure 14 of the chain saw whereas the other end of the brake band is secured to a first end of an elongated brake lever 15. The brake lever is at its mid part turnably arranged about a shaft 16 that is fixed to the base structure 14 whereas the second end of the lever 15 is turnably secured to a link arm mechanism that comprises a first and a second arm 17 and 18 resp. The first arm 17 is at one end coupled to said lever 15 whereas it at its other end via a dowel 19 is pivotally connected to one end of the second arm 18 which is shorter than the first arm. The dowel 19 is preferably under the influence of a spring (not shown) that creates a force F that pushes the dowel downwards in Fig. 1. The other end of the second arm is pivotally connected to a slider 20 that is movable sideways in Fig. 1 in a guide 21 arranged at the base structure. The link arm mechanism constitutes a knee shaped structure that can be turned such that the connection between the first and second link arm in one "locked" position rests against an abutment surface 22 on the slider 20 whereas the connection part can be released from this position by a triggering arrangement that is connected to a conventional turnable hand protector (not shown)

arranged at the chain saw and that applies an upwardly directed force in Fig. 1 on the dowel 19 when the hand protector is activated.

[0005] The arrangement also comprises a tension spring 23 of the helical type. One end of this spring is secured to the slider 20 whereas the other end is in engagement with the brake lever 15 close to the turning connection between the lever 15 and the first arm 17. The tension spring 23 encloses a coaxial compression spring 24 of the helical type. One end of the compression spring 24 rests against a seat 25 that is a part of the base structure 14 whereas the other end rest against the slider 20. The slider 20 is linearly movable in the guide 21 by means of an element 26 that by means of a mechanical transmission (not shown) is connected to a throttle knob arranged in the operating handle of the chain saw.

[0006] The arrangement operates in the following manner. During normal working conditions the brake is not activated as appears from Fig. 1-3 since the throttle knob is depressed thereby keeping the slider 20 in its right hand position in Fig. 1. Consequently the forces from the throttle knob will be transferred to the slider 20 and further to the second and first arms 18 and 17, which are in the locked position where they engage the abutment surface 22, as well as to the brake lever 15. This means that the upper part of the lever is in a right hand position in Fig. 1 whereas the lower part is in a left hand position causing the brake band 13 to be out of engagement with the brake drum. Simultaneously the compression spring 24 is in its compressed state.

[0007] If the throttle knob is released to stop the motor after switching off the drive motor the situation is such as shown in Fig. 4-6. In this position the slider 20 has been moved to the left hand position by means of the compression spring 24 since the opposite force created by the throttle knob transmission has ceased. During this movement the forces from the compression spring 24 are transferred to the second and first link arms 18 and 17 and further to the brake lever 15 such that the upper part of the lever is moved in the left hand direction whereas the lower part of the lever 15 is moved in the right hand direction causing the brake band 13 to be tightened around the brake drum 12 such that the chain is stopped from running.

[0008] If the kick brake becomes activated in order to immediately stop the chain from running, the situation is such as shown in Figs. 7-9. In this position the hand protector has been turned and by means of a transmission element acted on the dowel 19 and moved the connecting ends of the link arms 18, 17 upwards to the position shown in Fig. 7. This means that the tension spring 23 is activated and pulls the upper end of the brake lever 15 in the left hand direction whereas the lower end of the lever 15 is moved in the right hand direction such that the brake band 13 is tightened around the brake drum 12.

[0009] It should be said that even if the brake arrangement is primarily directed towards chain saws driven by electric motors the arrangement could as well be used

for combustion driven chain saws.

Claims

1. A motor chain saw with a chain brake arrangement comprising a kick brake and a coasting brake which via a link arm mechanism are acting on a brake lever (15) that is pivotally arranged on a shaft (16) directly or indirectly fixed to a chain saw base structure (14), said brake lever being connected to a brake band (13) acting on a brake drum (12) which is drivingly connected with the outlet shaft (11) of the motor **characterised in that** the link arm mechanism is connected to a slider (20) that is movable with respect to said base structure (14).
2. A chain saw according to claim 1 **characterised in that** said link arm mechanism comprises a first arm (18) and a second arm (17) that are turnably arranged with respect to one another, the first arm (18) being turnably arranged with respect to the brake lever (15) whereas the second arm is turnably arranged with respect to the slider (20).
3. A chain saw according to claim 2 **characterised in that** the brake lever (15) is elongated and the brake band (13) is connected to one end of the brake lever and the second arm (17) is connected to the other end of the lever whereas the shaft (16) is arranged between said ends.
4. A chain saw according to any of the previous claims **characterised in that** a tension spring (23) is arranged between the slider (20) and the brake lever (15).
5. A chain saw according to any of the previous claims **characterised in that** a compression spring (24) is arranged between the slider (20) and the base structure (14).
6. A chain saw according to claim 4 and 5 **characterised in that** the tension spring (23) as well as the compression spring (24) are helical springs that are arranged coaxially.
7. A chain saw according to any of the previous claims **characterised in that** the movement of said slider (20) is under the influence of a transmission arrangement connected to a throttle lever.
8. A chain saw according to any of the previous claims **characterised in that** the link arm mechanism by means of a hand protection element is movable from a first locked position in which a part of the mechanism is in a resting position against an abutment surface (22) to a second released position in which said

part is free from the abutment surface (22).

9. A chain saw according to claim 8 **characterised in that** the link arm mechanism is under the influence of a spring that pushes said part against the abutment surface (22).

Patentansprüche

1. Motorkettensäge mit einer Kettenbremsanordnung, die eine Trittbremse und eine Auslaufbremse umfasst, welche über einen Verbindungsarmmechanismus auf einen Bremshebel (15) einwirken, der schwenkbar an einer Welle (16) angeordnet ist, welche direkt oder indirekt an einer Kettensägenbasisstruktur (14) befestigt ist, wobei der Bremshebel mit einem Bremsband (13) verbunden ist, das auf eine Bremstrommel (12) einwirkt, welche antreibend mit der Abtriebswelle (11) des Motors verbunden ist, **dadurch gekennzeichnet, dass** der Verbindungsarmmechanismus mit einem Gleitstück (20) verbunden ist, das bezüglich der Basisstruktur (14) beweglich ist.
2. Kettensäge nach Anspruch 1, **dadurch gekennzeichnet, dass** der Verbindungsarmmechanismus einen ersten Arm (18) und einen zweiten Arm (17) umfasst, die drehbar in Bezug zueinander angeordnet sind, wobei der erste Arm (18) drehbar bezüglich des Bremshebels (15) angeordnet ist, während der zweite Arm drehbar bezüglich des Gleitstücks (20) angeordnet ist.
3. Kettensäge nach Anspruch 2, **dadurch gekennzeichnet, dass** der Bremshebel (15) gestreckt ist und das Bremsband (13) mit einem Ende des Bremshebels verbunden ist und der zweite Arm (17) mit dem anderen Ende des Hebels verbunden ist, während die Welle (16) zwischen den Enden angeordnet ist.
4. Kettensäge nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** eine Spannfeder (23) zwischen dem Gleitstück (20) und dem Bremshebel (15) angeordnet ist.
5. Kettensäge nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** eine Druckfeder (24) zwischen dem Gleitstück (20) und der Basisstruktur (14) angeordnet ist.
6. Kettensäge nach einem der Ansprüche 4 und 5, **dadurch gekennzeichnet, dass** die Spannfeder (23) sowie die Druckfeder (24) Schraubenfedern sind, die koaxial angeordnet sind.
7. Kettensäge nach einem der vorhergehenden An-

sprüche, **dadurch gekennzeichnet, dass** die Bewegung des Gleitstücks (20) unter Einfluss einer Getriebeanordnung steht, die mit einem Drosselhebel verbunden ist.

8. Kettensäge nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Verbindungsarmmechanismus mittels eines Handschutzelements aus einer ersten, gesperrten Position, in der sich ein Teil des Mechanismus in einer Ruheposition an einer Anstoßfläche (22) befindet, zu einer zweiten, freigegebenen Position beweglich ist, in der der Teil von der Anstoßfläche (22) frei ist.
9. Kettensäge nach Anspruch 8, **dadurch gekennzeichnet, dass** der Verbindungsarmmechanismus unter dem Einfluss einer Feder steht, die den Teil an die Anstoßfläche (22) drückt.

Revendications

1. Scie à chaîne à moteur avec un agencement de frein de chaîne comprenant un frein à rebond et un frein à inertie qui, par l'intermédiaire d'un mécanisme à bras de liaison, agissent sur un levier de frein (15) qui est agencé en pivotement sur un arbre (16) fixé directement ou indirectement à une structure de base de scie à chaîne (14), ledit levier de frein étant relié à une bande de frein (13) agissant sur un tambour de frein (12) qui est relié en entraînement avec l'arbre de sortie (11) du moteur, **caractérisée en ce que** le mécanisme à bras de liaison est relié à un coulisseau (20) qui peut se déplacer par rapport à ladite structure de base (14).
2. Scie à chaîne selon la revendication 1, **caractérisée en ce que** ledit mécanisme à bras de liaison comprend un premier bras (18) et un deuxième bras (17) qui sont agencés en rotation l'un par rapport à l'autre, le premier bras (18) étant agencé en rotation par rapport au levier de frein (15) tandis que le deuxième bras est agencé en rotation par rapport au coulisseau (20).
3. Scie à chaîne selon la revendication 2, **caractérisée en ce que** le levier de frein (15) est allongé et la bande de frein (13) est reliée à une extrémité du levier de frein et le deuxième bras (17) est relié à l'autre extrémité du levier tandis que l'arbre (16) est agencé entre lesdites extrémités.
4. Scie à chaîne selon l'une des revendications précédentes, **caractérisée en ce qu'**un ressort de traction (23) est agencé entre le coulisseau (20) et le levier de frein (15).
5. Scie à chaîne selon l'une des revendications précé-

dentes, **caractérisée en ce qu'**un ressort de compression (24) est agencé entre le coulisseau (20) et la Structure de base (14).

- 5 6. Scie à chaîne selon les revendications 4 et 5, **caractérisée en ce que** le ressort de traction (23) ainsi que le ressort de compression (24) sont des ressorts hélicoïdaux qui sont agencés de manière coaxiale.
- 10 7. Scie à chaîne selon l'une des revendications précédentes, **caractérisée en ce que** le mouvement dudit coulisseau (20) est sous l'influence d'un agencement de transmission relié à un levier de manette des gaz.
- 15 8. Scie à chaîne selon l'une des revendications précédentes, **caractérisée en ce que** le mécanisme à bras de liaison, au moyen d'un élément de protection des mains, peut se déplacer d'une première position verrouillée dans laquelle une partie du mécanisme est dans une position de repos contre une surface de butée (22) vers une deuxième position de libération dans laquelle ladite partie est libérée de la surface de butée (22).
- 20 9. Scie à chaîne selon la revendication 8, **caractérisée en ce que** le mécanisme à bras de liaison est sous l'influence d'un ressort qui pousse ladite partie contre la surface de butée (22).

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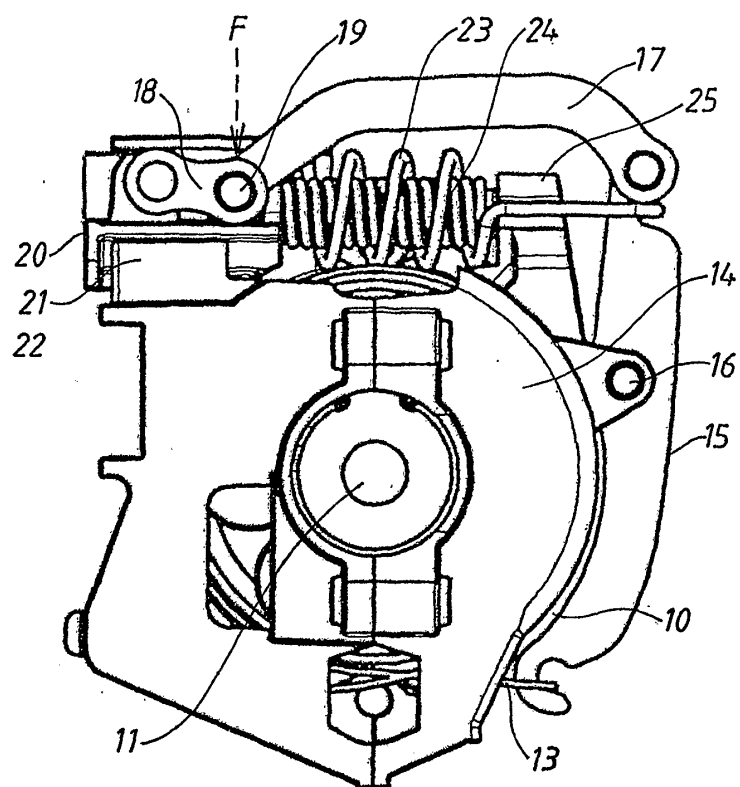


Fig. 1

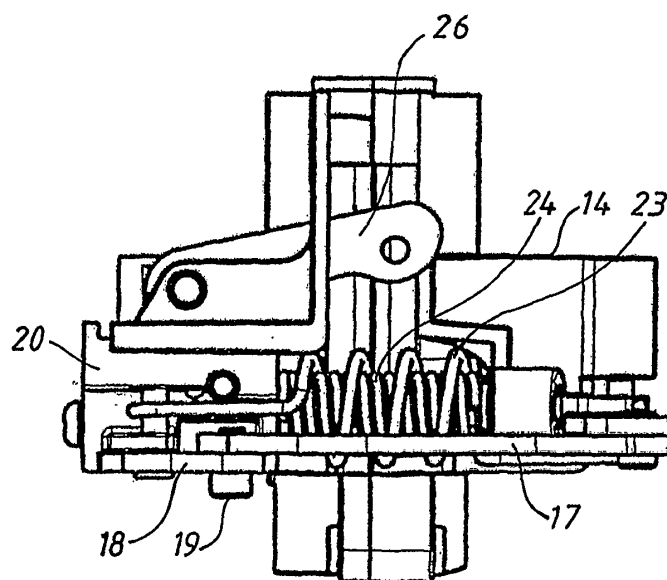


Fig. 2

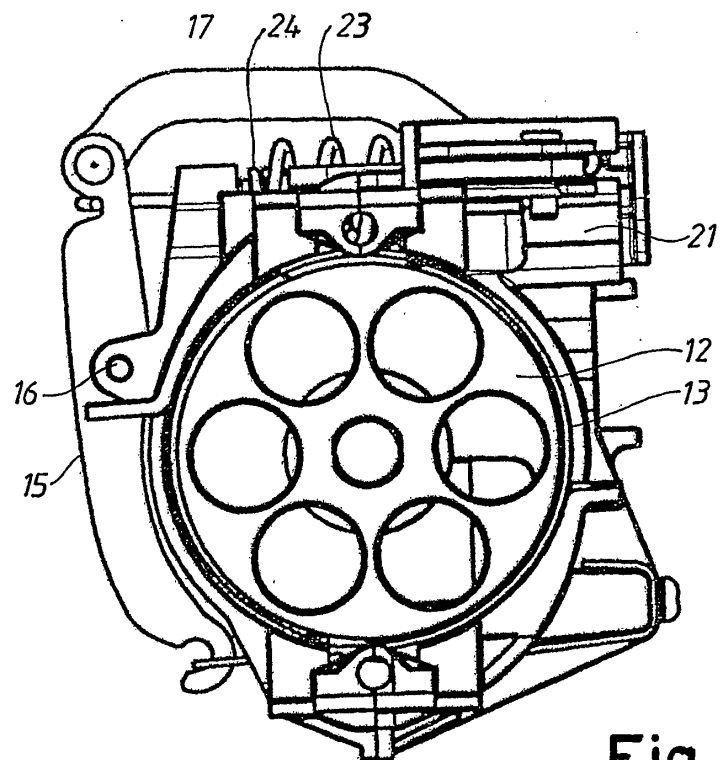


Fig. 3

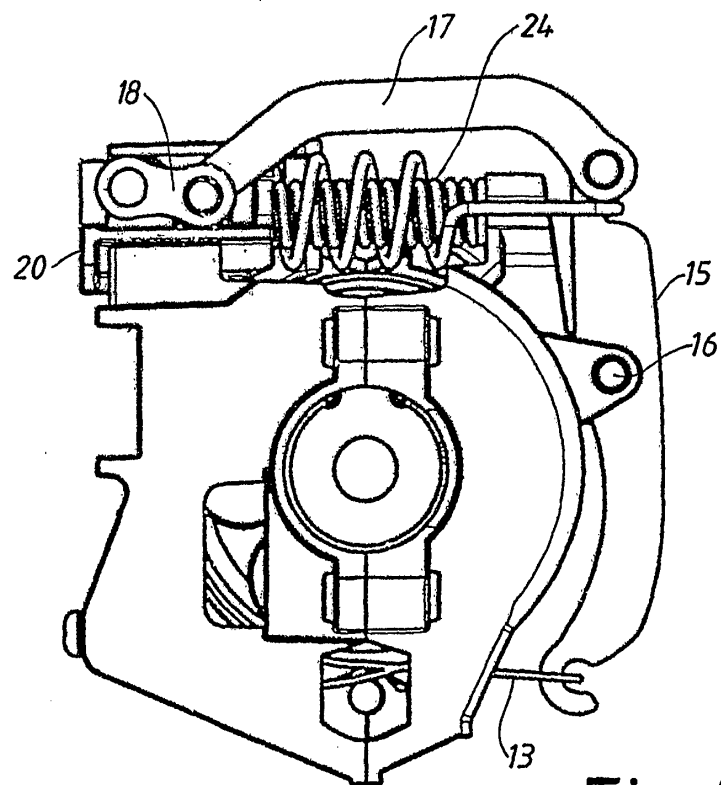


Fig. 4

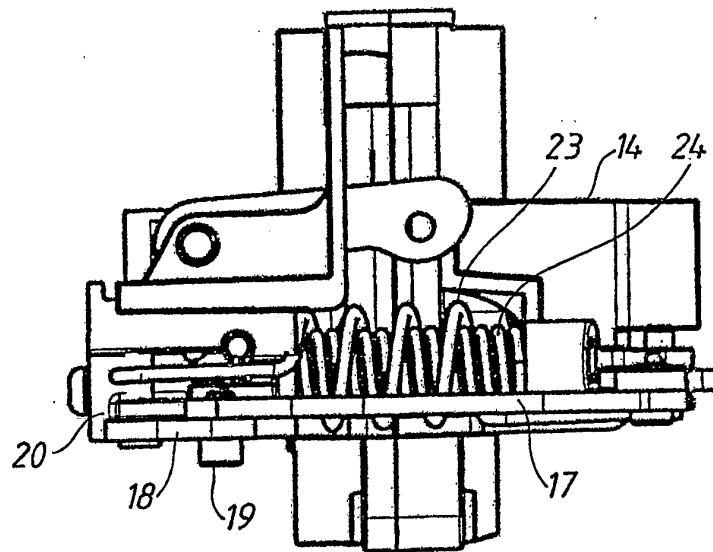


Fig. 5

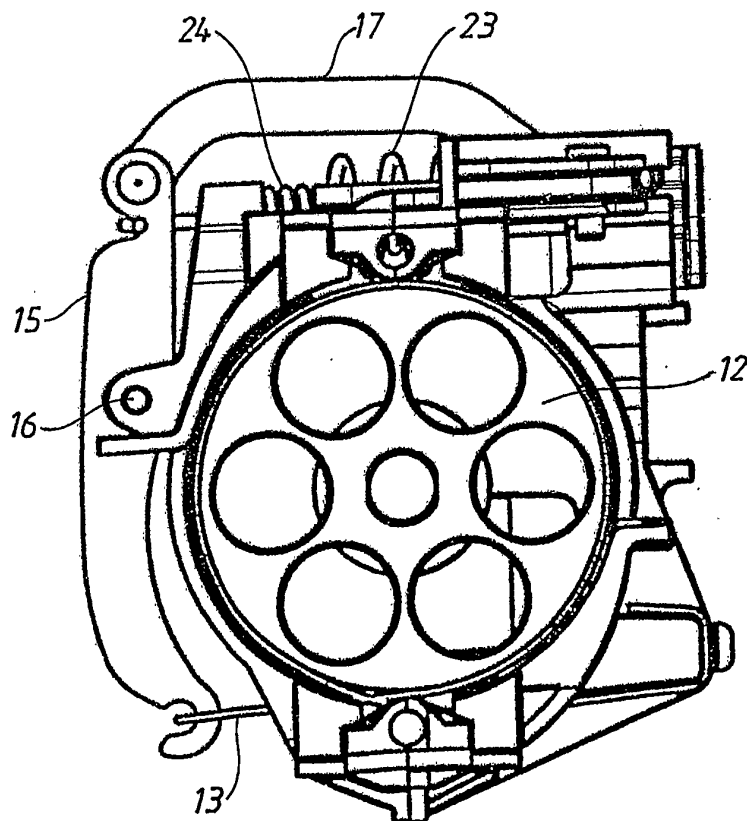


Fig. 6

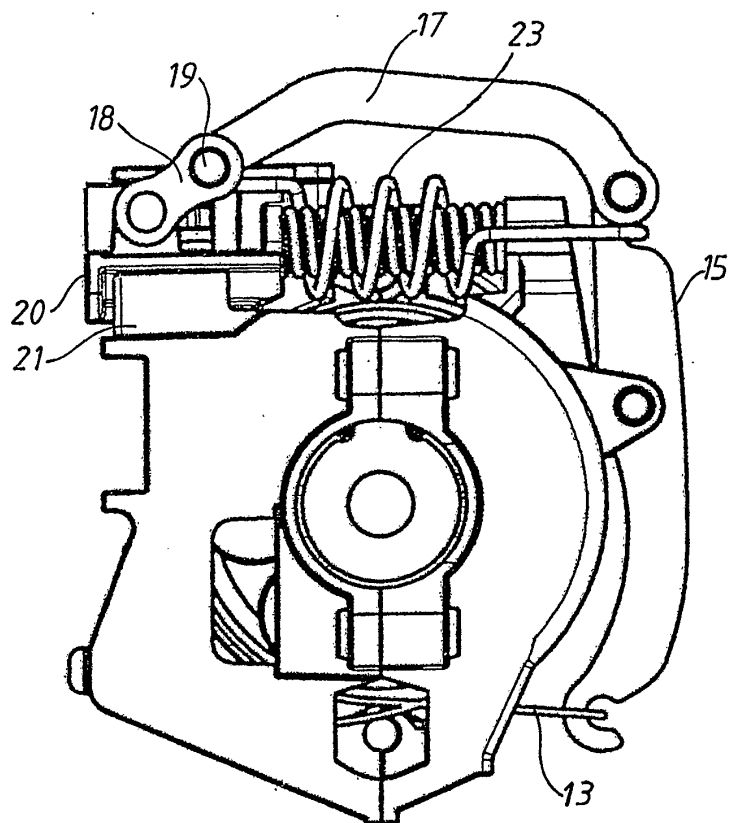


Fig. 7

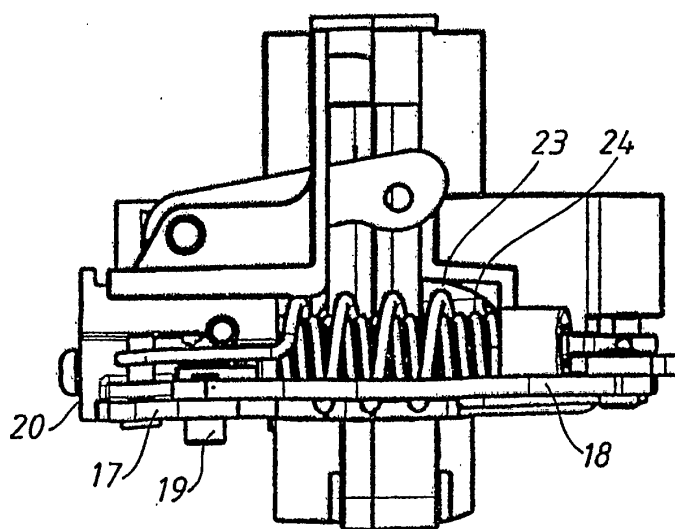


Fig. 8

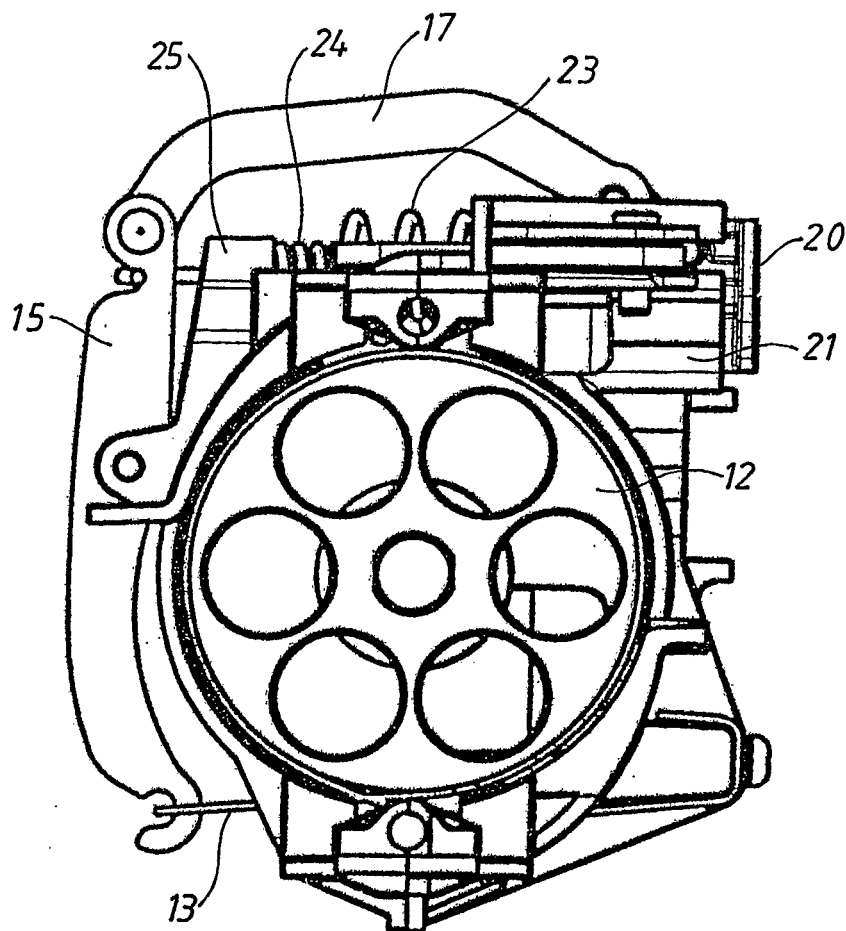


Fig. 9

REFERENCES CITED IN THE DESCRIPTION

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