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**(54) Peening unit for shell-molding machines**

Strahlanlage für Maskenformmaschine

Installation pour grendillage pour dispositif pour fastiquer des moules carapaces

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(56) References cited:  
**EP-A- 0 005 611**

- **PATENT ABSTRACTS OF JAPAN vol. 15 no. 481 (M-1187) ,6 December 1991 & JP-A-03 207550 (MINAMI TAKESHI) 10 September 1991,**

**EP 0 688 618 B1**

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## Description

The present invention relates to a peening unit for shell-molding machines.

Machines known as peening units are currently used to clean the molds of shell-molding machines; in practice, these units spray, by means of compressed air, very small beads of glass or other material that clean the mold by acting on its surface.

The molds are normally removed from the shell-molding machine for cleaning purposes and are arranged in the peening unit that cleans them. EP-A-5 611 discloses (Fig. 1) a mould peening station (1) to which molds (5) are transported for cleaning on bogies (6) having wheels (7) supported on a track (8).

Of course this method requires a great amount of work and is extremely time-consuming, since the handling of the molds, which are usually rather heavy, causes considerable labor times and machine downtimes.

In order to try to obviate this drawback, peening units have already been used which are mounted on a truck that can be placed at the shell-molding machine, which is preset so as to overturn the two molds and arrange them so as to be accessible by the peening unit.

However, even this solution has not been found to be particularly valid, since carrying the peening unit on a truck creates a considerable hindrance, especially in view of the fact that the shell-molding machines are usually arranged around the casting furnace and the truck must move in the confined space between the casting furnace and the shell-molding machine.

The presence of the carriage proximate to the shell-molding machines in practice forces to suspend production on adjacent shell-molding machines as well, with the obvious related drawbacks.

The aim of the present invention is indeed to eliminate the drawbacks described above by providing a peening unit for shell-molding machines that does not produce any hindrance during mold cleaning, so that the peening unit can operate without hindering in any way the shell-molding machines that are arranged adjacent thereto.

Within the scope of this aim, a particular object of the invention is to provide a peening unit that, in addition to cleaning the mold directly inside the machine, also allows to significantly reduce external scattering of dust, with full recovery of the beads that are used.

Another object of the present invention is to provide a peening unit in which the operator can activate the bead spraying gun directly from the outside of the peening unit, thus simplifying all the related operations.

Another object of the present invention is to provide a peening unit for shell-molding machines that, by virtue of its particular constructive characteristics, is capable of giving the greatest assurances of reliability and safety in use.

In accordance with the invention, there is provided a system consisting of a combination of a peening unit and at least two shell-molding machines as defined in the appended claims, in which the peening unit comprises a suspended peening assembly supported by an articulated arm that is connected to the upper end of a fixed post, and in which the peening assembly comprises means for spraying beads at open and overturned molds of the shell-molding machines. The fixed post is arranged in fixed relation with respect to the shell-molding machines such that the peening assembly may be selectively arranged upon a selected positioning of the articulated arm at the open and overturned molds of the shell-molding machines without requiring the molds to be physically removed and transported from the machines.

The particular characteristics and advantages of the invention will become apparent from the description of a preferred but not exclusive embodiment of a peening unit for shell-molding machines, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic plan view of a peening unit connected between two shell-molding machines;  
figure 2 is an elevation view of the peening unit applied to a shell-molding machine;  
figure 3 is a plan view of the peening unit applied to a shell-molding machine;  
figure 4 is a transverse sectional view of the peening unit;  
figure 5 is a schematic sectional view, taken along the plane V-V of figure 4;  
figure 6 is a sectional view, taken along the plane VI-VI of figure 5.

With reference to the above figures, the peening unit for shell-molding machines, according to the invention, comprises a peening unit, generally designated by the reference numeral 1, which is suspended, by means of a strut 2, to an articulated arm, generally designated by the reference numeral 3, which is connected at the upper end of a fixed post 5.

The articulated arm 3 has a first portion 3a pivoted to the post 5 and a second portion 3b which is in turn pivoted to the portion 3a.

In this manner it is possible to arrange the peening unit 1 at at least two shell-molding machines, generally designated by the reference numeral 10, without causing any hindrance in the surrounding region.

The fixed post 5 can in fact be arranged to the side of a shell-molding machine, or it can optionally also be placed in the central region of the area in which the shell-molding machines 10 are arranged; said shell-molding machines are usually arranged around the casting furnace, generally designated by the reference numeral 11.

The shell-molding machines 10 have molds 12 that

can be opened and overturned so that they can be arranged frontally with respect to the shell-molding machine and directed outwards, so as to be easily engaged by the peening unit 1.

The peening unit 1 is provided with an external body 20 which is closed, at the front, by sliding doors 21 movable with respect to each other in a guillotine-like fashion and provided with a portion made of flexible material, such as rubber or the like, to achieve a substantially hermetic coupling to the shaft 22 that supports the molds 12.

A spray gun 23 is provided inside the body 20 and draws, by means of a duct 24, from the beads 25 placed on the hopper-like bottom of the body; the gun is actuated in a per se known manner by compressed air.

A particularity resides in the fact that the gun 23 is moved by means of a lever system 26 that can be operated from the outside and is protected by a rubber hood 27.

The body 20 is furthermore provided, in an upward region, with a transparent door 28 allowing the operator to view the spraying of the jet against the molds 12.

Aspirators 30 are furthermore connected to the body 20 and create a suction current in the lower part of trapping columns 31 that are connected in an upward region, by means of grilles 32, to the internal chamber 33 formed by the body 20.

The materials aspirated from the inside of the chamber are constituted by dust, residues, and beads, and follow a path along inclined planes 34 that produces a first separation between the beads and the dust; outlets 37 are furthermore provided and feed the beads back into the body 20, whereas the dust and the residues are fed, by means of the aspirators 30, into decantation units, generally designated by the reference numeral 40, which have a duct portion that is laterally adjacent to the filtering columns 31 and in practice separate the dust with a cyclone-like system.

With this arrangement, therefore, the peening units are arranged at the shell-molding machines without creating any hindrance in the surrounding region, since in practice the peening units are suspended and arrangeable at several stations where the molds to be cleaned are located.

The particular structure of the peening unit furthermore allows to significantly reduce external scattering of dust and allows the operator to operate very quickly and easily, since the spray gun actuation means is accessible from the outside of the body assembly.

From the above description it is thus evident that the invention achieves the intended aim and objects, and in particular the fact is stressed that a peening unit is provided which is extremely practical and versatile and, in addition to allowing to clean the molds without removing them from the machine, offers the great advantage of causing no hindrance in the work area.

The invention thus conceived is susceptible of numerous modifications and variations, all of which are

within the scope of the inventive concept.

All the details may furthermore be replaced with other technically equivalent elements.

In practice, the materials employed, so long as they are compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

## Claims

1. A system consisting of a combination of a peening unit and at least two shell-molding machines, the peening unit comprising a suspended peening assembly (1) supported by an articulated arm (3) that is connected to the upper end of a fixed post (5), said peening assembly comprising means (23) for spraying beads (25) at open and overturned molds (12) of the shell-molding machines (10), and said fixed post (5) being arranged in fixed relation with respect to said at least two shell-molding machines (10) such that the peening assembly (1) may be selectively arranged upon a selected positioning of said articulated arm (3) at said open and overturned molds (12) of said at least two shell-molding machines (10) without requiring said molds (12) to be physically removed and transported from said machines (10).
2. The system according to claim 1, characterized in that said articulated arm (3) supports, at one end, said peening assembly (1) by means of a strut (2) and is pivoted to said post (5) at the other end.
3. The system according to any one or more of the preceding claims, characterized in that said articulated arm (3) has a first portion (3a) pivoted to said post and a second portion (3b) pivoted to said first portion.
4. The system according to any one or more of the preceding claims, characterized in that said peening assembly (1) has an external body (20) that is frontally closed by sliding doors (21) movable with respect to each other and provided with a portion made of flexible material for coupling to the mold supporting shaft (22).
5. The system according to claim 4, characterized in that said spraying means comprise, inside said external body (20), a spray gun (23) that is provided with a duct (24) for drawing beads (25) located on

the bottom of the body and can be operated by means of a lever system (26) accessible outside said body.

6. The system according to any one or more of the preceding claims 4-5, characterized in that said external body (20) has an optically transparent door (28). 5
7. The system according to any one or more of the preceding claims 5-6, characterized in that it comprises aspirators (30) that are connected to said external body (20) and are adapted to create a suction current at the lower part of trapping columns (31) which are connected in an upward region, by means of grilles (32), to the internal chamber of said body, said trapping columns having a path with inclined planes (34) and with outlets (37) for feeding the beads (25) back into said body, said aspirators being connected to decantation units (40) for dust elimination. 10 15 20

#### Patentansprüche

1. System bestehend aus einer Kombination aus einer Strahlanlage und mindestens zwei Maskenformmaschinen, bei dem die Strahlanlage eine aufgehängte Strahleinrichtung (1) hat, die von einem mit dem oberen Ende eines feststehenden Ständers (5) verbundenen Gelenkausleger (3) getragen wird und die Mittel (23) zum Strahlen von Körnern (25) auf offene und umgedrehte Formen (12) der Maskenformmaschinen (10) hat, wobei der feststehende Ständer (5) in einer festen Beziehung auf die mindestens zwei Maskenformmaschinen (10) so angeordnet ist, daß die Strahleinrichtung (1) wahlweise durch ein ausgewähltes Stellen des Gelenkauslegers (3) an die offenen und umgedrehten Formen (12) der mindestens zwei Maskenformmaschinen (10) angebracht werden kann, ohne daß die Formen (12) physikalisch von den Maschinen (10) entfernt und weg transportiert werden müssen` 25 30 35 40
2. System nach Anspruch 1, dadurch **gekennzeichnet**, daß der Gelenkausleger (3) an einem Ende mit einer Strebe (2) die Strahleinrichtung (1) trägt und mit dem anderen Ende drehbar an dem Ständer (5) gelagert ist. 45
3. System nach einem der vorhergehenden Ansprüche, dadurch **gekennzeichnet**, daß der Gelenkausleger (3) einen an dem Ständer drehbar gelagerten ersten Bereich (3a) und einen daran drehbar gelagerten zweiten Bereich (3b) hat. 50
4. System nach einem der vorhergehenden Ansprüche, dadurch **gekennzeichnet**, daß die Strahleinrichtung (1) ein äußeres Gehäuse (20) hat, das 55

vorn mit zueinander beweglichen Schiebetüren (21) geschlossen ist, die einen Bereich aus flexiblem Material zum Ankoppeln an den Formhalterschaft (22) haben.

5. System nach Anspruch 4, dadurch **gekennzeichnet**, daß die Strahlmittel in dem äußeren Gehäuse eine Strahlpistole (23) mit einer Leitung (24) zum Fördern von Körnern (25) vom Boden des Gehäuses haben, und daß die Strahlpistole (23) mittels eines außerhalb des Gehäuses zugänglichen Hebelsystems (26) bedient werden kann.
6. System nach Anspruch 4 oder 5, dadurch **gekennzeichnet**, daß das äußere Gehäuse (20) eine optisch transparente Tür (28) hat.
7. System nach Anspruch 5 oder 6, dadurch **gekennzeichnet**, daß Luftsauger (30) mit dem äußeren Gehäuse verbunden sind, die zum Erzeugen eines Saugstroms im unteren Teil der Rückhaltesäulen (31) geeignet sind, welche über Gitter (32) in einem oberen Bereich mit der inneren Kammer des Gehäuses verbunden sind und welche einen Durchlaß mit geneigten Flächen (34) und mit Auslässen (37) zum Rückführen der Körner (25) in das Gehäuse haben, und daß die Luftsauger mit Dekantiereinheiten (40) zum Entfernen von Staub verbunden sind.

#### Revendications

1. Système constitué d'une combinaison d'une unité de grenailage et d'au moins deux machines de moulage en coquille, l'unité de grenailage comprenant un ensemble de grenailage suspendu (1) supporté par un bras articulé (3) qui est relié à l'extrémité supérieure d'un montant fixe (5), ledit ensemble de grenailage comprenant des moyens (23) pour projeter des grains (25) sur des moules ouverts et renversés (12) des machines de moulage en coquille (10), et ledit montant fixe (5) étant agencé en relation fixe par rapport auxdites deux machines de moulage en coquille (10), de sorte que l'ensemble de grenailage (1) peut être agencé sélectivement lors d'un positionnement choisi dudit bras articulé (3) sur lesdits moules ouverts et renversés (12) desdites deux machines de moulage en coquille (10) sans qu'il soit nécessaire que lesdits moules (12) soient physiquement retirés et transportés au loin desdites machines (10).
2. Système selon la revendication 1, caractérisé en ce que ledit bras articulé (3) supporte, à une extrémité, ledit ensemble de grenailage (1) au moyen d'une entretoise (2) et est pivoté sur ledit montant (5) à l'autre extrémité,

3. Système selon l'une quelconque ou plus des revendications précédentes, caractérisé en ce que ledit bras articulé (3) présente une première partie (3a) pivotant sur ledit montant et une seconde partie (3b) pivotant sur ladite première partie. 5
4. Système selon l'une quelconque ou plus des revendications précédentes, caractérisé en ce que ledit ensemble de grenailage (1) présente un corps externe (20) qui est fermé frontalement par des portes coulissantes (21) déplaçables l'une par rapport à l'autre et est muni d'une partie réalisée en une matière souple pour le couplage à l'arbre de support de moule (22). 10 15
5. Système selon la revendication 4, caractérisé en ce que lesdits moyens de projection comprennent, à l'intérieur dudit corps externe (20), un canon de projection (23) qui est muni d'un conduit (24) pour aspirer les grains (25) situés sur le fond du corps et peut fonctionner au moyen d'un système à levier (26) accessible à l'extérieur dudit corps. 20 25
6. Système selon l'une quelconque ou plus des revendications précédentes 4-5, caractérisé en ce que ledit corps externe (20) présente une porte optiquement transparente (28). 30
7. Système selon l'une quelconque ou plus des revendications précédentes 5-6, caractérisé en ce qu'il comprend des aspirateurs (30) qui sont reliés audit corps externe (20) et sont adaptés pour créer un courant d'aspiration au niveau de la partie inférieure de colonnes de piégeage (31) qui sont reliées dans une zone supérieure, au moyen de grilles (32), à la chambre interne dudit corps, lesdites colonnes de piégeage présentant une voie à plans inclinés (34) et à sorties (37) pour ramener les grains (25) dans ledit corps, lesdits aspirateurs étant reliés à des unités de décantation (40) pour l'élimination des poussières. 35 40 45

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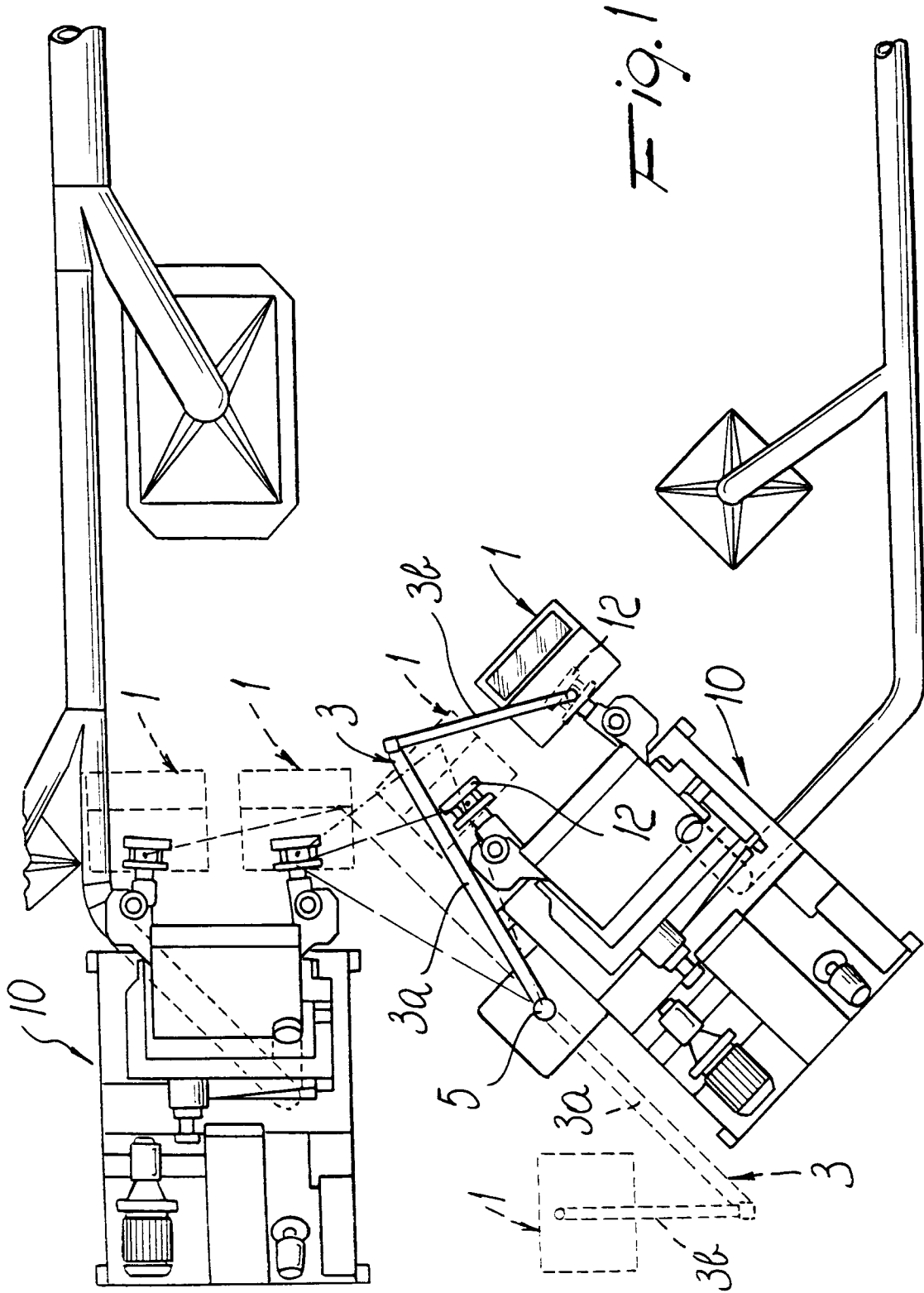
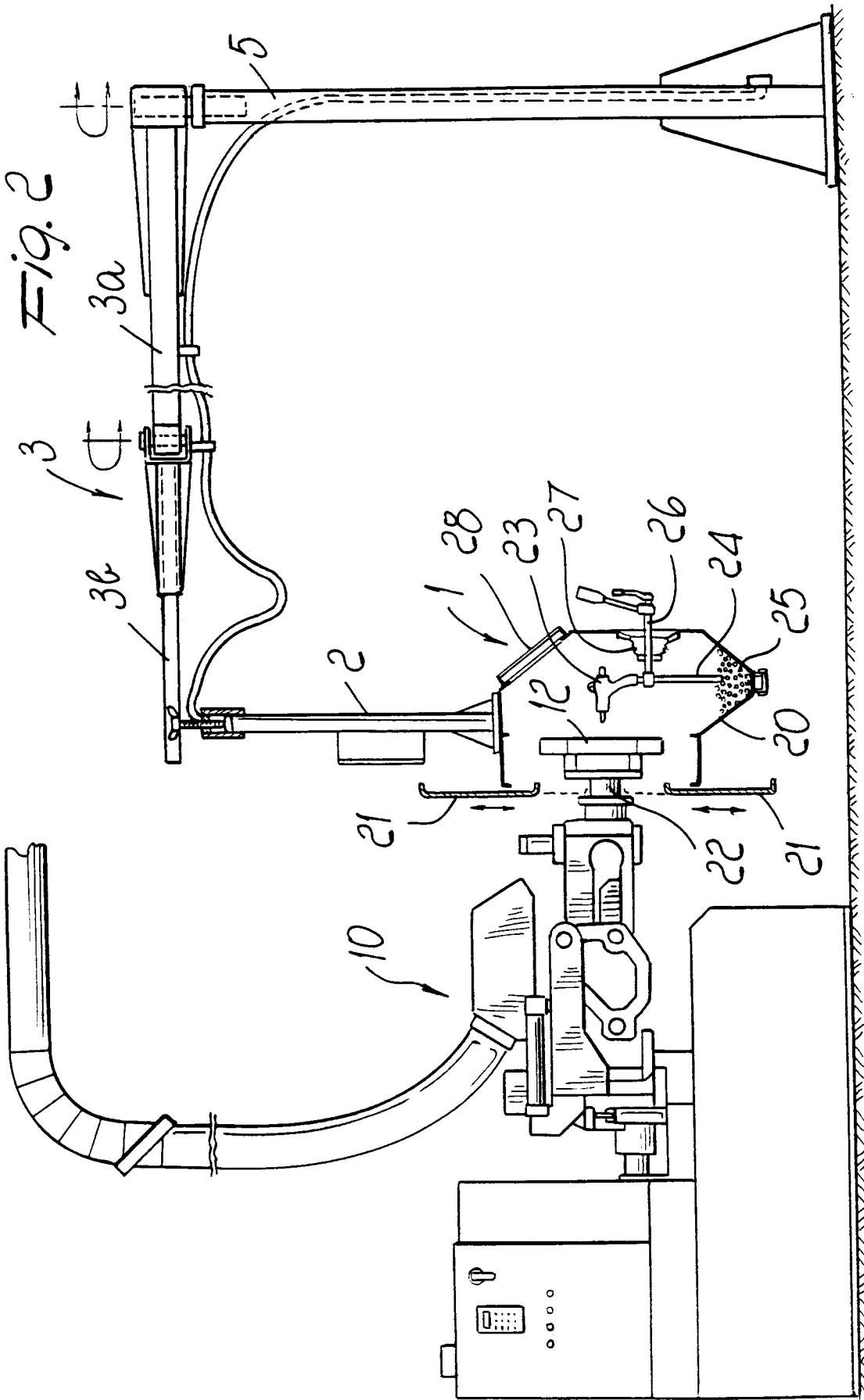


Fig. 1



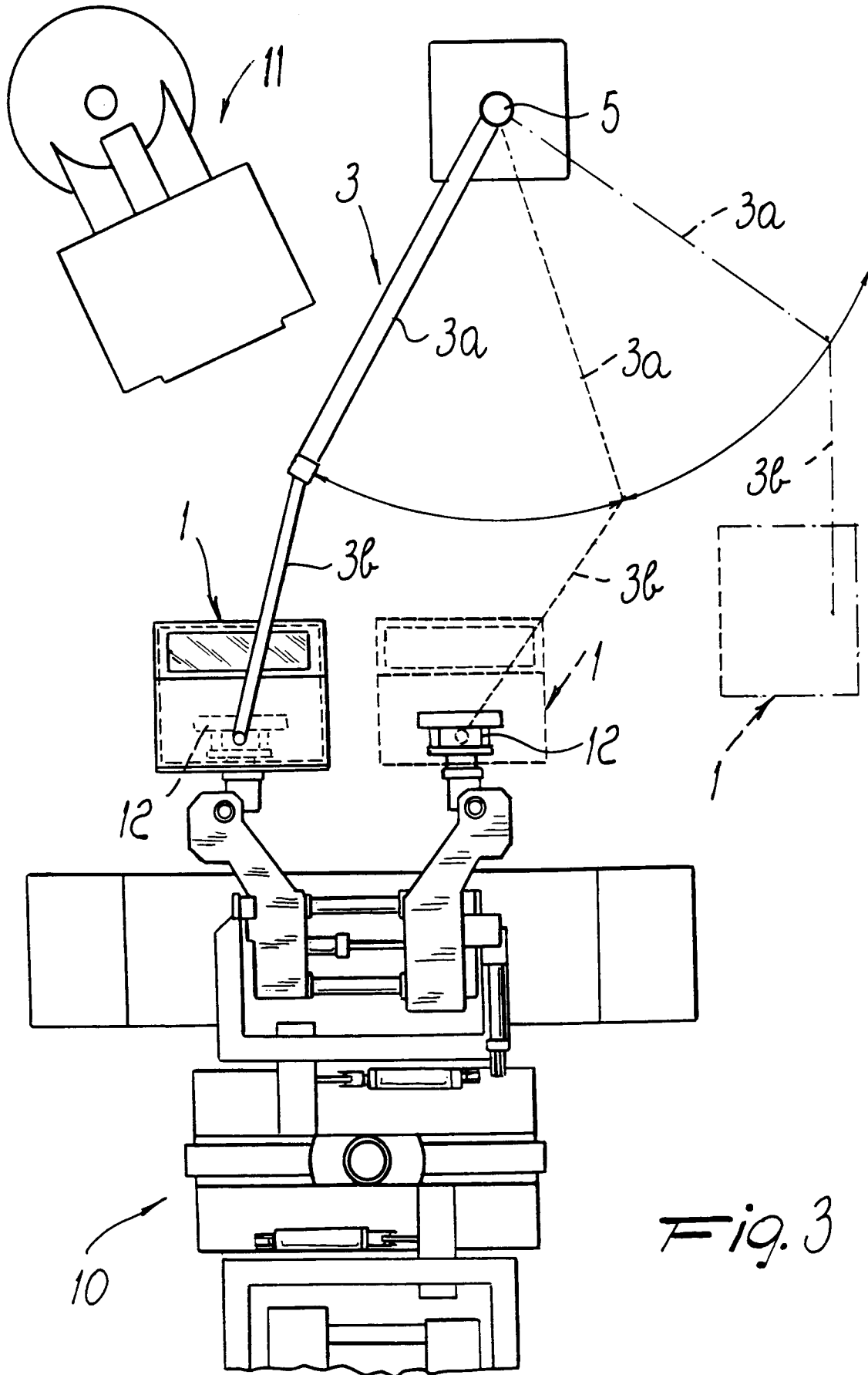


Fig. 3



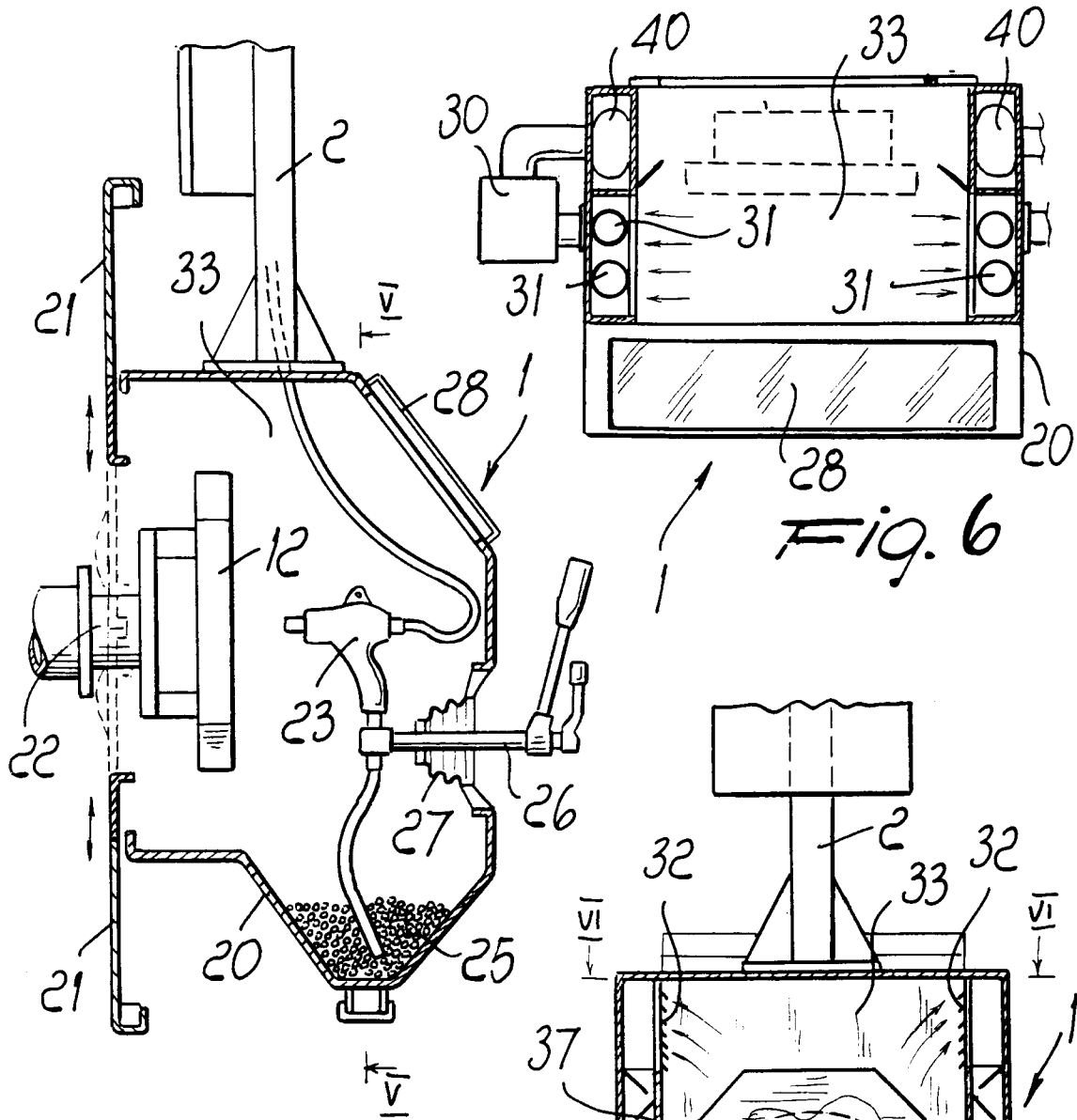


Fig. 4

Fig. 5

