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(54) Machine tool for stripping plaster and tiles off horizontal and vertical surfaces

(57) Its purpose is to remove mainly plaster or concrete surfaces from floors or walls in new construction or renovation work.

It consists of a set of metallic discs (1); these are fitted with toothed impact hammers (2), which are attached to each other by means of springs (6). These discs are fitted on a shaft (7) that runs on bearings (9), and which is made to rotate by the motor (4) by means of sprockets (10) and (19) and a toothed transmission belt (22).

The assembly has a metal structure (15) which joins the motor housing (14) with the head assembly where the impact mechanism is housed.

Its application lies in the construction field.

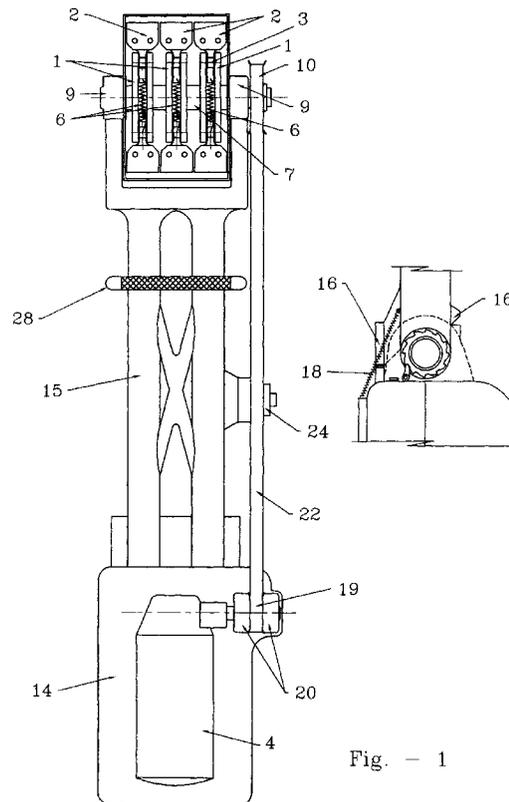


Fig. - 1

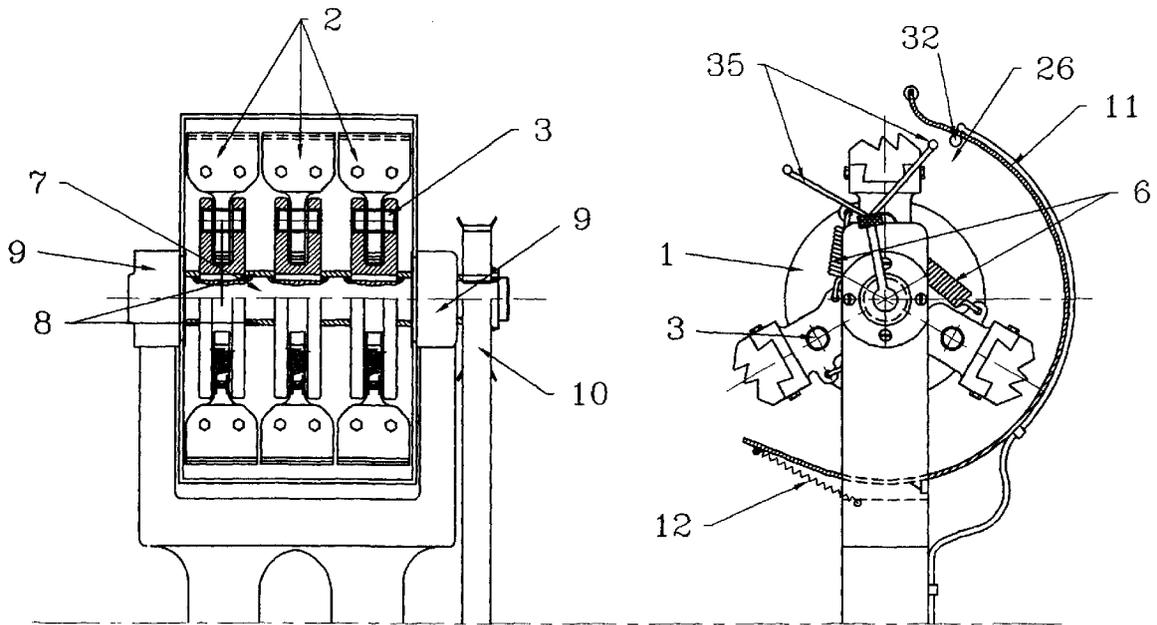


Fig. - 4

Description

This invention, as is expressed in the heading, consists of a machine tool that incorporates a mechanism for stripping plaster, concrete, tiles, etc, off wall or floor surfaces. Therefore, it will be used in the construction field, both in new and renovation work.

This invention's main advantages are that it manages to reduce the cost in such work as well as the labour; furthermore, it improves the quality since, as surfaces are removed evenly, the new surfaces find greater adherence.

INVENTION DESCRIPTION

One of the aims of this patent is to improve the execution of these jobs.

1 - In the stripping machine tool, the movement of the impact hammers is caused by a motor, which, therefore, eliminates the human effort which would be required to remove wall or floor surfaces manually. The machine tool can be used by one person on their own, thanks to its small size and light weight.

2 - The impact hammers are positioned in such a way that, as they go over the area, a wide strip is removed off the surface; this width can be increased depending on the power of the motor used, thus considerably reducing the work time required.

3 - Adjustable rods act as stops situated on either side of the machine tool's head assembly shaft; these rods allow the penetration depth of the hammers to be adjusted according to work requirements.

4 - The machine tool incorporates a water spray device, fitted on the shield, which is aimed directly at the area being removed by the hammers, in order to eliminate the dust produced while in operation.

5 - The machine tool can be used not only when the work area is near an electrical power point but also when electrical power is not available since it may incorporate an electric motor or an internal combustion engine.

INVENTION BACKGROUND

The techniques currently available for the removal of surfaces are primarily manual. A workman equipped with a chisel and hammer hacks away at the wall or floor surface, but this method is hard work and costly.

A pneumatic hammer may also be used: it is a device that has a shaft with a pointed end; a pneumatic system makes the shaft hammer repeatedly against the surface to remove material. With this system only a small surface area is worked on at a time; every blow eliminates a small piece of material and it is difficult to control penetration depth.

DESCRIPTION OF SUGGESTED IDEAL DESIGN

For a better understanding of how the machine tool

works, a description is offered with references to the drawings included in the following pages.

The surface stripping machine tool consists of, in its main mechanism (Fig. 4 and Fig. 5), a set of discs (1), which have a deep internal groove machined transversally to their centre axis. The groove houses the impact hammers (2) which are toothed to improve penetration capacity and which are held in place by shaft (3) with the appropriate fixing elements.

The impact hammers are divided into two pieces which are screwed together, a body (2a) and a toothed head (2b); the latter can be exchanged easily when worn or broken. These impact hammer assemblies swivel to and fro on shaft (3) due to their hammering action. Springs are attached to them in such a way that the hammers are made to work against each other's movements at the same time absorbing their impacts.

The discs (1) are held from rotating on shaft (7) with machine keys (5), and are kept at a distance from each other with metal spacers (8); this allows dismantling in case of breakage. The shaft (7) runs on two self lubricating bearings (9), with the corresponding fixing elements. The sprocket (10) is secured positively on the shaft but in such a way that dismantling is possible.

The assembly described makes up the main part of the machine tool head; it is protected from accidental manipulation by a shield (11), which is fitted so that it may swivel. Due to a spring (12) the shield is always held in place covering the impact hammers (2) whether or not the machine is being used; shield swivelling is limited by stops.

The head assembly is joined to the motor housing (14) (Fig. 1 and Fig. 2), through a tubular metal structure (15), which makes the machine tool lightweight. A bar (31) allows the machine tool to be placed on the floor without the hammers coming into contact with it. The tubular structure has an articulated joint which allows it to swivel; the swivelling is limited by stops (16) and is always upward from the horizontal plane. This articulated joint is fitted with a pawl that prevents it from moving from the different positions it can adopt. The swivelling is carried out manually and the spring (18) avoids sharp movements.

The motor (4) is fitted inside the housing. It incorporates a torque limiter which absorbs overloads caused by jamming when in use; this is a safety mechanism.

The power unit can be either an internal combustion engine or an electric motor. In any case it must have a variable speed control so that the power is transmitted smoothly to the transmission components, sprockets and belt.

On the output shaft of the motor there is a sprocket (19). Power transmission from the motor to the impact tools should be by means of sprockets and toothed belt for quiet and maintenance free operation, and high efficiency. Sprocket (19) runs on roller bearings (20) to avoid radial overloading.

When the motor begins to turn, it transmits its movement to the sprocket (19); this movement is controlled by the accelerator (21) located at the handle on the motor housing. As the accelerator is progressively pressed, the movement is increased and transmitted in turn to the sprocket; when the accelerator is released, the motor stops transmitting its power to the head assembly. To allow this function, it must incorporate a variable speed drive.

This start up and transmission system is ideal because there are occasions when, on the one hand, it is not necessary for the impact tools (2) to be working, for example, when changing the machine tool to another position, or changing to another work area, etc., but, on the other hand, it is necessary for the motor to be working. This avoids repeated starting and stopping. It is also a safety aid against accidents since, when the accelerator (24) is released, the impact hammers stop.

The turning movement of the motor is transmitted to the sprocket (19) which in turn transmits the movement to the other sprocket (10) by means of a transmission belt (22). The sprockets are of different diameter to achieve the necessary power to work the machine tool's impact hammers. The transmission belt has a safety cover to avoid accidental manipulation during operation. It also has a tensioner wheel (24) to adjust tension and facilitate assembly and removal.

The shaft in the head receives a rotating movement, which is transmitted to the hammers, or impact tools. As the machine tool is brought nearer to the wall surface, the shield (11) swivels to uncover the hammers. Their turning movement produces a continuous action on the wall or floor surface that causes material to fall away. The penetration depth of the hammers is limited by stops (35), which consist of two rods which can be adjusted by means of two threaded bolts. Wheels are incorporated on the ends to assist movement along the work area.

The machine tool has a water spray device, fitted to the shield, which aims water directly over the area being removed by the hammers, in order to eliminate the dust which is produced while in operation. Water supply is controlled by a trigger on the handle (28), which is connected to a water outlet by means of a quick fit system (34); the tubing up to the spray jets should be flexible, especially at the machine tool articulations.

The surface stripping machine tool incorporates two handles (28) and (29) to grip with hands and a strap (30) to hang on shoulder. Handle (28) can be adjusted at different positions by means of slots (33).

From the description and the examination of the diagrams it is possible to see the advantages the stripping machine tool provides with respect to other systems.

The materials used in the manufacture of the components for the stripping machine tool, their shape and dimensions, will not alter the invention, provided that its essential features are not affected.

BRIEF DESCRIPTION OF DRAWINGS

The attached drawings, which are referred to in the invention description, represent an example of a practical design for the surface stripping machine tool.

Fig.1 represents a general plan view of the machine tool and a detail of the articulated joint with pawl, stops and springs, at the connecting point between the metal structure and the motor housing; Fig.2 represents a right side elevation showing the transmission system with sprockets and toothed belt; Fig.3 represents a left side elevation with a cross sectional view of the head and a detailed view of the water spray system which projects water over the area being removed by the impact hammers; Fig.4 represents a detailed view of the machine tool head, plan and side elevation showing the arrangement of its elements; Fig.5 represents a detailed view of the arrangement of the impact hammers on the discs, plan and side elevation with partial cross sectional view.

Claims

1. MACHINE TOOL FOR STRIPPING PLASTER AND TILES OFF HORIZONTAL AND VERTICAL SURFACES with special characteristic features, as shown in Fig. 4 and Fig. 5, in that it has a rotating system of toothed impact hammers, each of which consisting of two pieces, body (2a) and head (2b), which can be easily separated for replacement in case of wear or breakage of the toothed head. The toothed impact hammers are attached to metal discs (1) by means of a shaft; the impact hammers within the same disc are also attached to each other by means of springs (6). Each disc assembly is fitted onto a shaft (7), which transmits its rotating movement to the assemblies.
2. MACHINE TOOL FOR STRIPPING according to claim 1, with special characteristic features, as shown in Fig 5, in that it has a system for attaching the impact hammers to each other by means of springs, in such a way that during operation the blows the impact hammers are subjected to are absorbed by these springs, at the same time opposing the oscillating motion of the impact hammers on their shafts (3), which attach them to the metal discs (1).
3. MACHINE TOOL FOR STRIPPING according to claims 1 and 2 with special characteristic features, as shown in Fig. 4, in that it has a water spray system by means of spray jets (32), which aim directly at the area being removed by the toothed hammers, in order to eliminate the dust produced while in operation.
4. MACHINE TOOL FOR STRIPPING according to

claims 1,2 and 3 with special characteristic features, as shown in Figs. 1,2 and 3, in that it has a head section where the impact mechanism is housed, a base section (14) where the motor is housed, and a structure (15) that joins the two. The structure swivels where it joins the motor housing; the swivelling may reach a predetermined angle as from the horizontal plane and always in a positive direction, limited by stops and a pawl that maintains it in the desired position.

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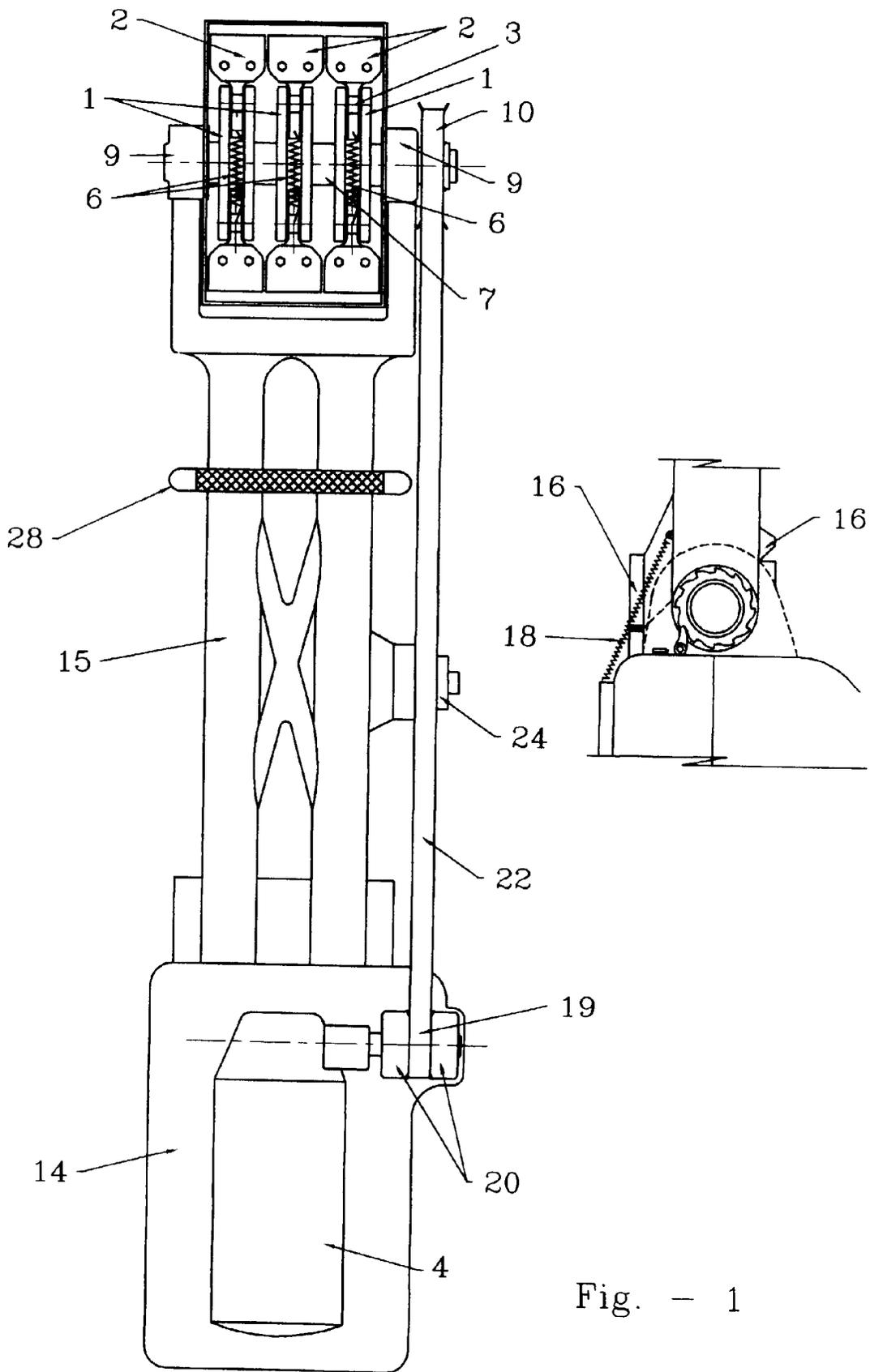


Fig. - 1

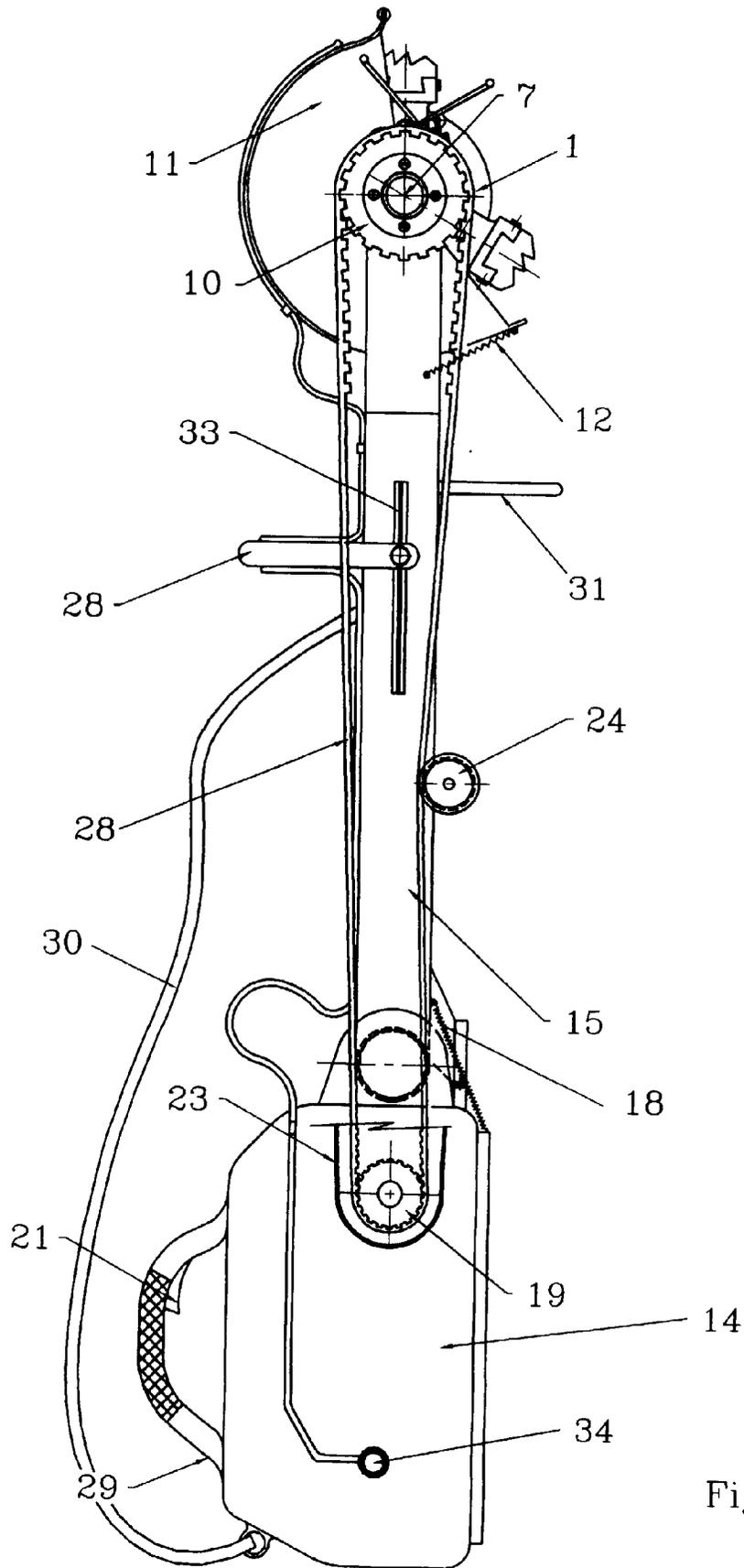
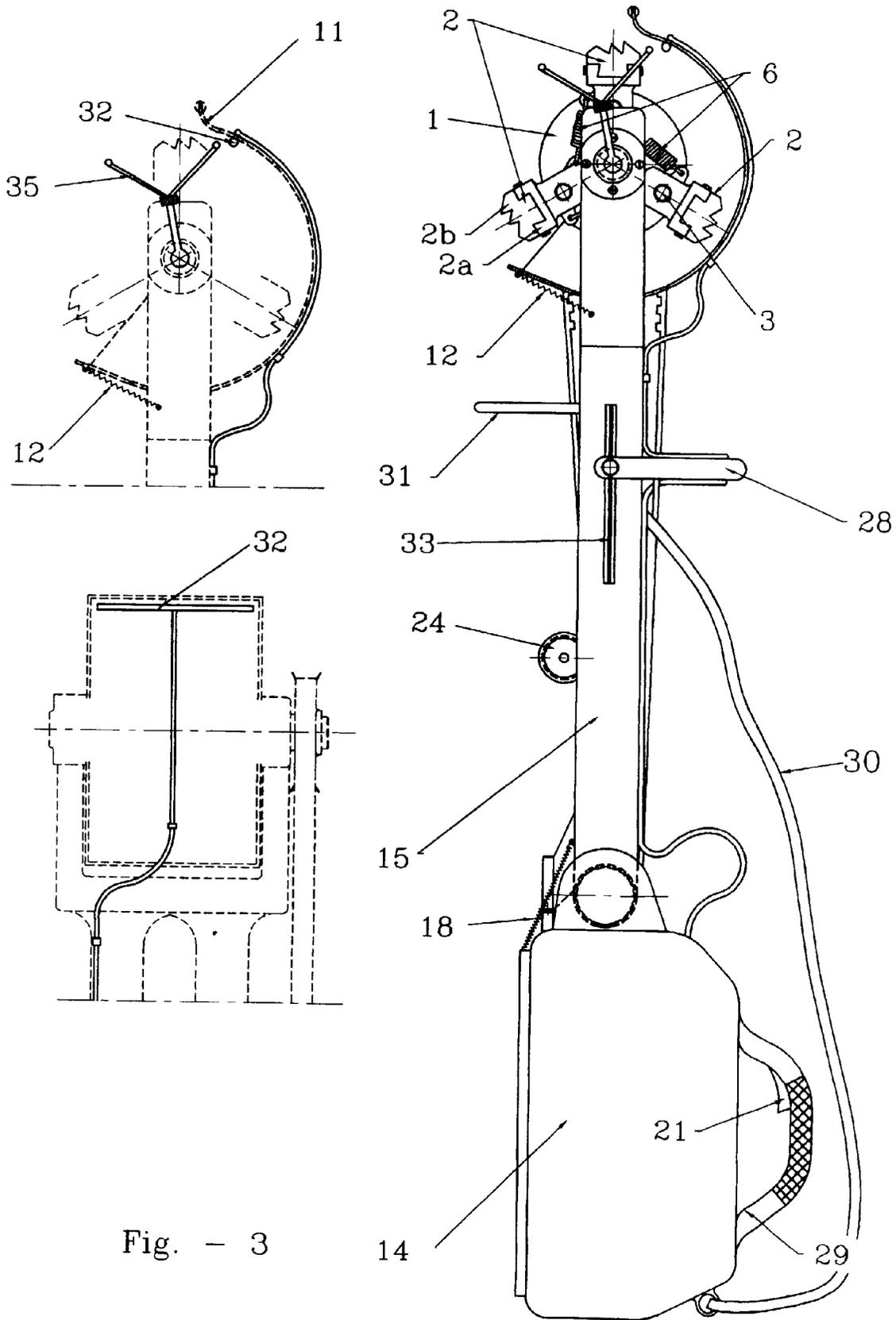


Fig. - 2



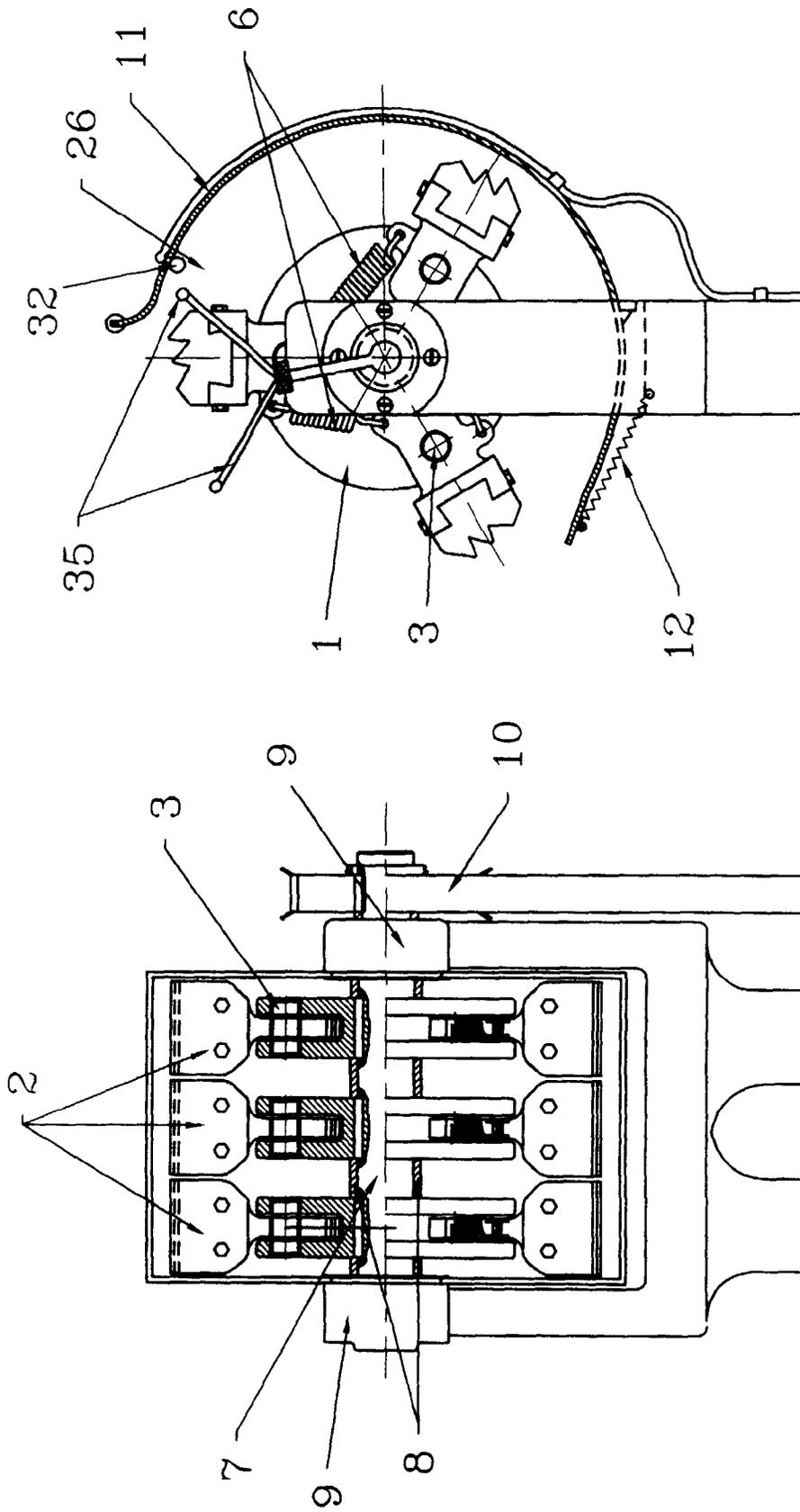


Fig. - 4

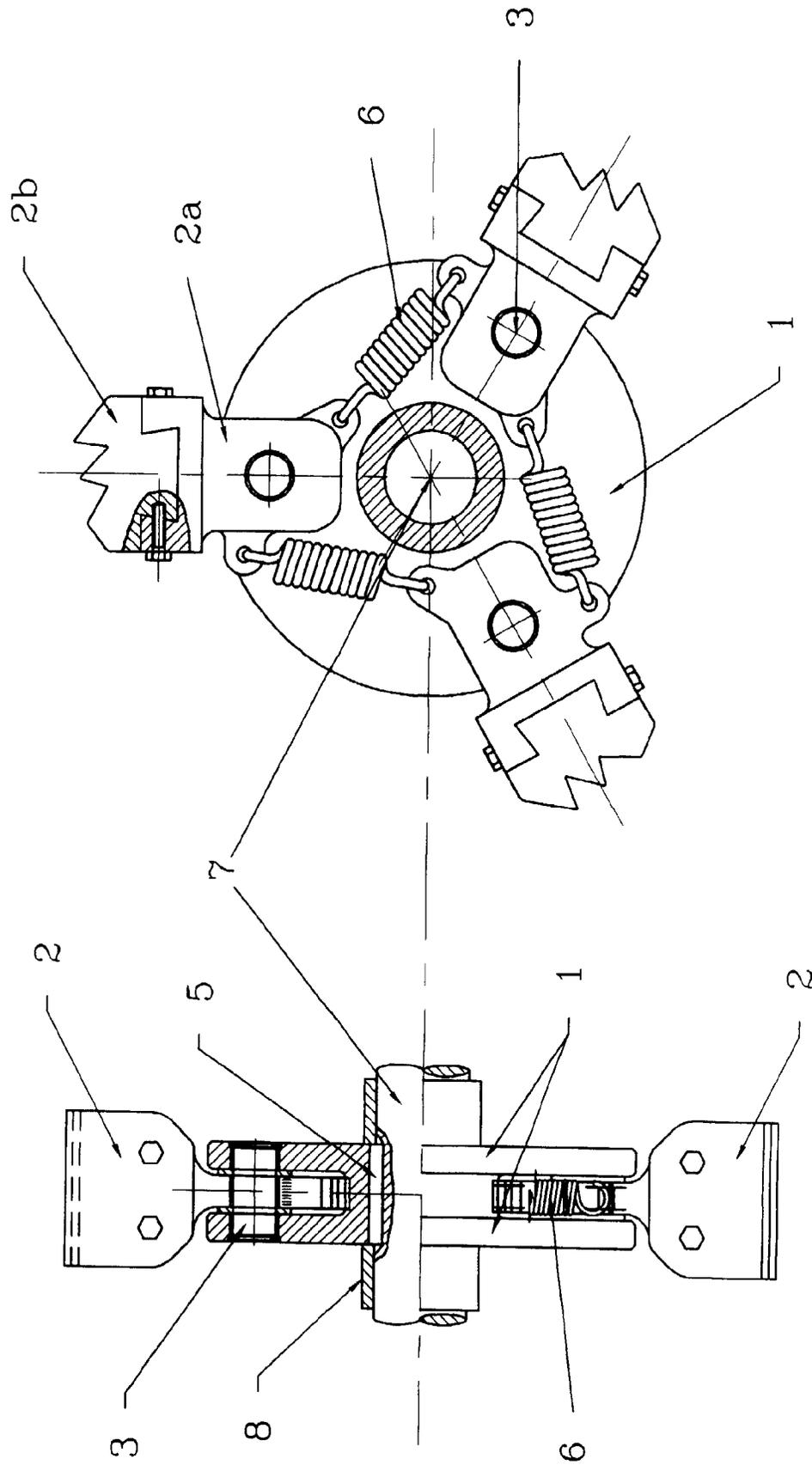


Fig. - 5



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 98 50 0094

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.6)
A	DE 33 29 465 A (ULL GEORG;GEIER FRANZ) 7 March 1985 * page 11, line 33 - page 12, line 23; figures 1,2 *	1,4	B28D1/18
P,A	DE 196 34 514 C (WENDEL NIKOLAUS) 17 July 1997 * column 2, line 9 - line 14; figures 3,5,6 *	1,2	
A	DE 24 17 752 A (ARX PAUL VON) 10 July 1975		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B28D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 26 August 1998	Examiner Rambaud, P
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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