(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 140 653**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **84307179.6**

(22) Date of filing: **18.10.84**

(51) Int. Cl.⁴: **B 08 B 15/00**, F 04 D 29/70

(30) Priority: **18.10.83 GB 8327832**

(43) Date of publication of application: **08.05.85 Bulletin 85/19**

(84) Designated Contracting States: **AT BE CH DE FR GB IT LI LU NL SE**

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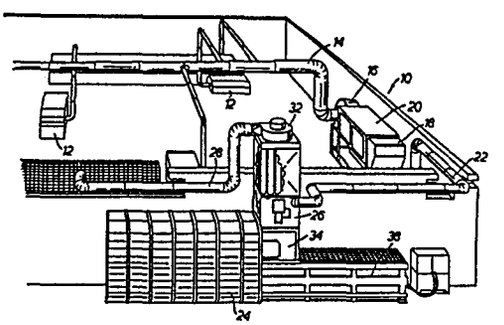
(54) Waste and dust handling system.

(57) The waste and dust handling system described is particularly applicable to the handling of paper waste and associated dust created by machines in the printing, book-binding and allied trades.

The ducting circuit connects a waste bunker (34) to a factory location where waste and dust is generated. A fan (16) creates an air flow in the ducting circuit to carry waste and dust therealong. The fan (16) separates the air flow into major and minor portions and by centrifugal force transfers most of the waste and dust to the minor portion. The air in the major portion is directed back to the factory space via a filter (20) to remove any dust contained in the major portion, and into the minor portion which carries the waste and dust to the waste container (34) where the waste and dust is deposited after which the minor portion of air flow is returned to the factory space.



WASTE & DUST HANDLING SYSTEM

The present invention relates to a waste and dust handling system and is particularly applicable to the handling of paper waste and associated dust created by machines in the printing, book-binding and allied trades.

Dust handling systems are known which extract the air from a factory location, pass the air through a filter and then return the air to the factory.

With such systems, the filters generally become quickly clogged up and so the filters frequently need replacing and cleaning. This entails deactivating the whole system.

Where waste materials such as paper scraps become drawn into the filtration system, the filters become speedily blocked and so can no longer function efficiently.

It is an object of the invention to provide an improved waste and dust handling system.

According to the present invention the waste and dust handling system includes a ducting circuit connecting a waste container to a factory location where waste and dust is generated, and a fan creating an air flow in the ducting circuit to carry waste and dust therealong, the fan being arranged to separate the air flow into a major portion which is directed back to the factory space via a filter to remove any dust contained in the major portion, and into a minor portion which carries the waste and dust to the waste container where the waste and dust is deposited after which the minor portion of air flow is returned to the factory space.

Preferably the fan is of the centrifugal type with an internal scroll directing the major air

flow to a radially inner outlet and the minor air flow to a radially outer outlet.

Conveniently the waste and dust is separated from the minor air flow by a filter of the cyclone type which causes the waste to drop under gravity into the waste container, the dust being trapped in a filter located above the cyclone filter.

An embodiment of the invention will now be described by way of example only with reference to the accompanying drawings in which:-

Figure 1 is a perspective diagrammatic view of a factory layout incorporating a waste and dust handling system according to the present invention;

Figure 2 is a side view partly in section of a separating fan of the system of Figure 1; and

Figure 3 is a perspective view with the cover removed of a cyclone filter of the system of Figure 1.

Referring to the drawings, the factory layout 10 is shown with paper handling machines 12 such as printing or book-binding machines. Solid paper waste and dust generated by the machines is pneumatically conveyed via dusting circuit 14 to a centrifugal fan 16 that separates the air flow into a major portion which is directed back to the factory space via outlet 18 and a filter 20 (to remove any dust contained in that major portion), and into a minor portion which carries the solid waste and dust along ducting 22 to a waste container 24, where the waste and dust is deposited by means of a filter 26 of the cyclone type. After removal of the waste and dust, the minor portion of the air flow is returned along ducting 28 back to the factory space; thus all the air extracted by the fan 16 is returned to the

factory space.

The fan 16 (see Fig. 2) has an impellor (not shown) fitted with a conical boss to prevent the paper waste from 'balling-up'. The fan has a single inlet 16a and an internal scroll 16b which creates the above mentioned major and minor air flows and directs the major air flow to a radially inner large outlet 16c and the minor air flow to a radially outer small outlet 16d. The major portion may be in the range >50% to 70% of the total air flow, and preferably 60%. Associated with the fan is the filter 20 consisting of a plurality of textile filter sleeves 20a through which the major air passes and which removes any dust therefrom prior to the air reaching outlet 18. The upper closed ends of the sleeves are resiliently suspended from a bar connected to pneumatic actuators 30. At convenient times (such as every 8 hours or when the factory is not in operation) the sleeves can be shaken by automatic energisation of the actuators thereby shaking dust from the internal surfaces of the sleeves, the dust falling into the lowermost region of the filter from where it is conveyed by the minor air portion into ducting 22. Ducting 22 carries solid paper waste and dust into the inlet 26a of cyclone filter 26 located outside the factory space. Inlet 26a directs the minor air portion tangentially into the interior of the cyclone filter which includes a perforated metal cylinder and a perforated inverted cone 26b covering the upper end and having an open lower end 26c through which the solid paper waste drop freely under gravity. Air and dust flowing upwardly through the perforations of the cyclone are directed through a plurality of textile filter sleeves 26d (similar to sleeves 20a) which

separate the dust from the air flow before it is returned to the factory space. The upward air flow in the cyclone filter is ensured by a balance fan 32. situated at the top of the filter and operable to maintain a slight negative pressure in the filter. Solid paper waste and dust dropping under gravity from the filter 26 is directed to a waste storage bunker 34 situated directly beneath the filter 26. When the level of waste in the bunker reaches a preset level sensed by a level sensor (not shown), a compactor/baler 38 is activated to compress and compact the waste into the waste container 24. When the container nears or reaches capacity, a sensor on the baler will activate an alarm and/or activate an automatic change-over gate to direct further waste to a second or back-up container.

CLAIMS

1. A waste and dust handling system for removing waste and dust from a factory location where waste and dust is generated, the system comprising

a ducting circuit for extracting air from the factory location and returning it to the factory location, a filter in the ducting circuit

a fan creating an air flow in the ducting circuit to carry waste and dust therealong characterised by a waste container and in that the fan is arranged to separate the air flow into a major portion which is directed back to the factory space via the filter for removing any dust contained in the major portion, and into a minor portion which carries the waste and dust to the waste container where the waste and dust is deposited whereafter the minor portion of air flow is returned to the factory space.

2. A system according to claim 1, characterised in that the fan is of the centrifugal type and has an internal scroll for directing the major air flow to a radially inner outlet and the minor air flow to a radially outer outlet.

3. A system according to claim 1 or to claim 2 characterised in that the waste and dust is separated from the minor air flow by a filter of the cyclone type which causes the waste to drop under gravity into the waste container, the dust being trapped in a filter located above the cyclone filter.

4. A method of handling waste and dust characterised by the steps of

extracting air containing waste and dust from an area to be cleaned,

directing the flow of air containing the waste and dust along a part circular path whereby

centrifugal force applied to the waste and dust will tend to shift the waste and dust into a radially outer part of the path, separating the radially inner and outer parts of the path into separate first and second channels, filtering the air flow passed along the first channel, receiving the air flow from the radially inner part of the path and returning it to said area, and processing the air flow in the second channel by first extracting the waste therefrom and then filtering out the dust before returning the air flow to the said area.

5. A method according to claim 4, characterised by the step of periodically cleaning the filters in the first channel and passing the dust removed into the second channel.

6. A method according to claim 4 or to claim 5 characterised in that the processing step includes passing the air flow through an air cyclone.

7. A waste and dust handling system comprising means for extracting and filtering air containing dust and waste from an area to be cleaned, characterised by centrifugal means for applying centrifugal force to the extracted air to transfer the majority of dust and waste to a selected part of the air flow, means for separating the air flow into first and second separate streams; the first stream containing that part of the air flow where the majority of dust and waste is located, means for filtering the dust out of the air in the second stream and returning the air to said area, means for extracting the waste from the second stream, and means for filtering the remaining dust from the second stream after removal of the waste therefrom and returningthe air flow to said area.

8. A system according to claim 7,

characterised in that the extraction means comprises a cyclone.

9. A system according to claim 7 or to claim 8 characterised in that each said filtering means comprises textile filters.

10. A system according to any one of claims 7 to 9, including a container for receiving the waste collected by the extraction means.

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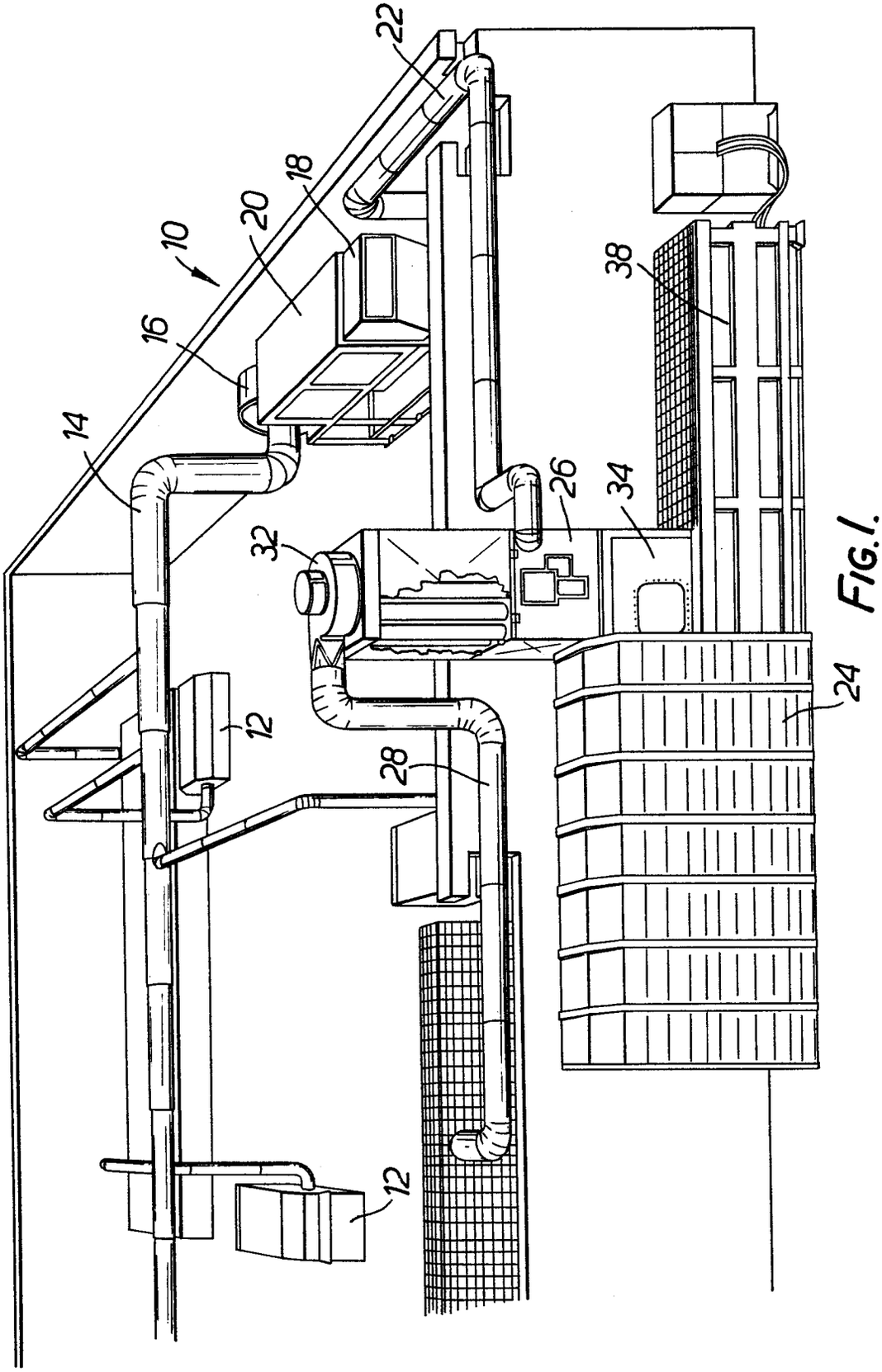

FIG. 1.

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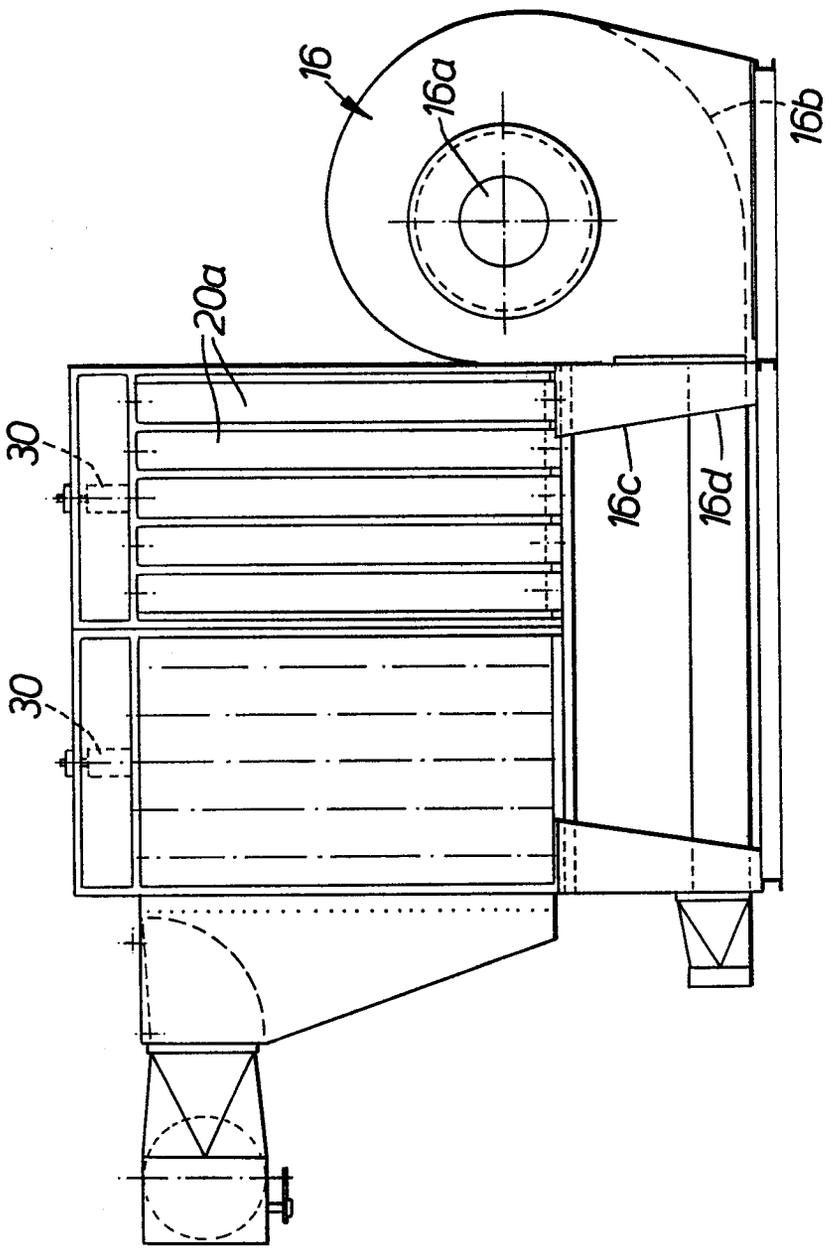

FIG.2.

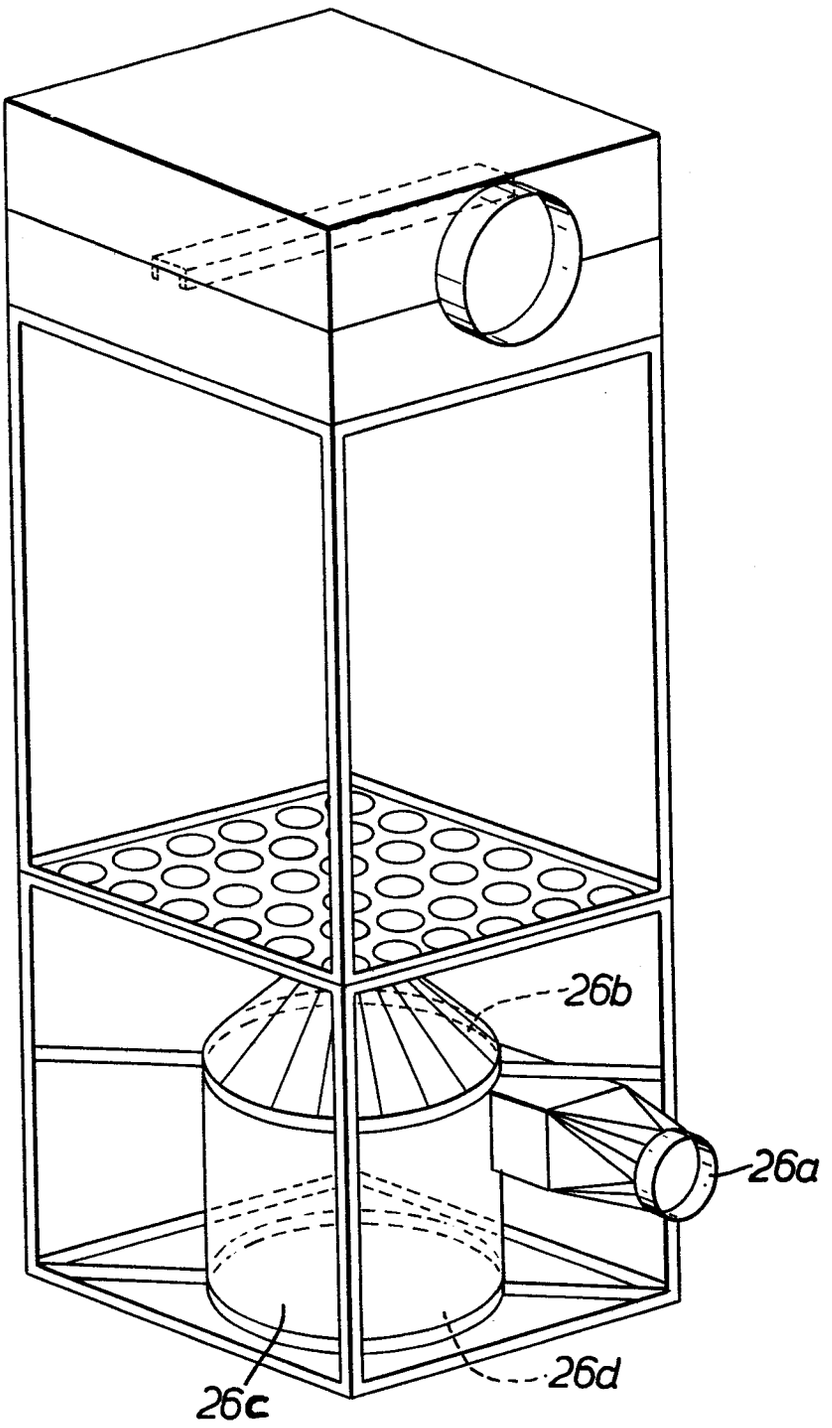

FIG. 3.

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EUROPEAN SEARCH REPORT

0140653
Application number

EP 84 30 7179

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.4)
Y	US-A-3 314 098 (CARSEY) * Whole document *	1,2,4, 6-8	B 08 B 15/00 F 04 D 29/70
Y	GB-A- 345 120 (SIMMEN) * Whole document *	1,2,4, 6-8	
A	FR-A-2 347 289 (AZO) * Page 3, line 33 - page 4, line 4; figure 1 *	1,4,7	
A	GB-A- 558 422 (STURTEVANT)		
A	FR-A-1 279 109 (MINISTERUL INDUSTRIEI BUNURILOR DE CONSUM)		TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	CH-A- 274 963 (PANELVE)		F 04 D B 08 B B 65 G B 01 D 50/00 D 01 H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25-01-1985	DE SCHEPPER H.P.H.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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