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(54) **Machinery for cutting off and storing parts from pressure casting articles or similar**

Vorrichtung zum Abtrennen und zur Lagerung von Teilen von Druckgiessenprodukt oder Ähnliches  
Machine pour le détachement et le stockage de pièces à partir de pièces produites par coulée sous pression ou d'autres pièces similaires

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## Description

**[0001]** It is known that in the melting, in the pressure casting or in any pieces obtained for die forming are present parts of material to be cut off to the moulded parts in getting out to the pressure casting to permit the subsequent storing up of the working products and the recovery of the rejections. These material parts are at present cut off by hand and, always manually, they are stored. In a lot of known workings machineries are used that exploit the centrifugal force. With these machineries the separation of the suitable parts to the discharging ones is not obtained and this separation must be manually made. Then, they have the drawbacks to often determine faulty products. The invention refers to a new and original machinery that, thanks to an axial robot arm and to an intelligent rod system, is able to cut off from the moulded parts in getting out to the melting the different products in working of any shape and dimension and then to automatically separate the same in suitable containers or between the discharging material. The invented machinery consists of a axial robot arm 1, able of programmed movements X, Y and rotatory, that puts the moulded part 2 in working in the more adequate position for the separation of each determined part 3 that must be separated. Said moulded part 2 is placed in median position between two containment bodies 4A and 4B. Said containment bodies are placed frontally and back to the moulded part 2 and they have holes 5 to permit the crossing of the rods 6. Said holes 5 and the corresponding rods 6 are placed with regular spaces according lines and columns. The rods 6 have a motion of translation to be programmed by a touch screen and to be driven to a translation unit 7. Said translation unit 7, in the main version, consists of a timing belt 8 connected to the rod 6 by flask 9. The timing belt 8 is kept parallel to the rod 6 by means of pulleys 10A and 10B. Others pulleys 11 connect the timing belt 8 with a reduction gear 12 and an electric brushless engine 13. The motion to the timing belt 8 is given to the gears of the reduction gear, whereas the rotation in one way or in the other is given to the electric brushless engine 13. Said electric Brushless engine is then connected to a logic card 14 for the driving of the control of the way and of the velocity of the rotations of the electric brushless engine 13 and consequently of the translations of the rod 6. Said logic card has also an electronic storage 15 for the control of the translations and of the translation times of the rods. The logic card 14 is then connected with a touch screen by means of what the operator can program, store and drive the translation of the rods in relation to the shape of each part to cut off. This is actuated by connection of the rods with a P.L.C. 16 or similar. In working phase the invented machinery provides the positioning of the moulded part 2, by the robot arm 1, in median position between the containment bodies 4A and 4B. By means of the electronic drive actuated to the logic card 14 and the P.L.C. 16, the electric brushless engines 13 are started, so to

make going on the opposite rods 6 till the contact with the moulded part 2. In this phase are started to the containment bodies 4A and 4B only the rods 6 opposite to a side and to the other so to determine the temporary blocking of the moulded part 2 near the material part 3 to cut off. The disposition of the opposite rods 6 in phase of temporary blocking is automatic and it is determined to the program set out before to the operator on the base of the position of the part 3 to cut off from the moulded part 2. The translation motion of the rods 6 is driven to the electronic devices of the invented machinery. The choose of the rods 6 for the temporary fixing is necessary to avoid flexions of the moulded part 2 in the subsequent phase of cutting of the part 3 to be cut off and consequent damages to the same moulded part. For each single piece is stored into the electronic storage 15 which rods 6 must be used and the motion of advancement of the rods in blocking phase. So there is the blocking of the moulded part 2 by the rods 6 in front and back to the piece. In the subsequent phase the operator determines which rods 6 to make going on in correspondance of the part 3 to cut off. These opposite rods are to be advanced firstly translating to a containment body 4A over the first part of the moulded part 2. Subsequent, returned in initial position the rod 6 of the containment body 4A, the rods 6 opposite to the previous ones are advanced by means of the containment body 4B till over the moulded part 2. So a first phase of folding of the cutting off part 3 is obtained, often already sufficient to determine the cutting from the die of said parts 3. Then, there is a second phase able to obtain the final cutting of the part 3, thanks to the advancement first in one way and then in the other of the rods 6 that go to hit the parts to be cut off. The selection of the rods 6 in correspondance of the part 3 to cut off, the translation and the velocity of advancement of the same rods is decided to the operator by means the electronic components and they are stored for each type of moulded part 2 so to can be recalled in the applications that have working of equal moulded part 2. The number of rods 6 can change from a minimum of four rods (two opposite rods for the blocking and two rods for the folding and the cutting off) to a variable number of rods on the base of the number of parts 3 to cut off. However, the number of rods 6 is always in excess in comparison to which in use in a determined time, such as it is provided the starting of some of them on the base of the use necessity and their number must be able to adapt to the different types of moulded part 2 from which the cutting off of the parts 3 is provided. The cut off parts fall down into hoppers and from these onto belt conveyors and then in underlying containers different for the different types of products so permitting a quick storing and the recovery of the working rejections. At the end, the moulded part 2, from which parts 3 are being cut off, is freed to the temporary blocking rods 6 to be separately recovered. In other embodiment the translation of the rods is actuated providing in the translation unit 7 double effect cylinders 17 connected with flask 9 to the rods so to have

the translation of said rods 6. The advancement of the rods is driven also in this embodiment to conventional electronic devices connected to a P.L.C. 16 and controlled to the operator by the touch screen. Other embodiment provides the use of solenoids 18 placed onto the rods with way of the current variable on the base of the wanted translation direction of the rods 6 by means of device 19 to invert the motion of the current and return spring 20 to the initial position. Conventional electronic devices, the disposition and the installation of which are known for an operator of the field, are placed for the driving of the translation motion of the rods 6 so as it is known in the previous art the use of driving and storage electronic cards and are known the necessary connections for the right working of the invented machinery. The invented machinery is illustrated in a merely and not limiting way in the drawings of sheets 1, 2, 3, 4, 5, 6, 7 and 8. In sheet 1 figure 1 is a perspective view of the translation unit 7 for the translation of the rods in the main embodiment. In sheet 2 figure 2 is view of the other embodiment of the translation unit 7 in which the advancement motion of the rods 6 is realized by double effect cylinders 17. In sheet 3 figure 3 is view of further embodiment where the motion of the rods 6 is due to the action of solenoids 18. The other sheets, i.e. the sheets 4, 5, 6, 7 and 8, show the function of the different phases of the invented machinery. In particular in the sheet 4 - figure 4 shows the positioning, actuated by means of the robot arm 1, of the die 2 in medium position between the containment bodies 4A and 4B of the rods 6. In sheet 5 - figure 5 shows, always in prospective view, the temporary blocking phase. The sheet 6 - figure 6 is view of the percussion phase by means of the rod 6 onto the part 3 to be cut off from the die 2. In this phase is created the break line or also already the cutting of the part 3. The sheet 7 - figure 7 is view of the second phase of percussion of the part 3 with the rod 6 opposite to the previous one in using phase, while the rod 6 of the first percussion is in rest position. In sheet 8 - figure 8 shows the advancement of the rod 6 over the die 2 with the part 3 already cuts off.

## Claims

1. Machinery for cutting off and storing parts (3) from pressure casting dies or similar comprising an axial robot arm (1) able of programmed movements x. y and rotatory and able to put a moulded part (2) in median position between two containment bodies (4A, 4B), **characterized in that:**

- the containment bodies (4A, 4B) are placed frontally and back to the moulded part (2), and **in that**
- the containment bodies (4A, 4B) have holes (5) permitting the crossing of rods (6), and **in that**
- the holes (5) and corresponding rods (6) are

placed with regular spaces according with lines and columns and each rod (6) is connected with a translation unit (7) able to actuate a translation motion to the rod (6), and **in that**

- each rod (6) in the first containment body (4A) has an opposing rod (6) in the second containment body (4B) forming pairs of rods able to have that each rod can be moved independently so to obtain that the machinery can operate pieces with different geometry to have flexibility of the Machinery and with a reduction of the working time, and **in that**
- the number of rods (6) can change from a minimum of four rods, with two opposite rods for the blocking and two rods for the folding and cutting off, to a variable number of rods (6) on the base of the number of parts (3) to cut off, and **in that**
- the parts (3) cut off to the moulded part (2) fall down into hoppers and from these onto belt conveyors and then in underlying containers different for the different types of products so permitting a quick storing and the recovery of the working rejections.

2. Machinery for cutting off and storing parts from pressure casting dies or similar, as per claim 1. **characterized in that** each single piece is stored into an electronic storage (15) which rods (6) must be use and the motion of advancement of the rods in blocking phase.
3. Machinery for cutting off and storing parts from pressure casting dies or similar, as per claims 1 and 2, **characterized in that** the number of rods (6) is in excess in comparison to which in use in a determined time.

## Patentansprüche

1. Vorrichtung zum Abtrennen und zur Lagerung von Teilen (3) von Druckgiessenprodukt oder Ähnliches mit einem Achsenausleger (1) der programmierte x, y und drehende Bewegungen zu machen fähig ist und der einen modellierten Teil (2) in eine mittlere Stellung zwischen zwei Enthältkörper (4A, 4B), **dadurch gekennzeichnet, daß**

- die Enthältkörper (4A, 4B) frontal und hinter dem modellierten Teil (2) gestellt sind, und daß
- die Enthältkörper (4A, 4B) Löcher (5) für das Durchqueren der Stange (6) haben, und daß
- die Löcher (5) und die entsprechende Stangen (6) in regelmässigen Räumen in bezug auf Linien und Ständer gestellt sind und jede Stange (6) mit einer Einheitsbewegung (7) zusammengefügt ist, die eine Translationsbewegung zur Stange (6) betätigen kann, und daß

- jede Stange (6) im ersten Enthältkörper (4A) eine gegenüberliegende Stange (6) im zweiten Enthältkörper (4B) hat, und die ein Paar Stangen bildet, wo jede Stange unabhängig bewegt werden kann, so dass die Vorrichtung Stücke mit verschiedenen Formen verarbeiten kann, um eine Mehrzweckvorrichtung und eine Verarbeitungszeitverkürzung zu erreichen, und dass
- die Zahl der Stangen (6) von mindeste vier Stangen ändern kann, mit zwei gegenüberliegenden Blockierungsstagen und zwei Biegungs- und Trennstangen, bis einer veränderlichen Quantität von Stangen (6) entsprechend der Zahl von abtrennbaren Teilen (3), und daß
- die aus dem modellierten Teil (2) abgetrennten Teile (3) in Trichter und von diesem in Förderbändern and dann in unterliegenden verschiedenen Behälter für die verschiedene Produkte hinunterfallen, um eine schnelle Lagerung und die Wiedernutzbarkeit von Verarbeitungs-ausschuss zu gestatten.
2. Vorrichtung zum Abtrennen und zur Lagerung von Teilen (3) von Druckgiessenprodukt oder Ähnliches, nach Anspruch 1, **dadurch gekennzeichnet daß** für jeden einzelnen Stück welche Stange (6) in einem elektronischen Speicher (15) benutzen muss und der Nachschubetrieb der Stangen in der Blockierungsstufe gespeichert wird.
3. Vorrichtung zum Abtrennen und zur Lagerung von Teilen (3) von Druckgiessenprodukt oder Ähnliches, nach Ansprüche 1 und 2, **dadurch gekennzeichnet daß** die Zahl der Stange (6) zuviel ist in Vergleich zu jeden, die in einem bestimmten Zeitpunkt benutze werden.

## Revendications

1. Machine pour le détachement et le stockage de pièces (3) à partir de pièces produites par coulée sous pression ou d'autres pièces similaires incluant un bras robot en guise d'axe (1) à même d'accomplir des mouvements programmés x,y et rotatoires et à même de placer une pièce modelée (2) en position moyenne entre deux récipients (4A, 4B), **caractérisée** du fait que
- les récipients (4A, 4B) sont placés en face et derrière la pièce modelée (2), et du fait que
- les récipients (4A, 4B) ont des trous (5) qui permettent la traversée des tiges (6), et du fait que
- les trous (5) et les tiges correspondantes (6) sont placés régulièrement et en correspondance avec les lignes et les colonnes, et chaque

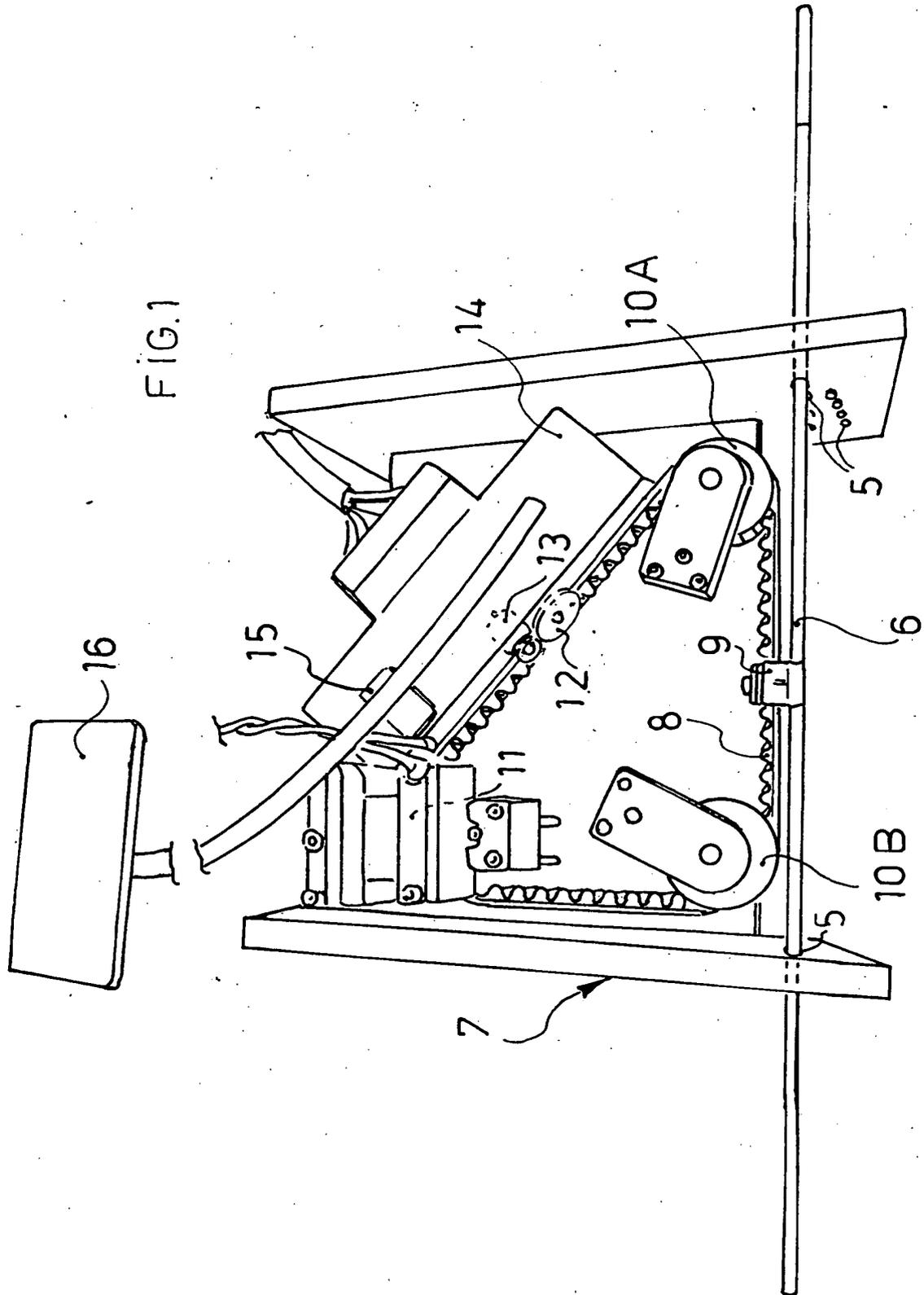
tige (6) est liée avec une unité de déplacement (7) a même d'accomplir un mouvement de déplacement de la tige (6), et du fait que

- chaque tige (6) dans le premier récipient (4A) a une tige (6) opposée dans le deuxième récipient (4B) constituant ainsi un paire de tiges dont chaque tige peut bouger de manière indépendante, et par conséquent la machine est à même d'usiner des pièces employant différentes géométries obtenant une flexibilité de la machine et une réduction des temps d'usinage, et due fait que

- le nombre des tiges (6) peut varier d'un minimum de quatre tiges, avec deux tiges opposées pour le blocage et deux tiges pour le courbement et le détachement, jusqu'à un nombre variable de tiges (6) selon le nombre de pièces (3) à couper,

- les pièces (3) détachées de la pièces modelée (2) tombent dans des trémies et d'ici sur des tapis roulants et ensuite dans de récipients placés au-dessous qui sont différents selon les divers types de produits afm de permettre un rapide stockage et le rattrapage des déchets d'usinage.

2. Machine pour le détachement et le stockage de pièces à partir de pièces produites par coulée sous pression ou d'autres pièces similaires, selon la revendication 1, **caractérisée** du fait que chaque pièce possède une mémoire électronique (15) à même d'établir quelle tige (6) doit être employée ainsi que l'avancement des tiges dans la phase de blocage
3. Machine pour le détachement et le stockage de pièces à partir de pièces produites par coulée sous pression ou d'autres pièces similaires, selon revendications 1 et 2, **caractérisée** de fait que le nombre de tiges (6) est en excès par rapport à celles employées es un donné moment.



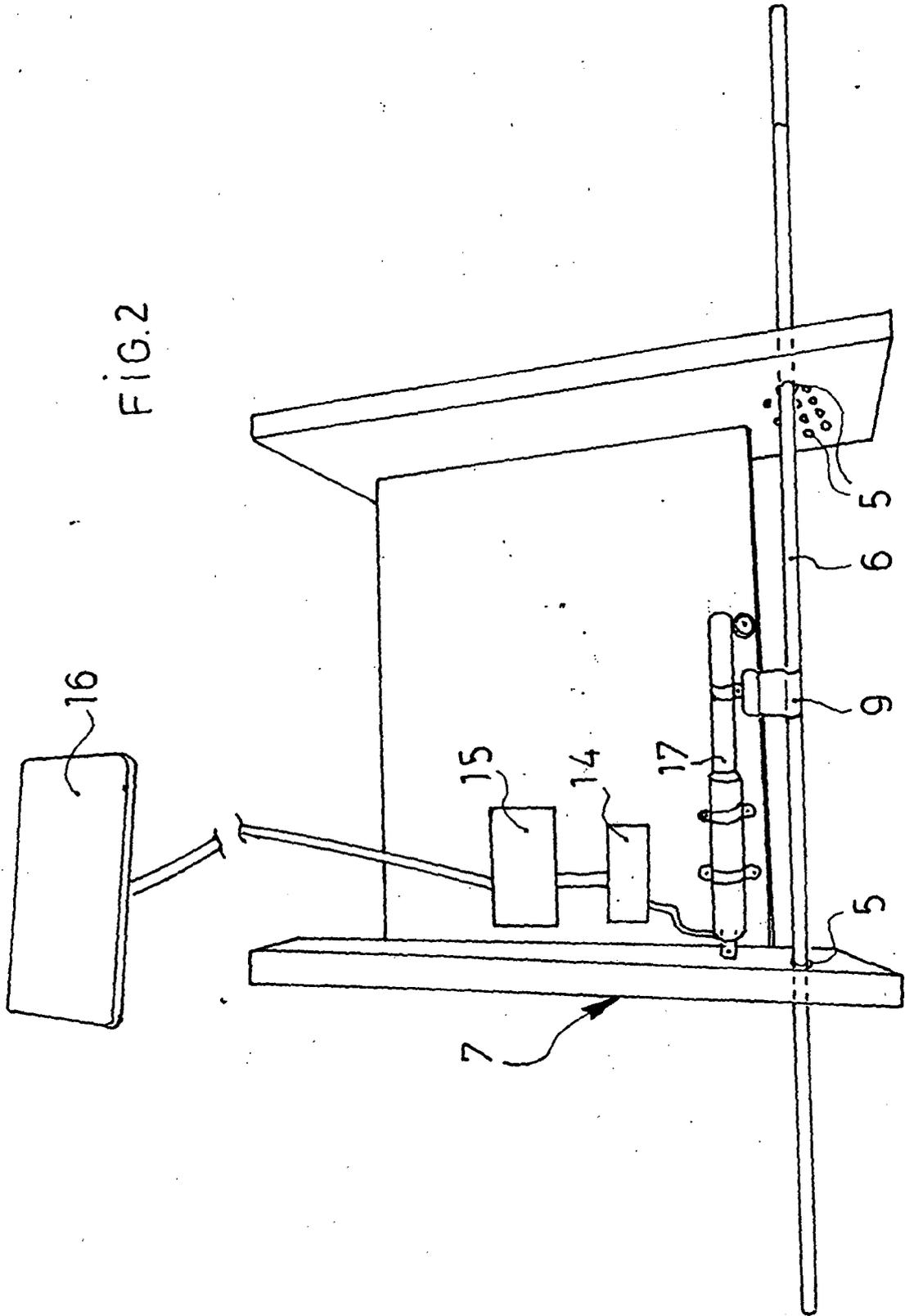


FIG.3

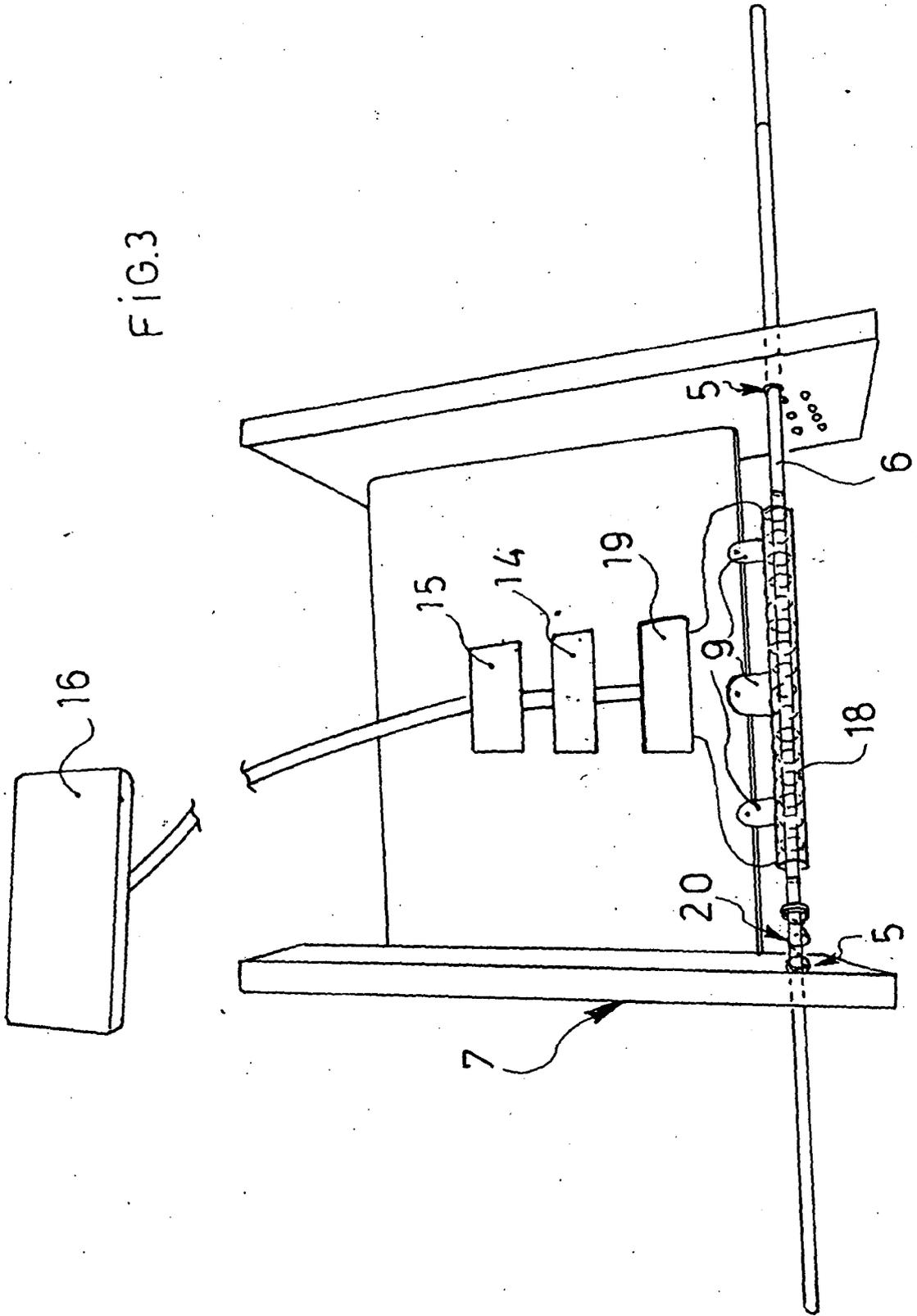
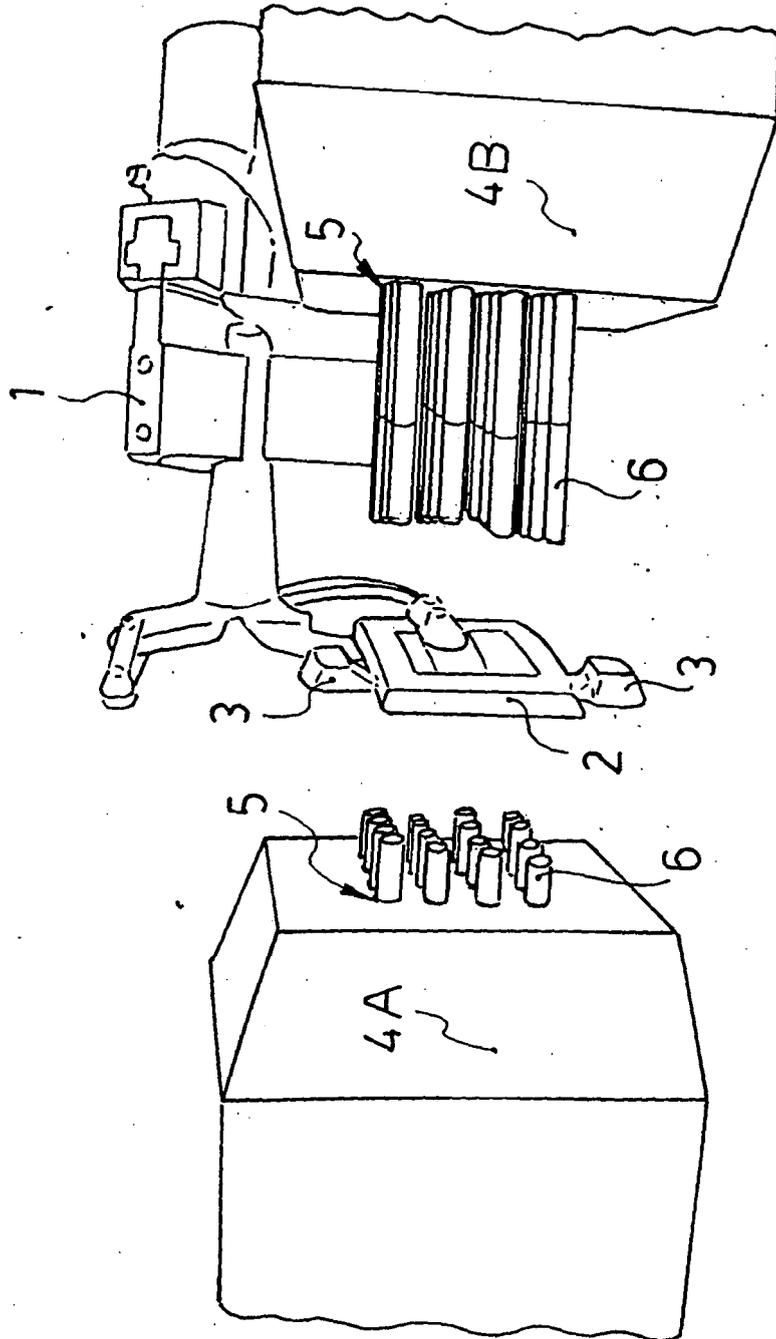


FIG.4



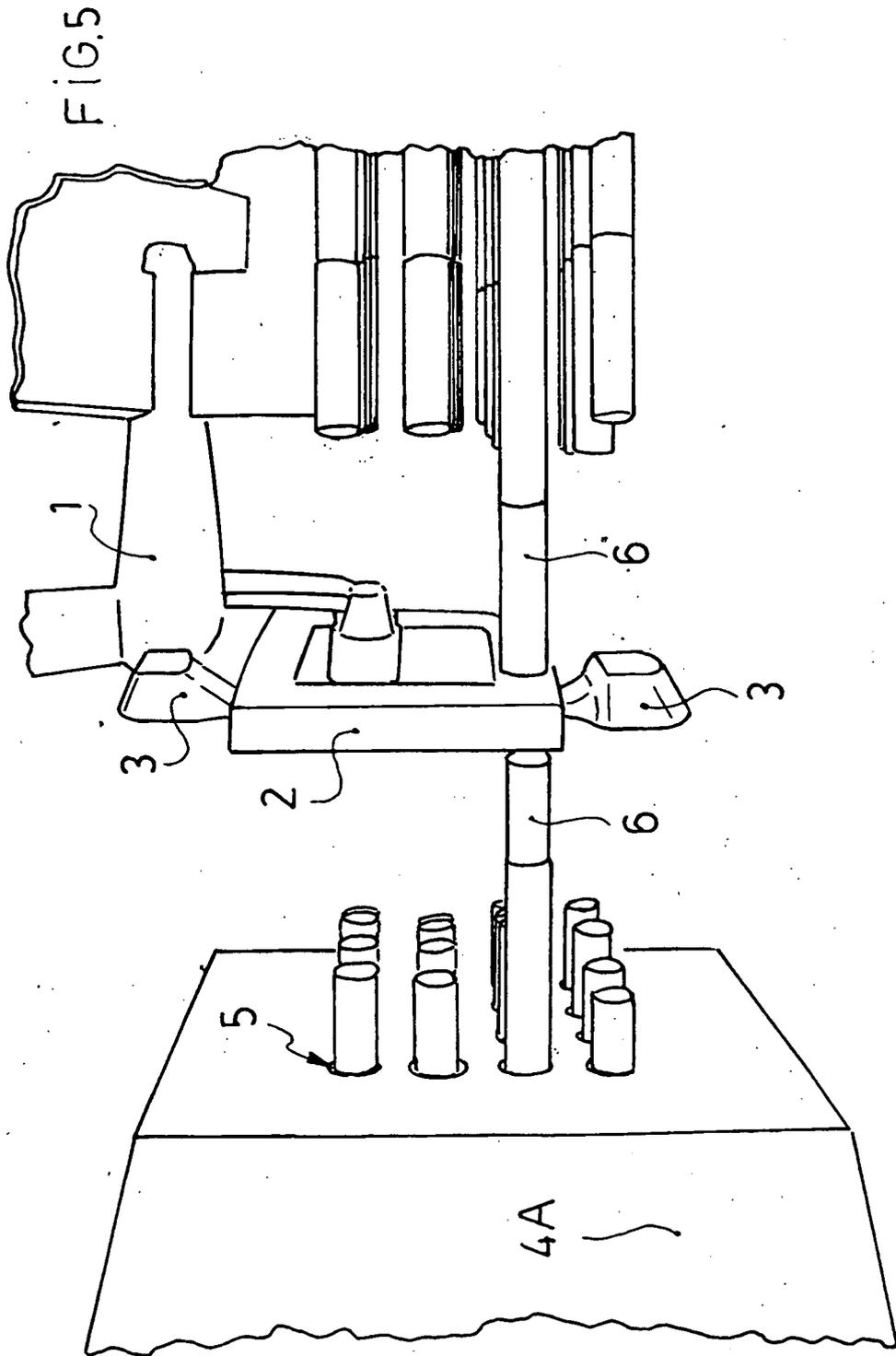


FIG.6

