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(54) **Hydraulic stone splitter**

Hydraulische Steinspalter

Machine hydraulique pour couper de la pierre

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Description

[0001] The invention relates to a device for splitting stones, according to the preamble of claim 1 (see for example DE-U-1 877 434).

[0002] Another device is known for instance from DE-C-198 42 670 in the name of applicant. The hydraulic means are formed here by a bellows which is arranged between the upper blade and the frame, so that the blade is pressed toward the other blade by filling the bellows with hydraulic oil, and a stone can thus be split. The drawback of this device is that the bellows has a short lifespan. The bellows wear due to the heavy use and will begin to tear, whereby leakage occurs and the device becomes unusable.

[0003] Devices are further known for splitting stones wherein the one blade is pressed to the other blade by means of a single hydraulic cylinder. The drawback of such a device is that the blade cannot adjust itself to the stone for splitting. If the blade comes to lie at only one point on the stone during splitting, the breaking of the stone will proceed in uncontrolled manner and an irregular breaking surface will thus occur. Such a device with only one hydraulic cylinder further has the drawback that, in order to obtain a sufficient pressure force, the dimensions of the single hydraulic cylinder will be large relative to the dimensions of the whole device. This affects the ability to handle the device.

[0004] It is an object of the present invention to prevent the above stated drawbacks.

[0005] This objective is achieved with a device according to claim 1.

[0006] According to the invention the two blades are arranged in blade holders arranged on the frame, wherein the distance between the blade holders is adjustable.

[0007] Stones of varying thickness can hereby be split with the same device, wherein the stroke of the hydraulic cylinders can remain limited.

[0008] In the device according to the invention the hydraulic means comprise a number of hydraulic cylinders placed adjacently of each other and between the frame and a blade holder, the outer diameter of which cylinders is substantially the same as the width of the relevant part of the frame and wherein the number of cylinders corresponds with the whole number part of the quotient of the available length on the frame and the outer diameter.

[0009] In the design of a device for splitting stones the dimensions of the frame and the blade holders are chosen such that the device is sufficiently strong. If the stone splitter is so designed, a limited space is then left between the frame and the blade holder.

[0010] According to the invention the outer diameter of each cylinder is chosen such that it corresponds with the width of the frame or the blade holder and as many cylinders as possible are placed mutually adjacently. The available space is hereby used optimally, and the device remains manageable.

[0011] In another embodiment spring means are ar-

anged for urging apart the blades. These springs ensure that the blades are once again carried apart after splitting of a stone, so that a following stone can be placed between the blades.

[0012] In a further embodiment of the invention the blades comprise a number of blade parts arranged mutually adjacently, which blade parts are arranged in spring-mounted manner. These spring-mounted blade parts offset small irregularities on the stone, so that the blade lies even better against the stone for splitting.

[0013] These and other features of the invention are further elucidated with reference to the annexed drawings..

Figure 1 shows in perspective view a device according to the invention;

Figure 2 shows the device of figure 1 with partly cut-away parts with the blades in their extreme position; Figure 3 shows the device of figure 1 with partly cut-away parts, wherein the blades are moved toward each other to split a stone.

[0014] Figure 1 shows a device 1 according to the invention. This device 1 has a base plate 2 on which is arranged a lower blade holder 3. On either side of lower blade holder 3 are arranged two jacks 4 between which an upper blade holder 5 is arranged. By operating the jacks 4 by means of handles 6, the lower and upper blade holders 3, 5 can be carried toward and away from each other, so that they can be adapted to the thickness of a stone S. Blade parts 7 are arranged in both lower blade holder 3 and upper blade holder 5.

[0015] In figure 2 parts of upper blade holder 5 are cut away. Thus can be seen that in the blade holder are arranged guide pins 8 along which upper blade holder 5 is guided. Arranged on top of the frame is a cylinder housing 9 in which four pistons 10 are accommodated. When hydraulic oil is fed to cylinder housing 9 via conduit 11, pistons 10 then press the upper blade holder 5 downward counter to the spring pressure of springs 12 so that the upper blade holder comes to lie against stone S (see figure 3).

[0016] Since the different spaces in the cylinder housing 9 in which the pistons 10 displace are in direct communication with each other via passages 13, the pistons 10 with the least resistance will displace further outward than the pistons with more resistance. It hereby becomes possible for upper blade holder 5 to come to lie against stone S parallel to the upper surface thereof, wherein upper blade holder 5 does not have to be parallel to lower blade holder 3. Thus is ensured that during splitting of the stone S the blade parts 7 lie against stone S along the whole cutting length thereof, thus resulting in a good breaking surface.

Claims

1. Device for splitting stones, which device comprises:

- a frame;
- two blades arranged on the frame and displaceable away from and toward each other;
- hydraulic means for at least displacing the blades toward each other,

said hydraulic means comprising at least two hydraulic cylinders (9) which are in liquid communication with each other, wherein the two blades are arranged in blade holders arranged on the frame, wherein the distance between the blade holders is adjustable-,

characterized in that

the hydraulic means comprise a number of hydraulic cylinders (9) placed adjacently of each other and between the frame and a blade holder, the outer diameter of which cylinders is substantially the same as the width of the relevant part of the frame and wherein the number of cylinders corresponds with the whole number part of the quotient of the available length on the frame and the outer diameter.

2. Device as claimed in claim 1, comprising spring means (12) for urging apart the blades.

3. Device as claimed in claim 1 or claim 2, wherein the blades comprise a number of blade parts (7) arranged mutually adjacently, which blade parts are arranged in spring-mounted manner.

Patentansprüche

1. Vorrichtung zum Spalten von Steinen, wobei die Vorrichtung umfasst:

- ein Gestell;
- zwei Messer, die am Gestell angeordnet sind und auseinander schiebbar sowie zusammenschiebbar sind;
- hydraulische Mittel, um die Messer wenigstens zusammen zu schieben,

wobei diese hydraulischen Mittel wenigstens zwei hydraulische Zylinder (9) umfassen, die miteinander flüssigkeitsverbunden sind,

wobei die zwei Messer in Messerhaltern angeordnet sind, die am Gestell angeordnet sind, wobei die Distanz zwischen den Messerhaltern justierbar ist,

dadurch gekennzeichnet, dass

die hydraulischen Mittel eine Anzahl von hydraulischen Zylindern (9) umfassen, die nebeneinander und zwischen dem Gestell und einem Messerhalter platziert sind, wobei der äußere Durchmesser von

diesen Zylindern im wesentlichen derselbe wie die Breite des relevanten Teils des Gestells ist und wobei die Anzahl von Zylindern mit dem ganzzahligen Teil des Quotienten der verfügbaren Länge am Gestell und des äußeren Durchmessers übereinstimmen.

2. Vorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der hydraulische Steinspalter Federmittel (12) zum Auseinandertreiben der Messer umfasst.

3. Vorrichtung gemäß Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Messer eine Anzahl von Messerteilen (7) umfassen, die gegenseitig nebeneinander angeordnet sind, wobei diese Messerteile in einer federbefestigten Art angeordnet sind.

Revendications

1. Dispositif pour fendre des pierres, lequel dispositif comprend :

- un châssis ;
- deux lames agencées sur le châssis et pouvant se déplacer dans le sens qui les éloigne et dans le sens qui les rapproche l'une de l'autre ;
- des moyens hydrauliques pour déplacer les lames au moins dans le sens qui les rapproche l'une de l'autre ;

lesdits moyens hydrauliques comprenant au moins deux cylindres hydrauliques (9) qui sont en communication entre eux pour le liquide, dans lequel les deux lames sont agencées dans des porte-lames agencés sur le châssis, la distance entre les porte-lames étant réglable,

caractérisé en ce que

les moyens hydrauliques comprennent plusieurs cylindres hydrauliques (9) placés adjacents entre eux et placés entre le châssis et un porte-lame, le diamètre extérieur de ce cylindre étant pratiquement égal à la largeur de la partie intéressée du châssis, et dans lequel le nombre des cylindres correspond à la partie entière du quotient de la division de la longueur disponible sur le châssis par le diamètre extérieur.

2. Dispositif selon la revendication 1, comprenant des moyens à ressort (12) destinés à écarter les lames l'une de l'autre.

3. Dispositif selon la revendication 1 ou la revendication 2, dans lequel les lames comprennent plusieurs parties de lames (7) agencées mutuellement adjacentes, lesquelles parties de lames sont montées à ressort.

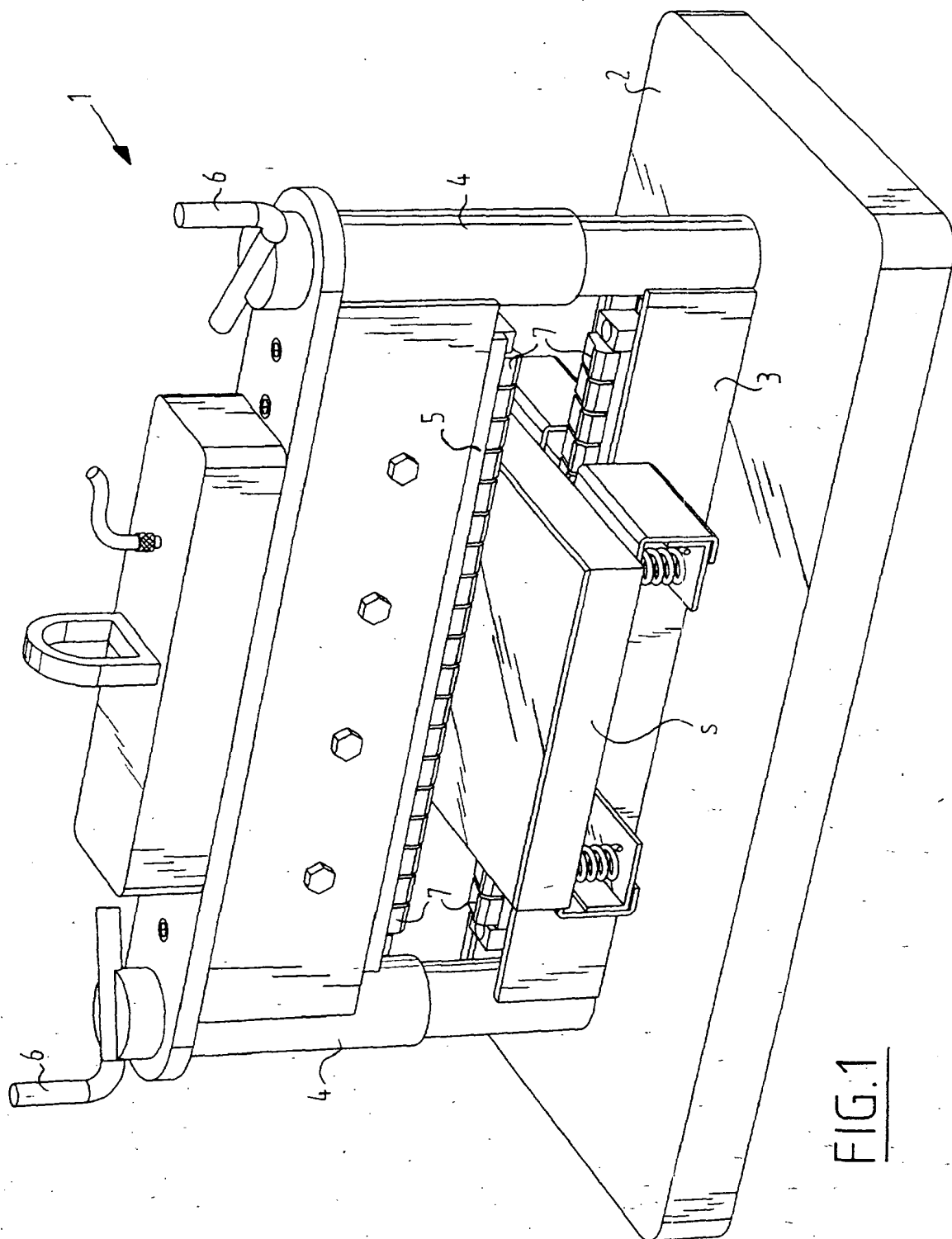
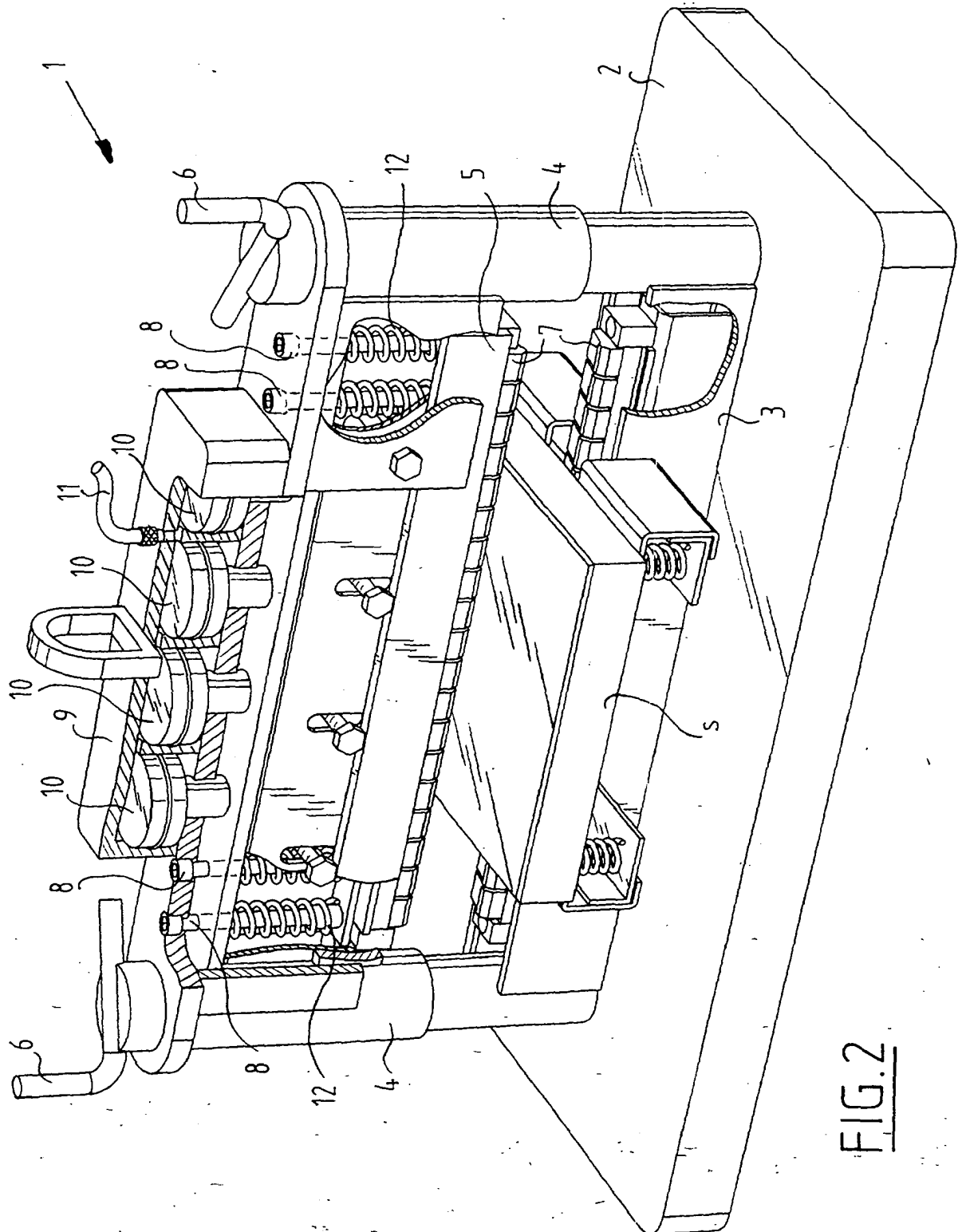


FIG. 1



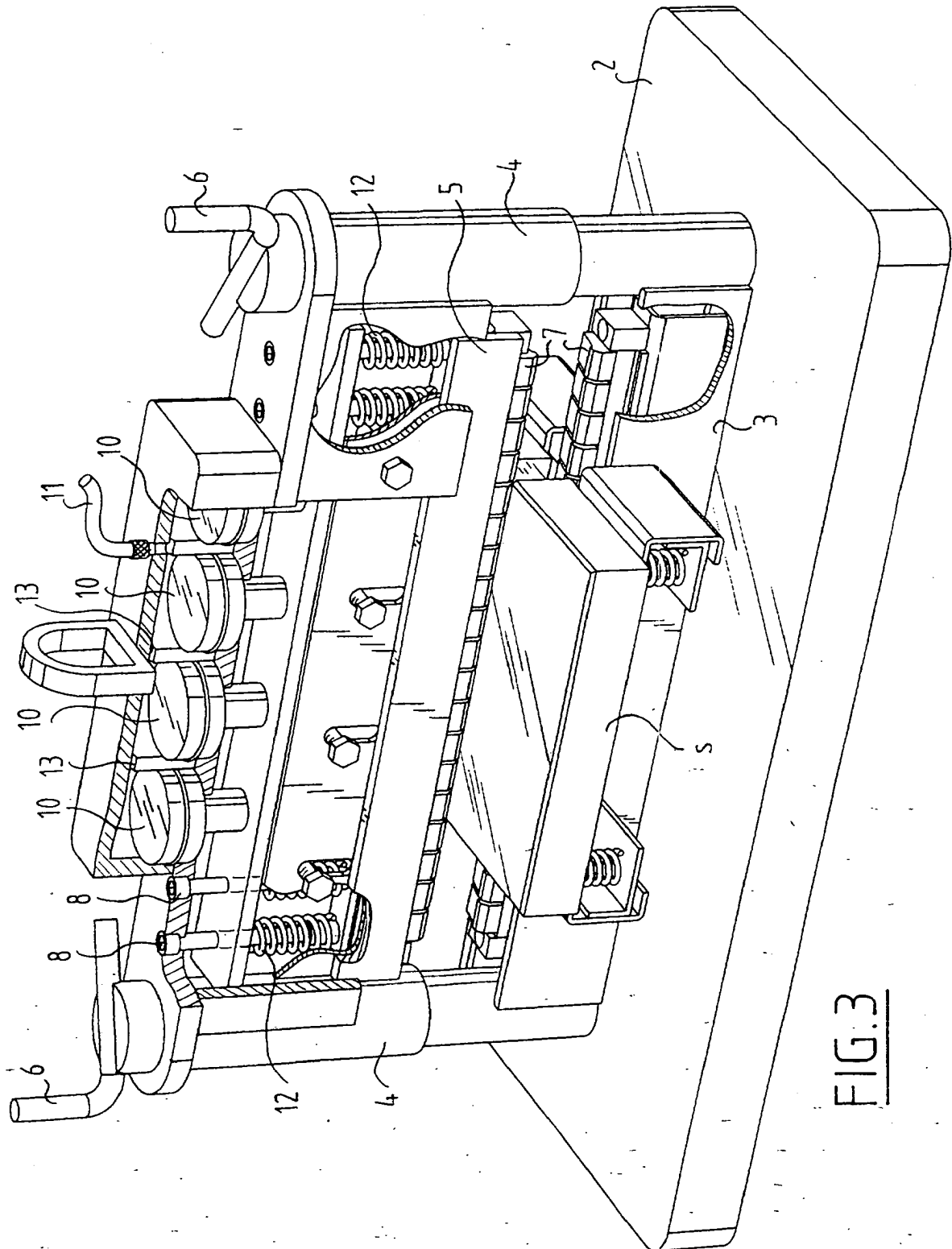


FIG. 3