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Automatized press for moulding grinding wheels

This invention relates to a moulding press, operated in an entirely automatic fashion, for moulding of grinding wheels, of the kind which contain two or more reinforcing gauzes made of woven fabric, for example resin-impregnated fiberglass.

The conventional moulding presses for the use referred to above are semi-automatic in operation and this fact implies a continuous and cumbersome work for the operator in order that a commercially significant production may be achieved, so that the output is always a function of random factors; automatic presses for this purpose are unknown to the applicant.

As a matter of fact, the operator is requested manually to load on the press platen, which usually holds two moulds, the reinforcing gauzes, the metallic hub for the wheel bore and also the marking label which identifies the manufacturer and usually bears the wheel standard markings.

As a result, the times required for feeding the abrasive mix to the moulds and for moving the press bottom platen from the pressing position to the mould loading position are closely bound to the manual steps referred to above and must be calculated so as to leave certain lag times for the operator.

Consequently, the press is not exploited to the maximum of its potential output.

In addition, the work of the operator, in spite of the time allowances referred to above still remains cumbersome.

An object of the present invention is to do away with the shortcomings referred to above by providing a press in which the abrasive mix, the reinforcing gauzes, the wheel hub and the marking label are charged in the moulds in a completely automatic sequence so that the potential output of the press can be exploited to the utmost irrespective of the performance of the individual press attendants.

To achieve this object it has been envisaged, according to the present invention, to provide an automatic press for moulding grinding wheels incorporating two or more reinforcing gauzes, a wheel hub for the wheel bore and a marking label, said moulding press comprising:

two platens, a bottom one and a top one, carrying respectively at least one male mould and a female mould, the bottom platen being horizontally withdrawable from the press towards a position adapted to load in the mould the abrasive mix, the gauzes, the wheel hub and the marking label, said press further comprising in combination, a first unit for automatically feeding into the mould the gauzes, the wheel hub and the label, and a second unit for automatically removing from the mould the as-moulded grinding wheel, said first unit comprising, in its turn, a stepwise-going conveyor carrying at least a row of dishes, each dish

having a central plug which can be retracted against the bias of a spring, and a translation carriage which is reciprocable between said conveyor and said mould and carrying at least an expansion pincer which is vertically movable in constant alignment with the plug of a dish, said second unit comprising at least an expansion pincer which can be moved both vertically and horizontally between said mould and a position outside the press.

The functional and structural features of the invention and its advantages over the prior art will be better understood with reference to the exemplary description of an embodiment, with reference to the accompanying drawings, wherein:

FIGURE 1 is a perspective view showing a press which embodies the features of this invention.

FIGURES from 2 to 8 inclusive are detail views which show the several working steps of the machine.

FIGURE 9 is an end view taken along the arrow F of FIGURE 1 with parts removed and shown in cross-section for the sake of clarity, and

FIGURE 10 is an exploded view showing a grinding wheel.

Having now reference to the drawings, the press in question, in its general layout, is of a conventional kind well known to those skilled in the art and which comprises a bottom platen 10 and a top platen 11. The platens 10 and 11 carry, respectively, the male and the female moulds used for shaping the grinding wheels. The top platen 11 is vertically movable in the direction of the arrow 12, whereas the bottom platen 10 is horizontally movable in the direction of the arrow 13. Thus, the platen 10 is shifted from a working position of shaping of the grinding wheel, in alignment with the platen 11, to a position of mould loading and unloading, wherein the platen 10 is offset relative to the platen 11 in a position outside the press, as shown in FIGURE 1. The abrasive mix is loaded into the moulds 14 in the conventional way by means of a hopper 16 which is moved horizontally in the direction of the arrow 17 by means of an actuating ram 18. The mix 15 is deposited by gravity onto the platen 10 and emerges through a slot 19.

According to the present invention, the quite conventional press briefly described above is associated with two sets, which, in FIGURE 1 of the drawings, are generally indicated at 20 and 21, respectively.

The set 20 is intended automatically to feed the moulds 14 with the gauzes 22 to reinforce the abrasive mix, a wheel hub 23 for the central wheel bore of the wheel D and a marking label 25 (FIGURE 10).

The set 21, conversely, is intended auto-

matically to remove, from the moulds 14, the finished grinding wheel D (FIGURE 8).

The set 20 is structurally composed by a slat conveyor 26 which is fed forward stepwise by a motor 27. Each slat 28 of the conveyor 26 carries a couple of dishes 29. With reference to the detail views of FIGS. 2 and 3, each dish 29 has a central plug 30, which can be retracted against the bias of a spring 31. The conveyor 26 has, cooperating therewith, a translational carriage 32 which, by the agency of an actuating ram 34, is reciprocated in the direction of the arrow 33 between the withdrawn and outstretched positions shown in FIGURES 1 and 5, respectively.

The carriage 32 carries a couple of pincers 35 of the expansion type (FIGURES from 2 to 5), mounted on a frame 36 which can be lifted and lowered in the direction of the arrow 37 by the agency of an actuating ram 38.

Each pincer 35 comprises two arms 39, 40 pivotally connected at 41. The arm 39 is fastened to the frame 36, whereas the arm 40 can be rotated about 41 against the bias of a spring 42. The concurrent rotation of the arms 40 of the couple of pincers 35 is controlled by the stems 43 of two confrontingly assembled pistons 44 displaceable in the interior of a ram 45 against the bias of springs 46. Each pincer 35, in addition, is surrounded by a sleeve 47, the latter being axially slidable and terminated by a flange 48, the purpose of which will be explained hereinafter.

The set 21 is structurally comprised of a suction apron 49, which is connected to a suction pump 50 through a stiff tube 51 and a hose 52. The suction apron 49 is as wide as the platen 10 and has a comparatively narrow suction slot. The stiff tube 51 is borne by a framing 53 and is movable in the direction of the arrow 54 by the agency of an actuating ram 55. More detailedly, the tube 51 is borne by an upright 56 slidable on ways 57 which overhangingly extend from the framing 53. The tube 51 in its shank close to the apron 49 carries, moreover, a couple of pincers 135 which, both as to their structure and their operability, are substantially a counterpart of the pincers 35 of the set 20 described hereinabove. The only difference is that the pincers 135 do not have the sleeve 47 or the relevant flange 48, either. The component parts of the pincers 135, depicted in FIGURES 6, 7, 8 and 9, will not be described in detail and carry the same numerical references as the pincers 35 but increased by 100.

It is thus apparent that the apron 49 and the pincers 135, integral with the tube 51, are moved between the position of FIGURES 6, 7 and 8, wherein the finished wheels are removed and the platen 10 cleaned, and the position of FIGURE 9, wherein the finished wheels are unloaded, for example onto a conveyor 58 which forwards them to a storing station.

The operation of the subject press is

apparent from the foregoing, but, briefly stated, is as follows.

The operator deposits on a couple of dishes 29 the hub 23, the label 25, and the gauze 22 (FIGURE 2) and, on the next oncoming dish coupled 29 a gauze 22 only, and so forth in the same alternate sequence. The conveyor 26 is moved stepwise so as to bring each couple of dishes 29 with their charge into alignment with the couple of pincers 35 of the carriage 32 (FIGURE 2).

Let this motion be considered in relationship with the first couple of dishes 29 carrying the hub 23, the label 25 and the gauze 22.

The pincers 35 are lowered from the position of FIGURE 2 to that of FIGURE 3 so as to become inserted into the assembly 23, 25 and 22, by axial depression of the plug 30 and relative motion between the pincers 35 and the respective flanges 48.

The pincers 35 are then closed from the position of FIGURE 2 to the position of FIGURE 3 and lifted to the position of FIGURE 4.

The carriage 32 is then moved from the position shown in FIGURE 1 in dotted lines (also shown in the detail of FIGURE 4).

During this motion, the flange 48, by axially pressing against the assembly 23, 25, 22 ensures the centering of the latter relative to the plug 59 of the movable bottom wall 60 of the mould 14 (best seen in FIGURE 4).

The pincers 35 are then lowered to the position of FIGURE 5 and opened, so as to place on the bottom wall 60 of the assembly 23, 25, 22.

At this stage, in a manner known per se, the moulds 14 are filled with the abrasive mix 15 by shifting the hopper 16 in the direction of the arrow 17. Within the mould 14, atop the mix 15, a second gauze 32 is placed, which has been withdrawn from the dishes 29 by the pincers 35 in the same way as described above with reference to the assembly 23, 25, 22.

The platen 10 is then moved under the platen 11, the mix is compressed and the platen 10 is brought back to the position of FIGURE 1, outside the press, for withdrawing the finished grinding wheels.

To this purpose, the set 21 has been shifted to the position shown in dash and dot lines in FIGURE 9 and the pincers 135, which are open, are lowered from the position of FIGURE 6 to the position of FIGURE 7 wherein they are closed on the central bore of the moulded wheel after that the bottom wall 60 has been lifted (by extractor of conventional make, not shown) to prevent any interference by the plug 59.

The pincers 135 are then lifted to the position of FIGURE 8 and carry with themselves the finished grinding wheel D. The set 21 is eventually brought back to the position of FIGURE 9 on the conveyor 58 onto which the wheels are deposited as the pincers 135 are opened.

During this reciprocation of the set 21, the

suction apron 49 provides to sweep out of the platen 11 the residues of abrasive flour, thus preventing it from becoming airborne and from causing any damage to the attendants.

For each couple of grinding wheels there are repeated, of course and in the same sequential order, the steps which have been described hereinabove.

Thus the object indicated in the introductory portion of this specification is achieved in a simple and extremely functional and the advantages stemming therefrom are apparent.

While the invention has been shown and described in connection with the moulding of two grinding wheels at a time, the same basic principles can as well be applied for moulding a single wheel or more than two wheels. In addition, also the number of reinforcing gauzes for each wheel can be varied without departing from the scope of the invention as defined in the appendant claims.

Claims

1. An automatic press for moulding grinding wheels incorporating two or more reinforcing gauzes, a hub for the wheel central bore and a marking label, the press comprising a bottom platen and a top platen which carry, respectively, at least a male and a female mould for shaping the wheel, the bottom platen being horizontally withdrawable from the press to a position adapted to load the abrasive mix into the mould together with the gauzes, the hub and the label, said press further comprising in combination, a first unit (20) for automatically loading into the mould (14) the gauzes (22), the hub (23) and the label (25), and a second unit (21) for automatically removing from the mould (14) the moulded grinding wheel (D), said first unit (20) comprising: a conveyor (26) movable stepwise and carrying at least one row of dishes (29) each of which has a central plug (30) which can be retracted against the bias of a spring (31) and a translational carriage (32) movable reciprocally between said conveyor (26) and said mould (14) and carrying at least one expansion pincer (35) movable vertically in constant alignment with the plug (30) of a dish (29), said second unit (21) comprising at least an expansion pincer (135) vertically movable and also horizontally between said mould (14) and a position outside the press.

2. Press according to Claim 1, wherein said conveyor (26) is a slat conveyor and each slat (28) carries said dishes (29).

3. Press according to Claim 1, wherein said carriage (32) is placed above the conveyor (26).

4. Press according to Claim 1, wherein said pincer (35) comprises two arms (39, 40) pivoted mutually at (41), the arm (39) being stationary, whereas the arm (40) is rotatable about (41) against the bias of a spring (42), the rotation of the arm (40) being commanded by an actuating ram (45).

5. Press according to Claim 1, wherein the pincer (135) is integral with a pipe (51) carrying a suction apron (49) adapted to sweep the platen (10); said tube being mounted on a framing (53) so as to be reciprocable.

6. Press according to Claim 4, wherein said pincer (35) is surrounded by a sleeve (47) slidable axially relative thereto and terminated by a flange (48).

Revendications

1. Presse automatique pour moulage des disques abrasifs incorporant deux ou plusieurs filets d'armature, une douille métallique de renfort du trou central et éventuellement une étiquette, la presse étant du genre qui comprend: deux tables, une inférieure et une supérieure, qui portent respectivement au moins une moule et une contre-moule de moulage qui est extraite horizontalement de la presse dans une position pour charger dans la moule le mélange abrasif, les filets, la douille et l'éventuelle étiquette, cette presse étant caractérisée en ce qu'elle comprend en combinaison: un groupe (20) pour alimenter automatiquement dans la moule (14) les filets (22), la douille (23) et l'éventuelle étiquette (25), et un groupe (21) pour prélever automatiquement de la moule (14) le disque abrasif moulé (D); ce groupe (20) comprenant: un transporteur (26) mobile pas à pas et portant au moins une file de plats (29) chacun desquels est muni d'une tige centrale (30) retractible contre l'action d'un ressort antagoniste (31), et un chariot translatateur (32) mobile alternativement entre ce transporteur (26) et cette moule (14) et portant au moins une pince à expansion (35) mobile verticalement toujours en alignement avec la tige (30) d'un plat (29); ce groupe (21) comprenant au moins une pince à expansion (35) mobile verticalement, et horizontalement entre cette moule (14) et une position externe à la presse.

2. Presse selon la revendication 1, caractérisée en ce que ce transporteur (26) est à écailles et chaque écaille (28) port ce plat (29).

3. Presse selon la revendication 1, caractérisée en ce que ce chariot (32) est placé au-dessus du transporteur (26).

4. Presse selon la revendication 1, caractérisée en ce que cette pince (35) comprend deux bras (39, 40) axés entre eux en (41), le bras (39) étant stationnaire, tandis que le bras (40) est pivotable autour de (41) contre l'action d'un ressort (42), la rotation du bras (40) étant commandée par un cylindre actionnateur (45).

5. Presse selon la revendication 1 caractérisée en ce que la pince (35) est solidaire à un tube (51) portant une bouche aspirante (49) destinée à nettoyer la table (10), ce tube étant monté sur une carcasse (53) de façon translatable en avant et en arrière.

6. Presse selon la revendication 4, caracté-

térisée en ce que cette pince (35) est entourée pour un manchon (47) coulissant axialement vis-à-vis de celle-ci et terminant avec un plat.

Patentansprüche

1. Automatisierte Presse zum Formen von Schleifscheiben, in denen zwei oder mehrere Verstärkungsnetze, eine Nabe für die Mittelbohrung der Scheibe sowie eine Etikette einverleibt sind, welche Presse eine untere und eine obere Platte umfasst, die mindestens eine Form bzw. einen Stempel zur Formung der Scheibe tragen, wobei die untere Platte waagrecht aus der Presse in eine Lage zum Einbringen der Schleifmittelbindung zusammen mit den Netzen, der Nabe und der Etikette in die Form herausverschiebbar ist und die Presse ferner in Kombination eine erste Einheit (20) zum selbsttätigen Einbringen in die Form (14) der Netze (22), der Nabe (23) und der Etikette (25), sowie eine zweite Einheit (21) zur selbsttätigen Entnahme aus der Form (14) der geformten Schleifscheibe (D) umfasst, und wobei die genannte erste Einheit (20) einen schrittweise beweglichen Förderer (26) mit mindestens einer Reihe von Tellern (29), die je einen mittleren Stift (30) aufweisen, der entgegen der Wirkung einer Feder (31) einziehbar ist, sowie einen zwischen dem genannten Förderer (26) und der genannten Form (14) hin- und herverschiebbaren beweglichen Wagen

(32) umfasst, der mindestens eine, stets in Ausrichtung mit dem Stift (30) eines Tellers (29) lotrecht bewegliche Expansionszange (35) trägt, während die genannte zweite Einheit (21) mindestens eine, sowohl lotrecht, als auch waagrecht zwischen der Form (14) und einer Lage ausserhalb der Presse bewegliche Expansionszange (135) umfasst.

2. Presse nach Anspruch 1, wobei der genannte Förderer (26) ein Plattenbandförderer ist und jede Platte (28) eine der genannten Teller (29) trägt.

3. Presse nach Anspruch 1, wobei der genannte Wagen (32) oberhalb der Förderers (26) angeordnet ist.

4. Presse nach Anspruch 1, wobei die genannte Zange (35) zwei miteinander in (41) gelenkig verbundene Arme (39, 40) umfasst, von denen der Arm (39) feststeht, während der Arm (40) entgegen der Wirkung einer Feder (42) um (41) drehbar ist und die Drehung des Armes (40) durch einen Betätigungszyylinder (45) gesteuert ist.

5. Presse nach Anspruch 1, wobei die Zange (135) an einem Rohr (51) befestigt ist, das eine Saugmündung (49) besitzt, die geeignet ist, die Platte (10) abzufegen, wobei das Rohr an einem Rahmen (53) angebracht ist, so dass es hin- und herbewegbar ist.

6. Presse nach Anspruch 4, wobei die Zange (35) von einer ihr gegenüber axial beweglichen, mit einem Flansch (48) endenden Buchse (47) umgeben ist.

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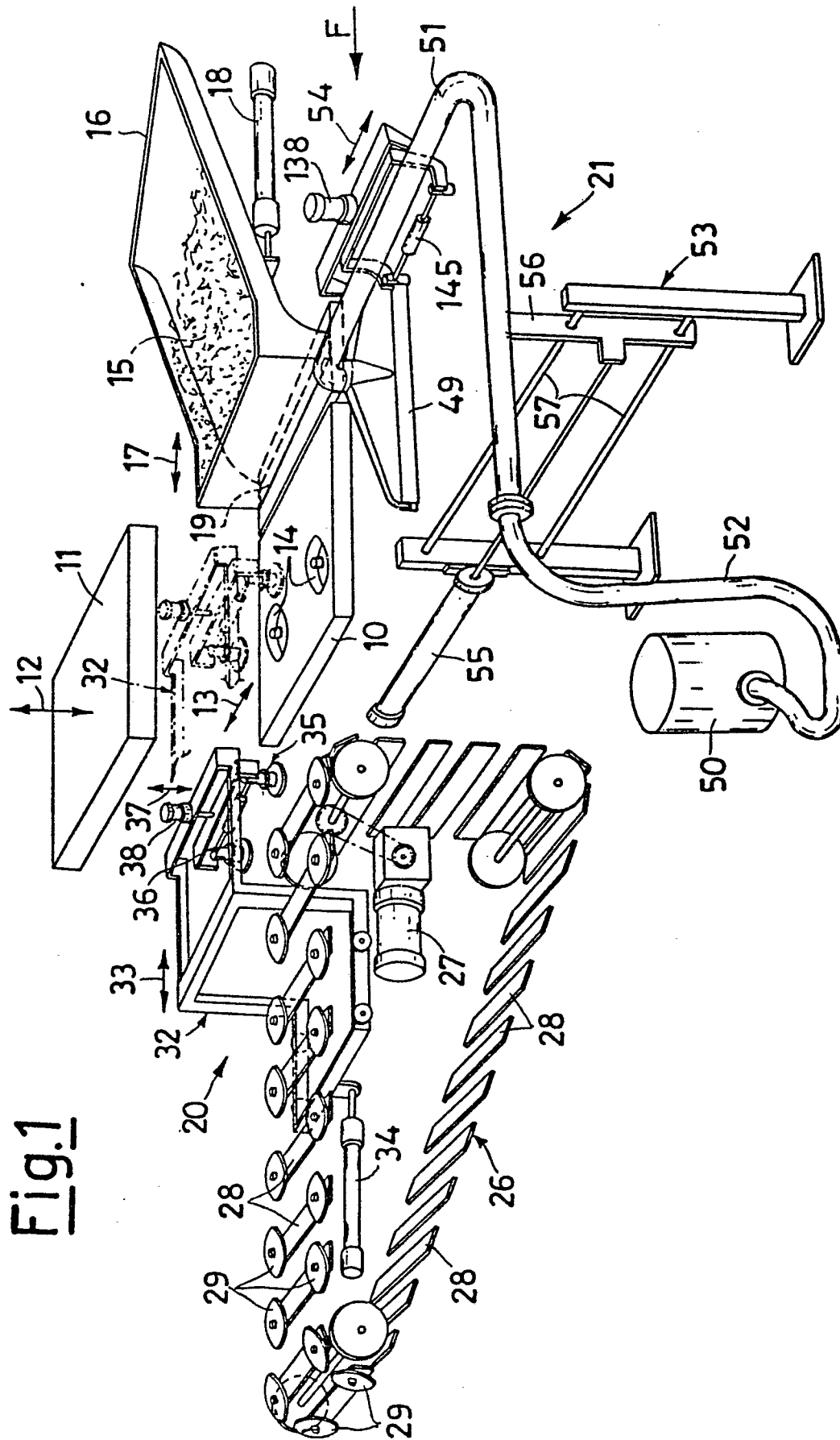
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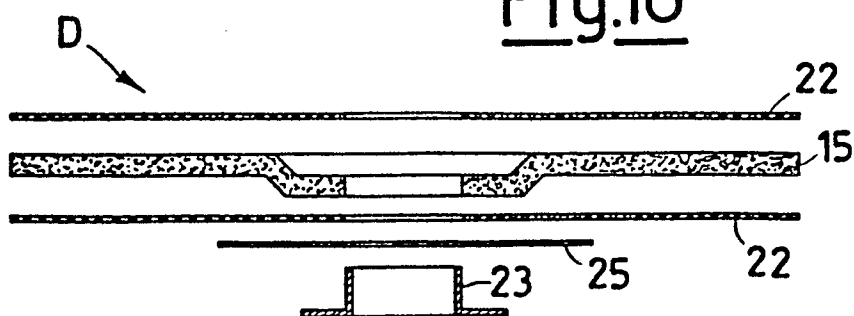
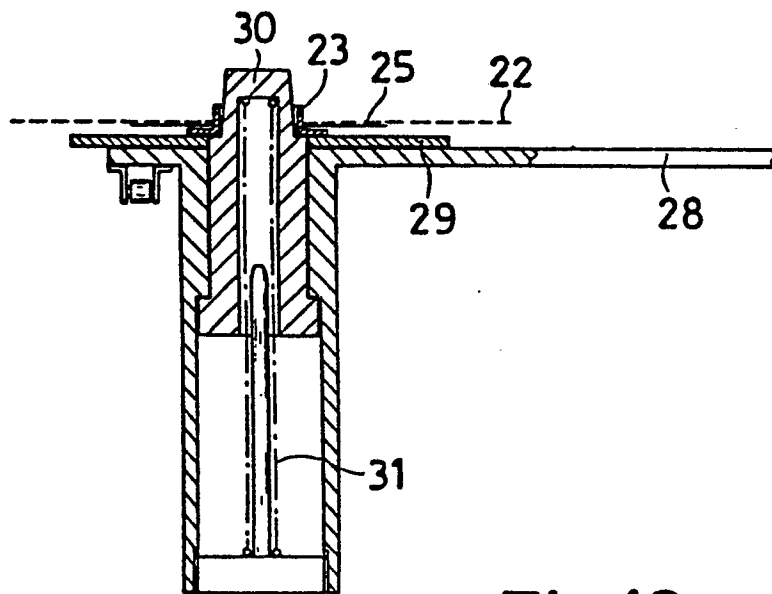
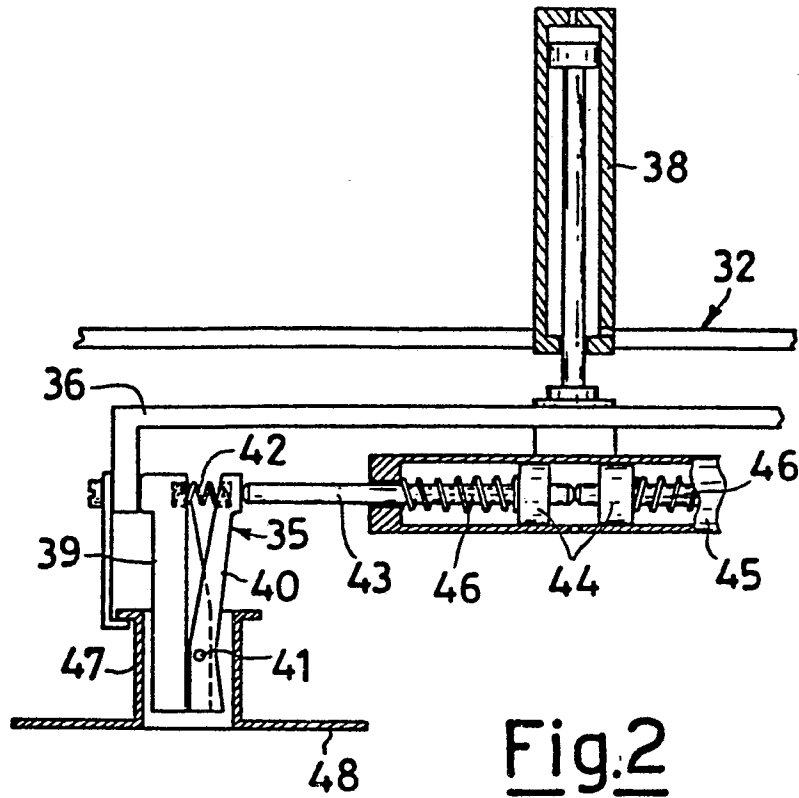
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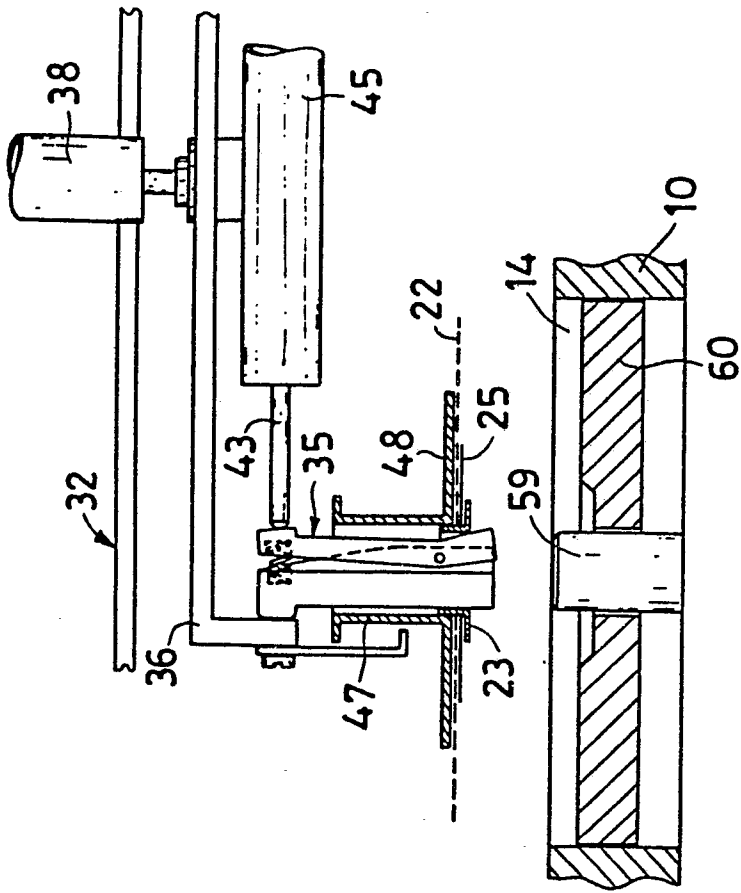


Fig. 4

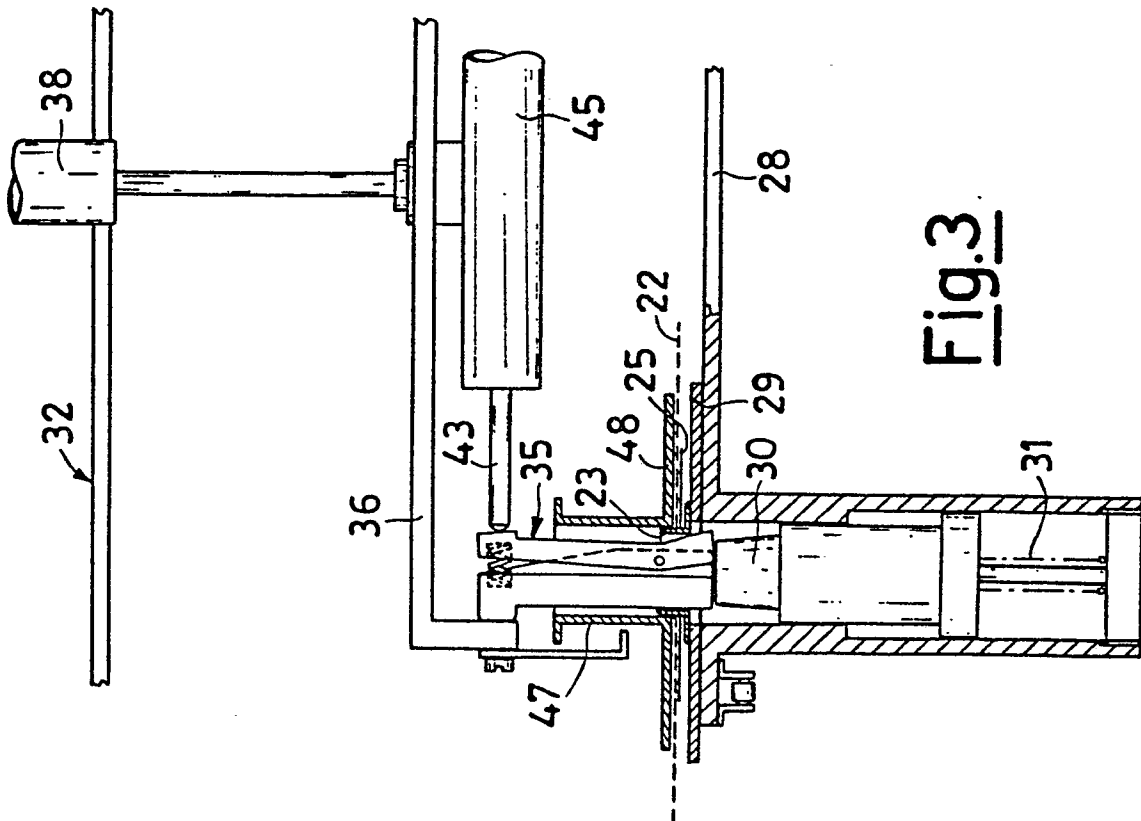


Fig. 3

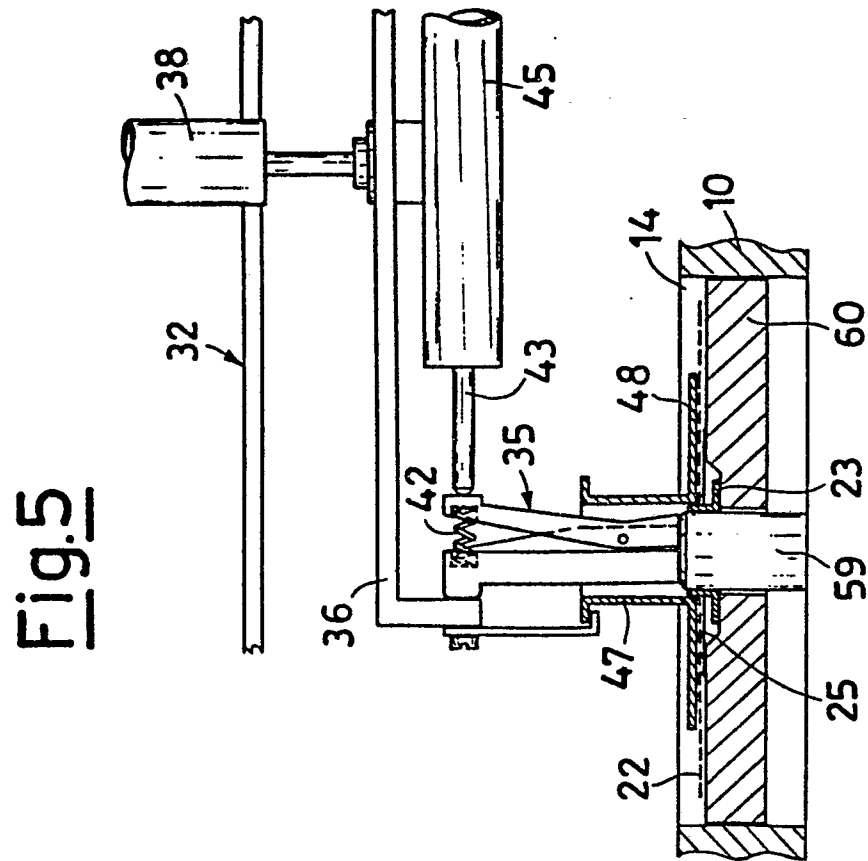


Fig. 5

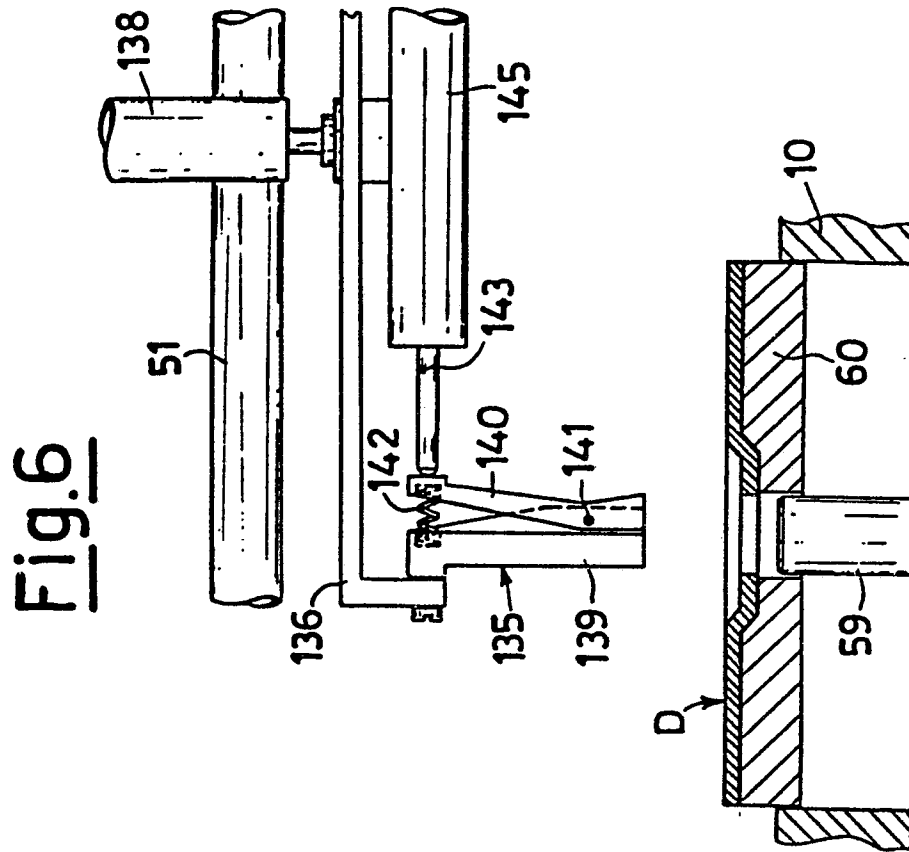


Fig. 6

Fig.8

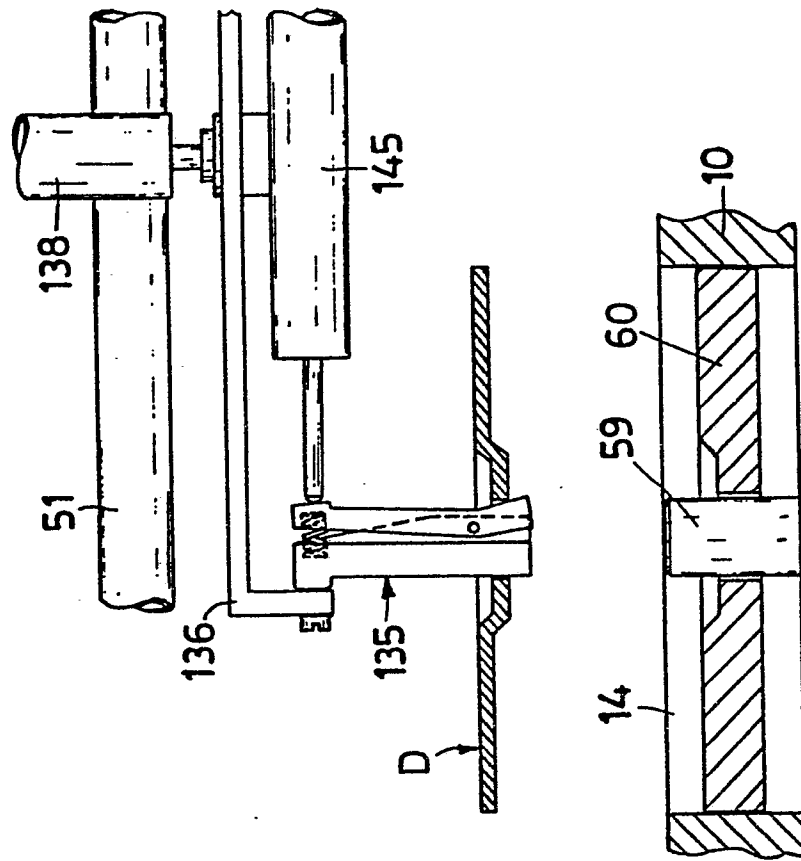


Fig.7

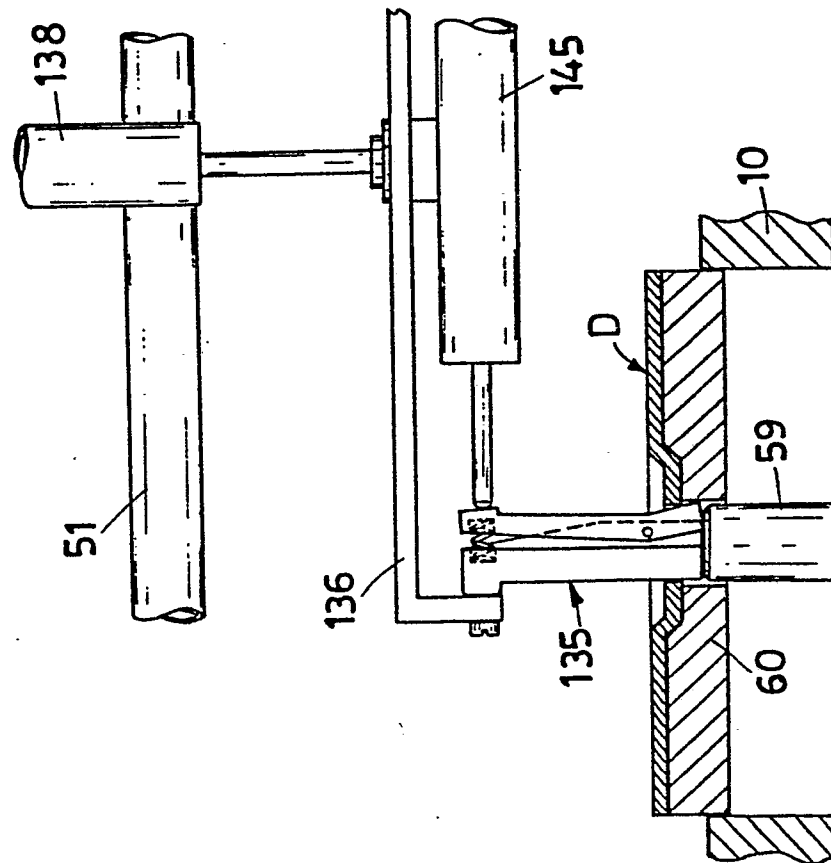


Fig. 9

