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(71) Applicant : **Berggren, Stefan**
Hertig Karls Alle 38
S-691 41 Karlskoga (SE)

(71) Applicant : **Själin, Kjell-Erik**
Stortorpsvägen 53
S-142 65 Trangsund (SE)

(72) Inventor : **Berggren, Stefan**
Hertig Karls Alle 38
S-691 41 Karlskoga (SE)
Inventor : **Själin, Kjell-Erik**
Stortorpsvägen 53
S-142 65 Trangsund (SE)

(54) Fumes-exhausting hood.

(57) The invention relates to a fumes-exhausting hood (1, 1′) for exhausting noxious fumes arising from melting furnaces or other tiltable preparation vessels (2) during various phases of a melting process, such as charging, melting and discharging. The hood comprises at least one exhaust valve opening (4, 4′) and is pivotally mounted via a linkage (8) on a tubular part (14) forming part of the exhaust duct (10) to allow the hood to be raised, lowered and moved aside during the various phases of the melting process. The hood is pivotally mounted about at least three axis, two horizontally disposed axes (S1, S2) through the ends of the linkage (8) and one vertically disposed axis (S3) through the tubular part (14).

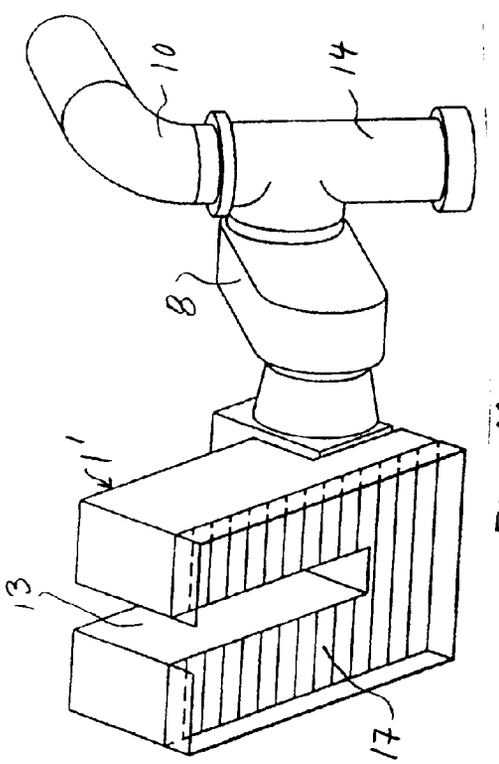

Fig. 11

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The invention relates to a hood for exhausting noxious fumes arising from melting furnaces or other tiltable preparation vessels during various phases of a melting process.

During various phases of a melting process noxious fumes are exuded which fumes have to be evacuated for working environment reasons. Various types of hoods, located on or close to the melting furnace, have been proposed to collect such fumes, see for instance SE 401 399 and SE 420 235. In order to permit access to the process the hoods normally must be moved aside, however, during various phases of the process, particularly during charging and pouring phases of the foundry process.

The object of this invention is to provide a hood for efficiently evacuating fumes emanating from melting furnaces and other tiltable vessels during various phases of a melting process with a minimum of air volumes involved.

A further object of the invention is to provide a non-bulky hood which permits greater access to the melting process, for instance during charging operations with overhead cranes as well as trucks.

According to the invention said objects have been accomplished by a hood as characterized in the accompanying claims.

The advantages offered by the invention are mainly a better working environment for the workers as well as a significant savings due to reduced capacity requirements on the dust-collecting equipment as the necessary air quantity flowing through the system has been substantially reduced.

Two ways of carrying out the invention are described in detail below with reference to the drawings which illustrate one specific embodiment, in which:

Figure 1 is a side view of the hood movably mounted over a melting furnace showing the hood in its charging and melting positions.

Figure 2 is a front view of the hood in the same position as illustrated in figure 1.

Figure 3 is a plane, top view of the hood in the same position as in figure 2 as well as a position in which the hood has been moved aside, indicated by dashed lines.

Figure 4 is a side view showing the hood swung upwardly to permit operation of the charging bucket to its discharging position.

Figure 5 is a side view showing the hood in the discharging position.

Figure 6 is a perspective view of the hood taken from the bottom.

Figures 7 - 11 are corresponding views showing a second embodiment of the invention.

A hood 1 is mounted on the top of a melting furnace 2 to collect dusty fumes emanating from the melting charge during various phases of the melting process. The hood is pivotally mounted to permit evacuation of the fumes also during discharging operations, from the furnace 2 to a bucket 3. The hood has three different exhaust openings 4, 5 and 6 to evacuate the fumes, which openings are provided with exhaust valves which are controlled by electrical or pneumatic adjusting means 11, 12. The hood is pivotally mounted above three axes S^1, S2 and S3, i.e.. supported on a rotatable part 14 of the exhaust duct 10 via a linkage 8. The exhaust duct 10 is preferably connected to the rotatable part 14 from above, as illustrated in figure 2, but can also be connected from the bottom side. Raising and lowering the hood is effectuated by means of the linkage 8. Each of the three pivot points is provided with a gear ring 9 connected to a gear drive motor.

The part of the hood that embraces the furnace charge opening is comparatively thin and provided with an opening 7 having a ceramic wall covering to allow recharging and other supply of additives through the opening.

Fumes emanating from the charge is evacuated through an annular gap opening and an open valve 6. During the charging phase the opening 7 is closed by a lid.

The thin end portion of the hood with the opening 7 is referenced by numeral 15 in figure 1. This portion is connected to a base portion 17 having an exhaust opening 4 via an intermediate angled part 16. The base portion 17 has a slot 13 to permit passage of a chain for the bucket 3 carried by an overhead crane 19. Also the intermediate part 16 has an exhaust opening 5 with valves.

In the following the movement of the hood is described in connection with the different phases of the foundry operation. Preferably the motion of the hood is automatically adapted to the foundry operation by means of a control system but it could also be manually controlled from an operator's desk.

Figure 1 illustrates the hood in its charging position with dashed lines. In this position the end portion 15 of the hood has been moved away from the furnace charge opening to allow free access for the charging operation with an overhead crane or a truck. Fumes from the charge are collected by the valve opening 5 in the intermediate portion of the hood.

Figure 1 also illustrates the hood position in the melting phase in which the end portion 15 covers the furnace opening and the fumes are collected by the annular opening 6 in the hood, while the valve openings 4 and 5 are closed.

In order to allow operation of the bucket 3 during recharging operations of the foundry process, for instance during steel hardening and tempering operations, the hood can also be moved aside through pivotal movement about the center axis of the rotatable duct part 14. This has been indicated by dashed lines in figure 3. After this motion the hood is returned to the position illustrated in figure 1.

Before the discharging phase of the process the

bucket 3 is positioned by the overhead crane. In this position the hood has been moved away to an upright position by means of the linkage 8 in which position the base portion of the hood does not interfere with the chain when positioning the bucket. In this position the linkage 8 has a vertical, upright position.

The position of the hood during the discharging phase of the foundry operation is illustrated in figure 5. In this phase the charge is discharged from the furnace 2 to the bucket 3 and the fumes are evacuated through the valve openings 4 and possibly the valve openings 5 in the intermediate portion 16 of the hood.

In order to efficiently evacuate the fumes emanating from the charge the hood is moved, by means of the linkage 8, into a position with the base portion 17 close to the charge on the bucket side. The walls of the valve openings are therefore covered by a ceramic material. In figure 5 the hood is also illustrated in an approximately 100 degrees upright position to allow the discharging operation.

The present design of the hood and its variable pivotal movement in different coordinates makes it possible to more efficiently trap the emanating fumes during all the different phases of the foundry process.

The design of the hood is best illustrated by the perspective view in figure 6. The design has been adapted to the fact that the valve opening 6 provides an optimal evacuation from the furnace 2 and the valve opening 4 an optimal evacuation from the bucket 3 during the discharging phase. On the same time the hood is not allowed to interfere with the operation of the bucket carried by a crane in a chain. Raising and lowering of the hood is effectuated by means of a linkage 8.

The design of the hood 1' illustrated in figures 7 - 11 has been somewhat modified, compared with the first embodiment, see specifically the perspective view in figure 11. In this case the hood 1' is pivotally mounted about four axes S1, S2, S3 and S4 to make the hood even more movable during the melting process. The hood has only one exhaust opening 4' with valves controlled by electrical or pneumatic adjusting means (not shown).

Also in this case the hood is supported on a tubular part 14 rotatable about a vertical axis S3 and which is a part of the exhaust duct 10. Raising and lowering of the hood is carried out by means of the linkage 8 movable about the two parallel axes S1 and S2 which are perpendicular to the first mentioned axis S3. The hood is also rotatably mounted about a fourth own, axis S4, eccentrically located so that the hood can be rotated about this axis and moved aside to permit access to the recharging phase of the process also in such cases in which the bucket is moved to the furnace from an opposite direction in which case the chain cannot pass through the slot 13 in the hood. Each of the four pivot points is provided with a gear ring connected to a gear drive motor.

In the following the movement of the hood is described in connection with different phases of the foundry operation. Figures 7a - 10a are side views, figures 7b - 9b also side views (90° direction) and figure 10b a top view illustrating a position in which the hood has been rotated about its axis S4.

Figure 7 illustrates the hood 1' in its charging position in which position the hood has been moved aside to allow free access to the charging operation with an overhead crane or a truck. Fumes from the charge are collected and exhausted through the vertical valve opening 4'.

The position of the hood during the melting phase of the process is illustrated in figure 8. In this case the hood covers the furnace opening and the fumes are effectively exhausted through the valve opening 4'.

Claims

1. Pivoting hood for exhausting noxious fumes from melting furnaces or other tiltable preparation vessels during various phases of a melting process, such as charging, melting and discharging, comprising at least one exhaust valve opening (4, 4') characterized in that the hood (1, 1') is pivotally mounted, via a linkage (8), on a tubular part (14) forming a part of the exhaust duct (10), to allow the hood to be raised, lowered and moved aside during various phases of the melting process.

2. Hood as claimed in Claim 1 characterized in that the hood is pivotally mounted at one end of the linkage (8) for pivotal movement about a horizontally disposed axis (S1), that the other end of the linkage (8) is pivotally mounted on the tubular part (14) for pivotal movement about a second axis (S2), which is parallel to the first-mentioned axis (S1), and that the tubular part (14) is pivotally mounted in the exhaust duct (14) for pivotal movement about a vertically disposed axis (S3).

3. Hood as claimed in Claim 2 characterized in that the hood (1') is pivotally mounted about a fourth, axis (S4) which is substantially perpendicular to the bottom surface of the hood.

4. Hood as claimed in Claim 3 characterized by a substantially rectangular main body wherein the exhaust opening (17) is located on the bottom surface and wherein the rear part of the hood i connected to the linkage (8) and provides means for rotary movement of the hood about said axis (S4) which is also located on the rear part.

5. Hood as claimed in Claim 4 characterized in that the noxious fumes are evacuated from the hood via the connection to the linkage (8), through the

linkage and the tubular part (14) out through the exhaust duct (10).

6. Hood as claimed in Claim 2 characterized in that the hood (1) comprises a comparatively thin end portion (15), a comparatively thick base portion (17) and an intermediate, angulated portion, each portion having an exhaust opening (4, 5, 6).

7. Hood as claimed in Claim 6 characterized in that said base portion (17) has means (13) to allow passage of a suspension attachment (18) for the charging bucket or the like during the discharging phase of the process.

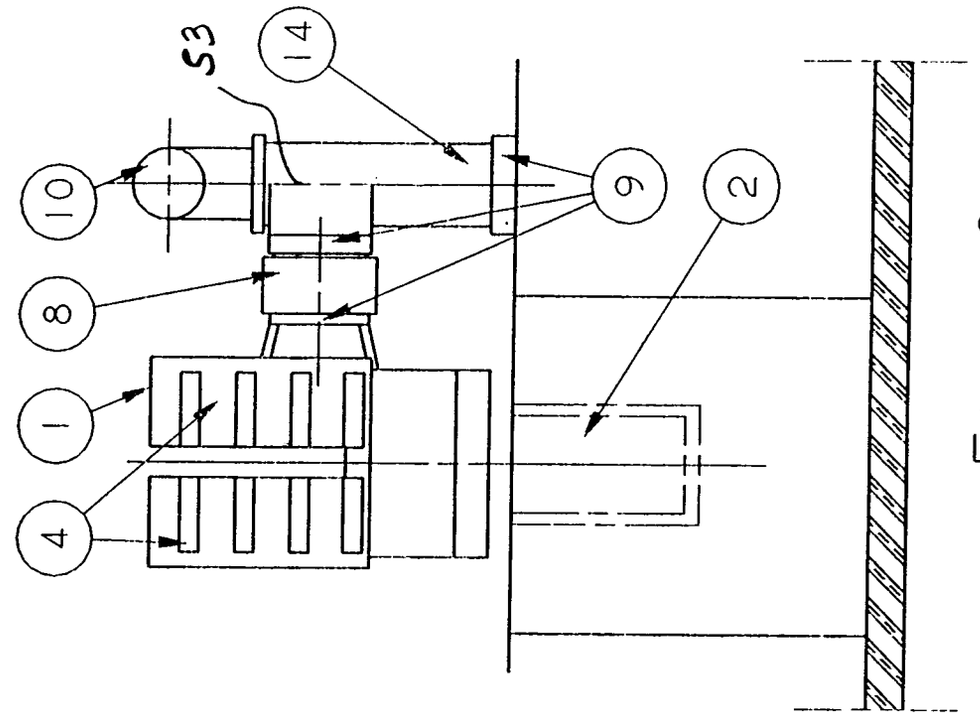

Fig 2

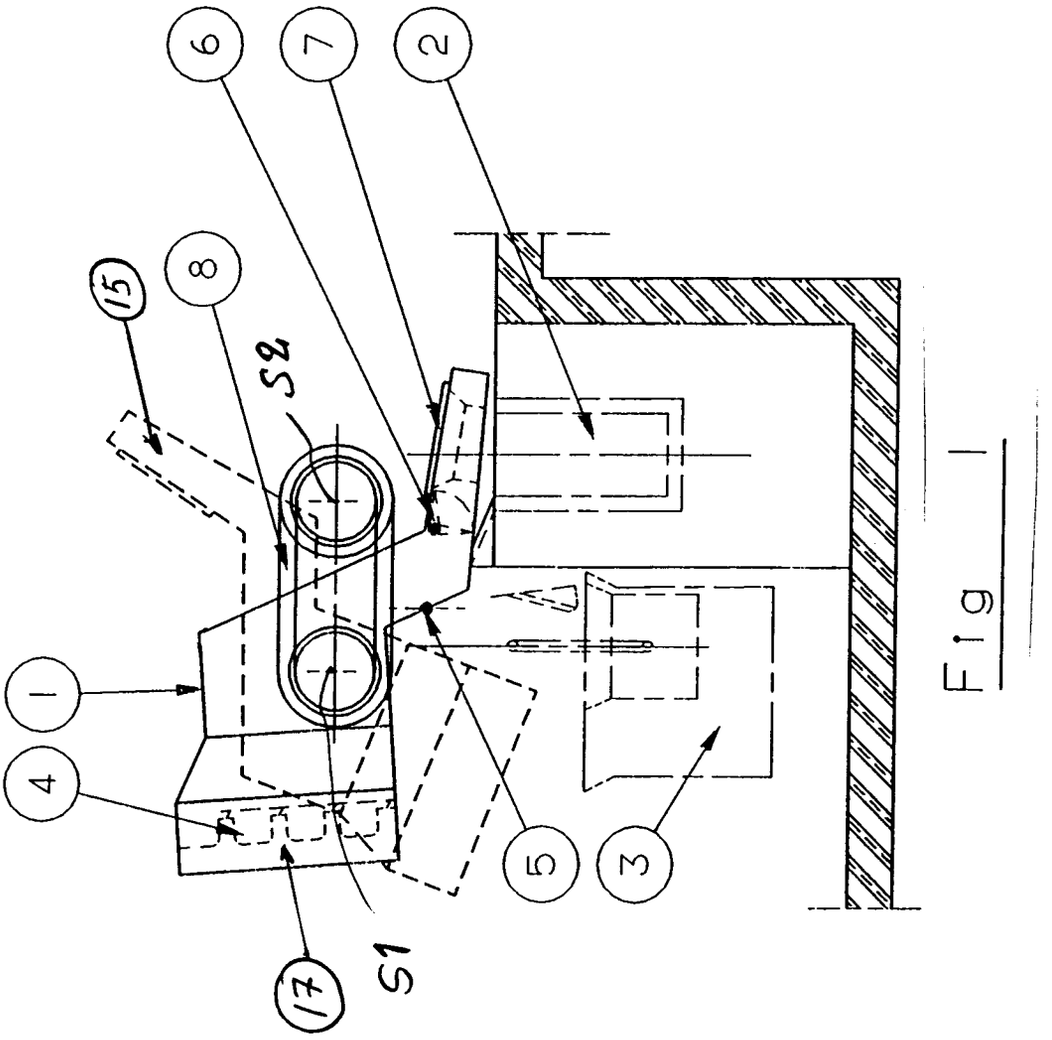

Fig 1

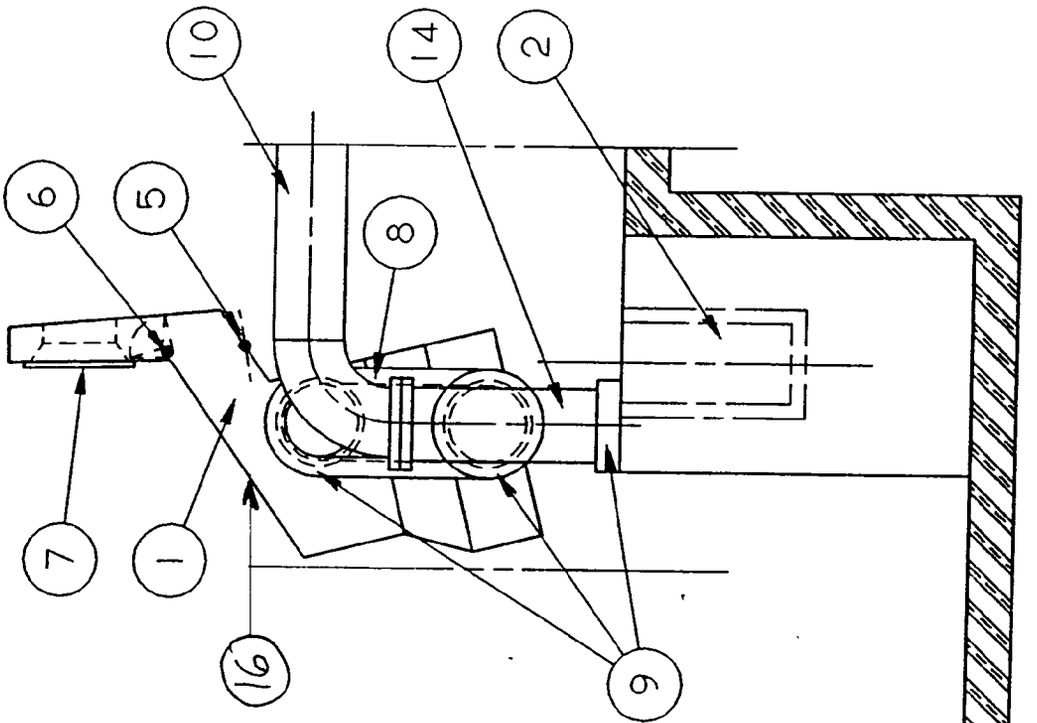

Fig 4

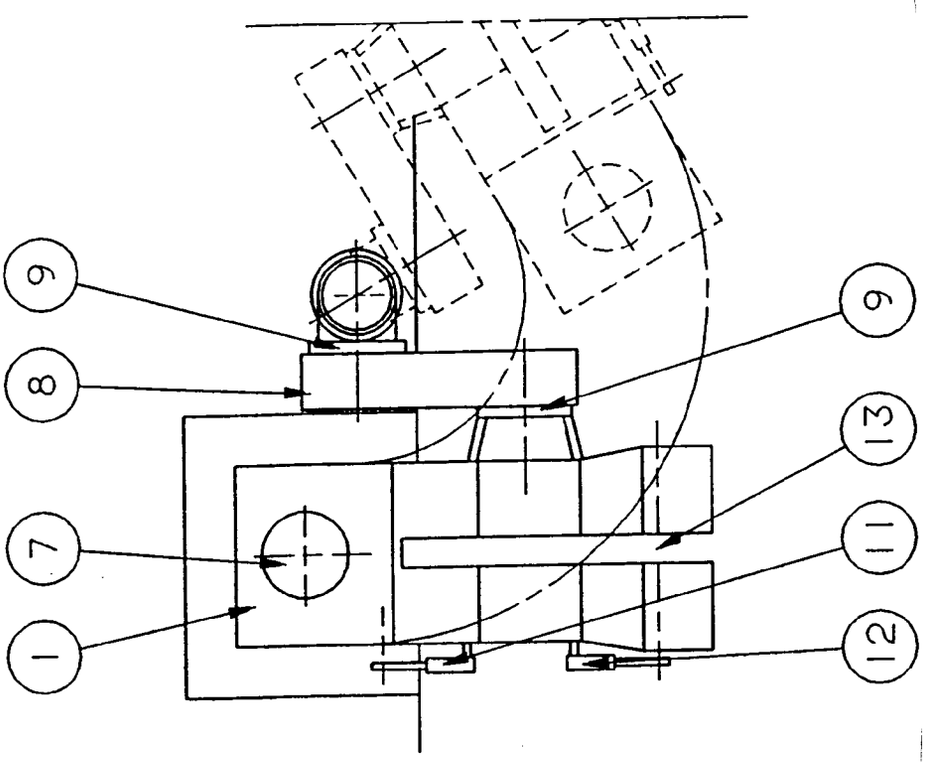

Fig 3

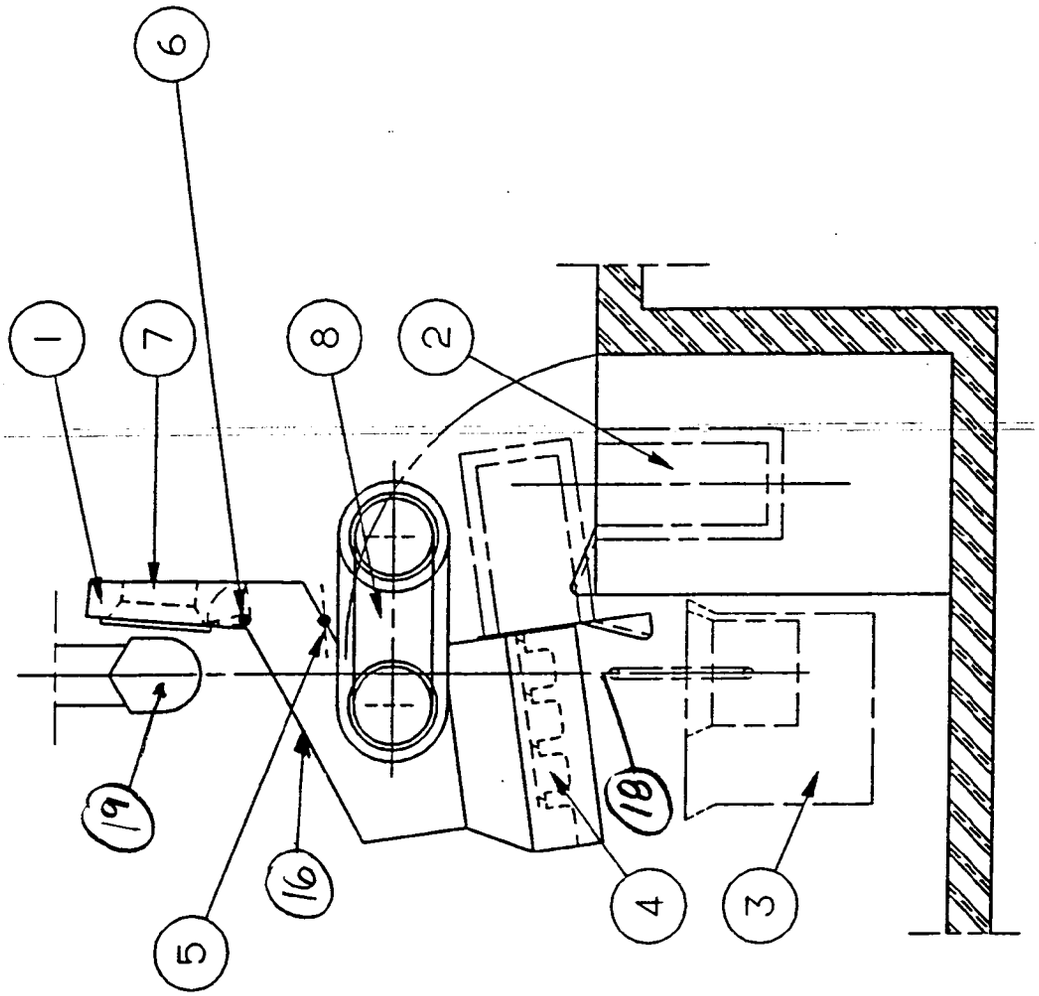

Fig 5

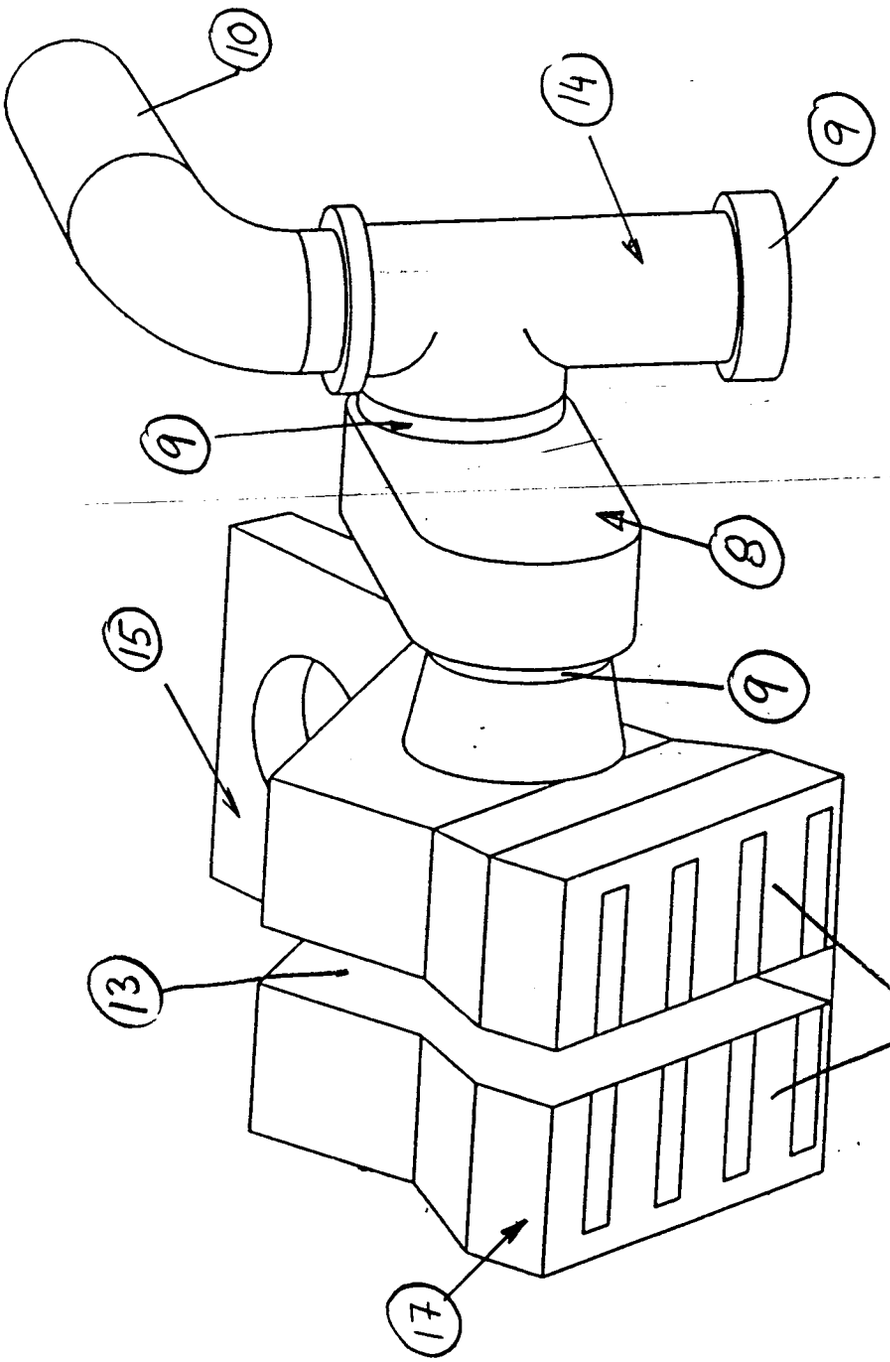

Fig 6

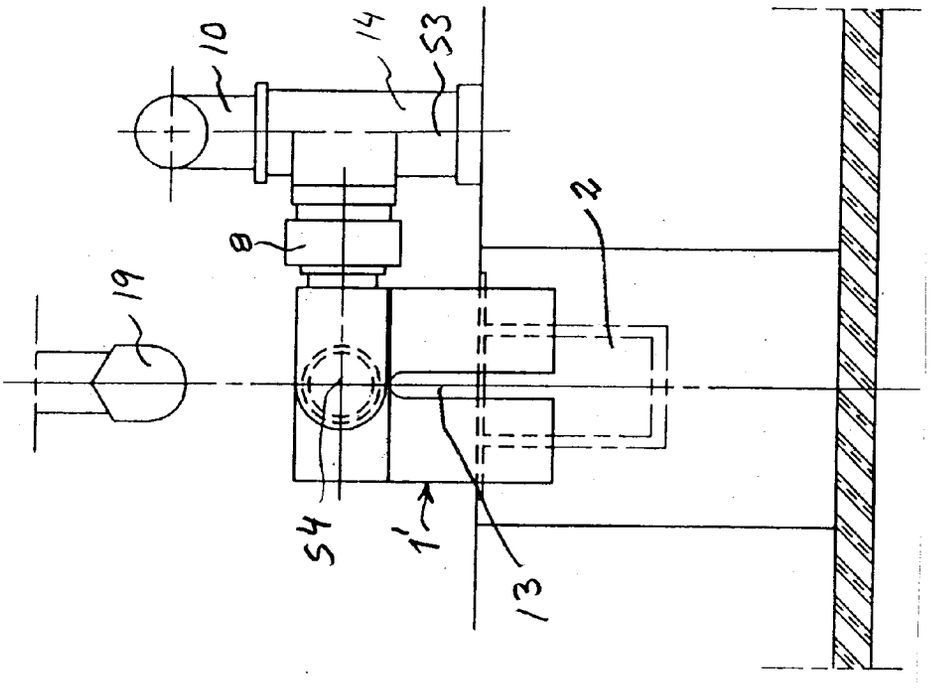

Fig. 7b

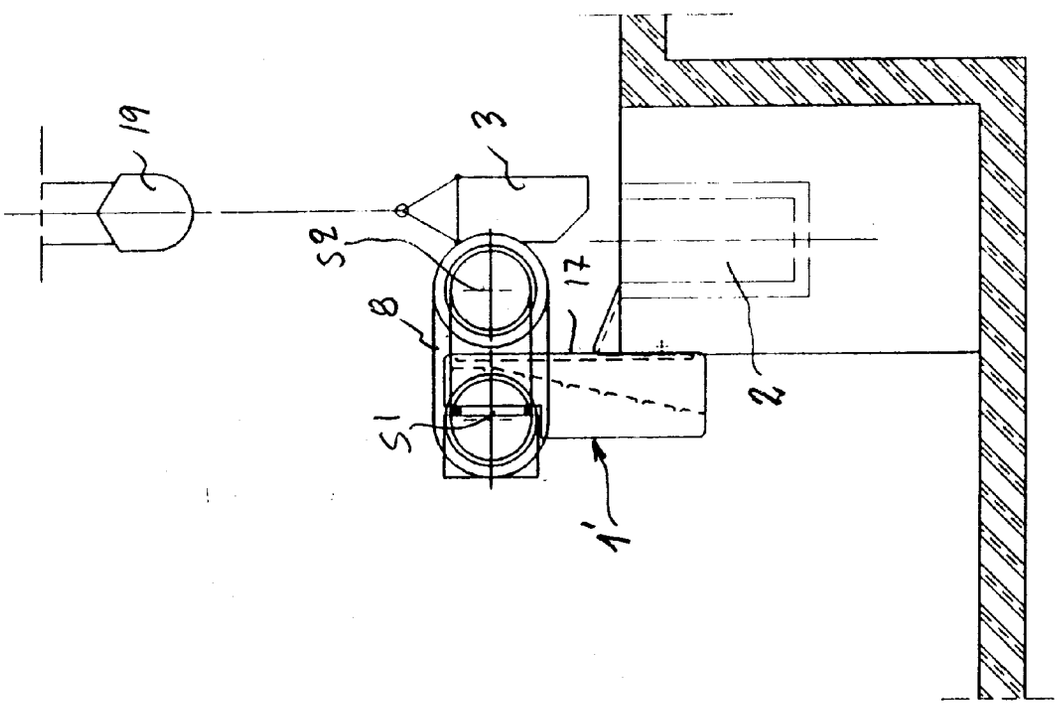

Fig. 7a

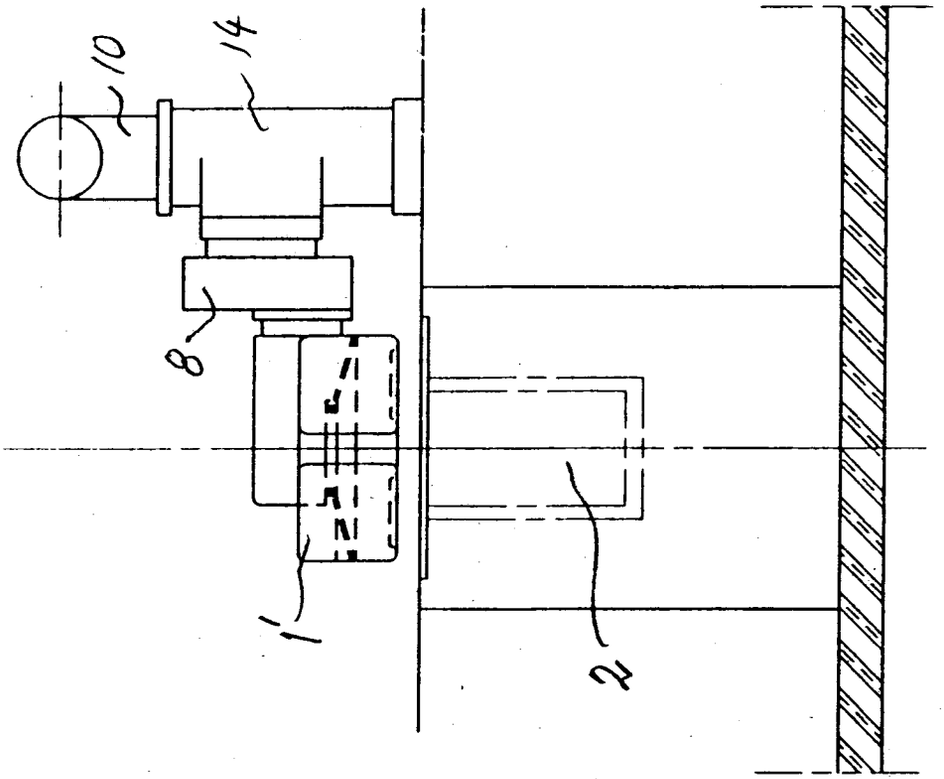

Fig. 8b

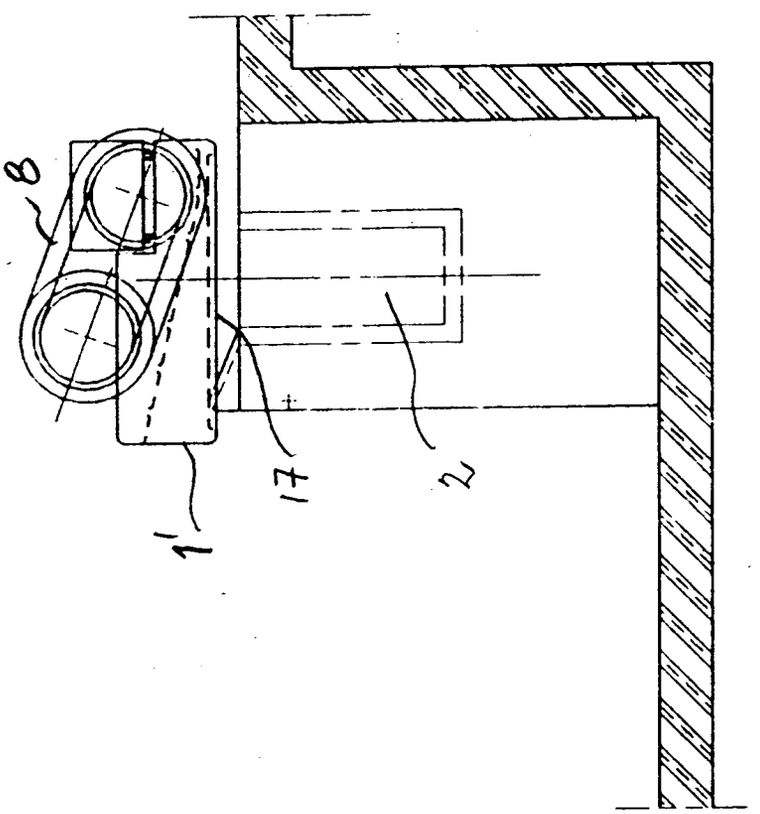

Fig. 8a

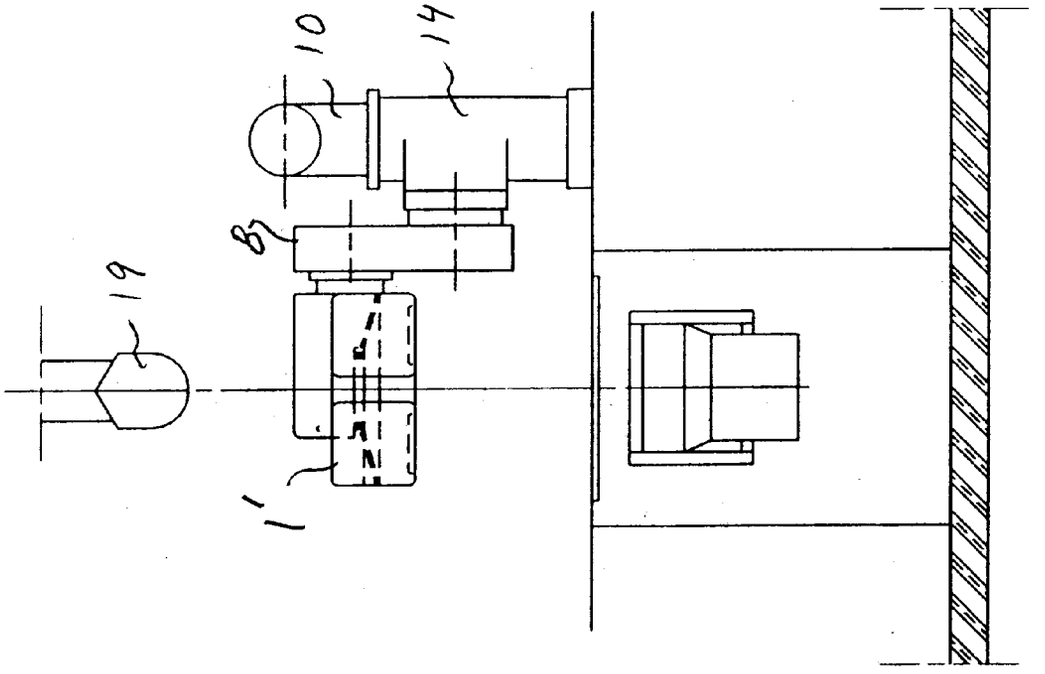

Fig. 9b

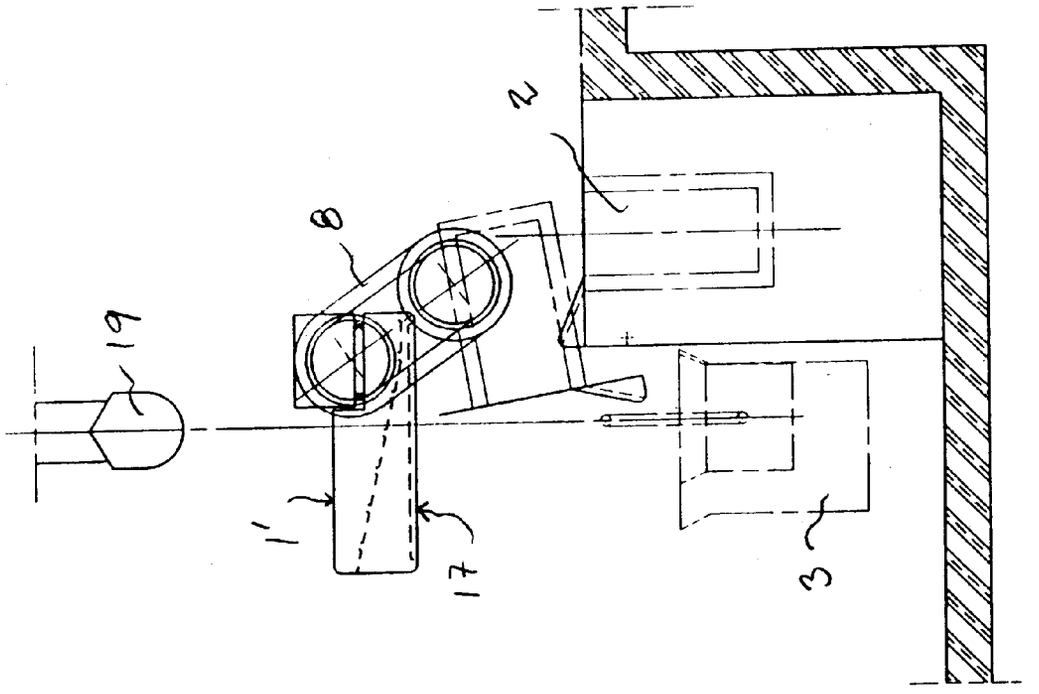

Fig. 9a

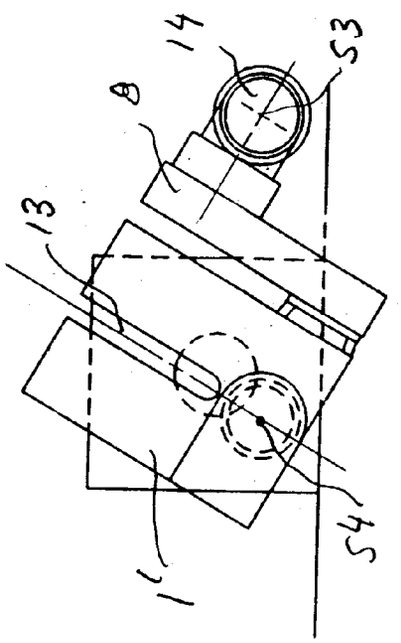

Fig. 10b

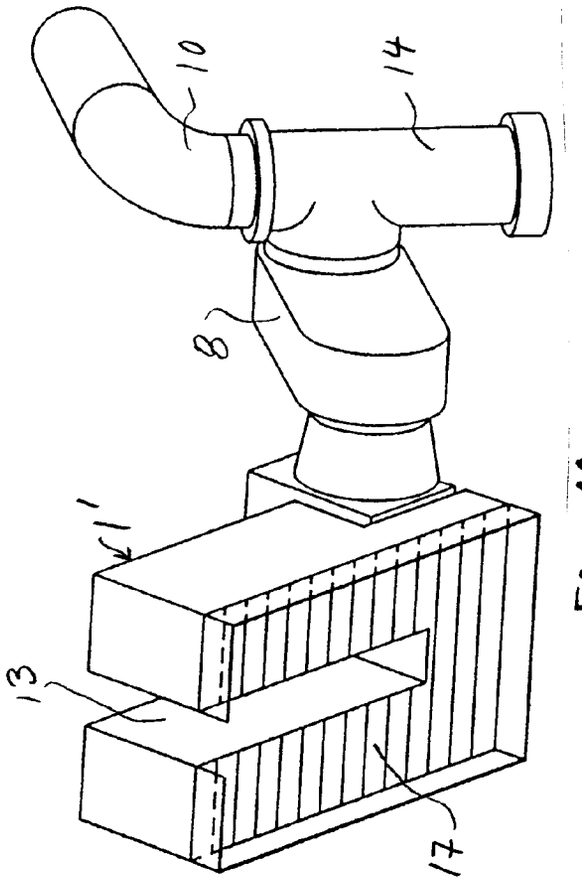

Fig. 11

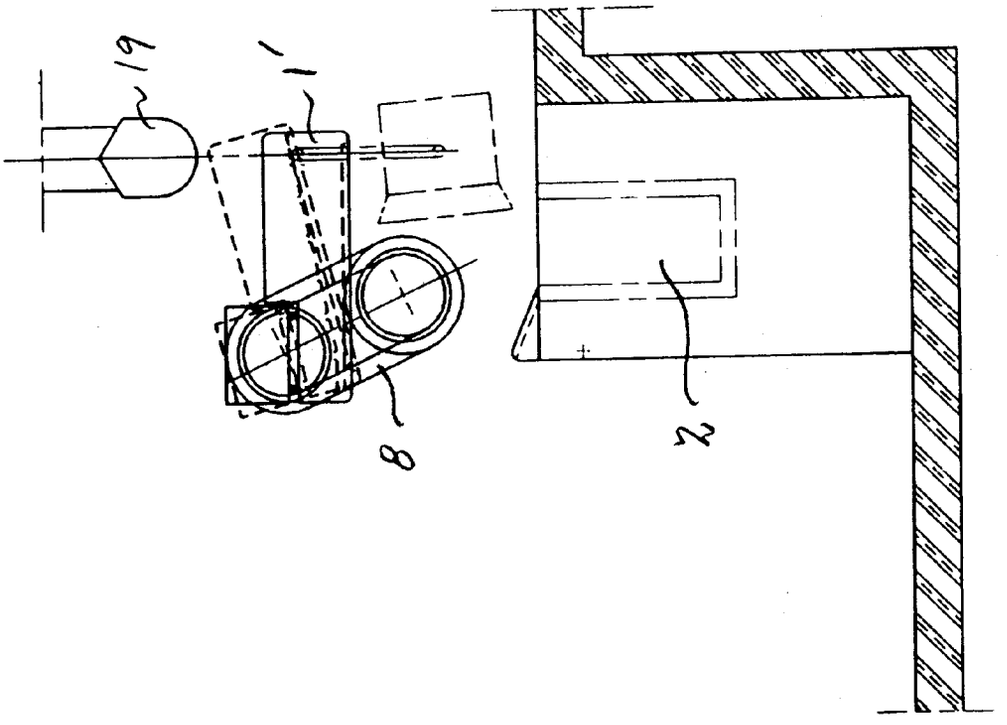

Fig. 10a

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 92 85 0298

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.5)
X	US-A-2 268 918 (J.R.ALLAN) * page 2, line 3 - line 32; figures 3-7 *	1	F27D17/00 C21C5/40 B22D45/00
X	GIESSEREI. vol. 74, no. 5, 2 March 1987, DUSSELDORF DE pages 128 - 129 D.NALASKOWSKI 'Rauchgaserfassung an zwei Induktionsöfen' * page 129; figures 2,3 *	1	B08B15/02
A	US-A-3 999 001 (OVERMYER ET AL.)		
A	STAHL UND EISEN. vol. 81, no. 10, 11 May 1961, DUSSELDORF DE pages 686 - 687 K.GUTHMANN 'Rauchgasbeseitigung bei Lichtbogenöfen'		
A	FR-A-2 254 768 (BROWN,BOVERI & CIE)		TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A,D	SE-A-420 235 (AB BAHCO)		C21C F27D B22D B08B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	20 APRIL 1993	OBERWALLENEY R.P.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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O : non-written disclosure
P : intermediate document

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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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& : member of the same patent family, corresponding document

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