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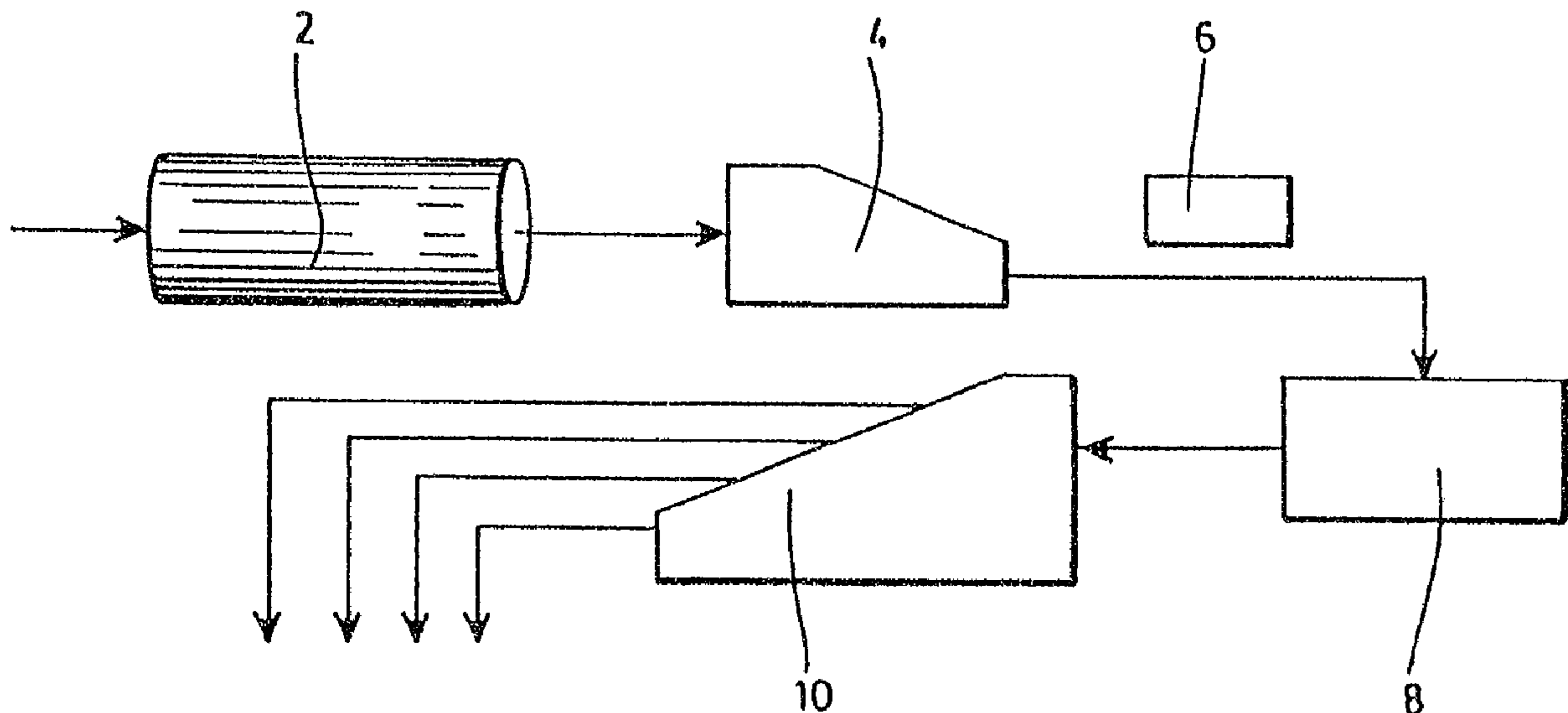
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(54) Titre : VERRE POUR LE TRAITEMENT DES SURFACES DURES, COMPORTANT DES FRAGMENTS DE VERRE;
PROCEDE DE FABRICATION

(54) Title: GLASS MATERIAL FOR TREATING HARD SURFACES, COMPRISING PARTICLES OF BROKEN GLASS,
AND A PROCESS FOR MAKING SAID PARTICLES



(57) Abrégé/Abstract:

The process for making an abrasive material consisting essentially of particles of broken glass, comprises steps of (a) burning recycled glass material including heterogeneous glass pieces, paper and cardboard but excluding fluorescent glass or similar to eliminate paper and cardboard; (b) submitting the glass material obtained from step (a) to an electromagnet to remove unwanted metal pieces; (c) grinding the glass material obtained from step (b) to produce broken glass material; and (d) sieving the broken glass material obtained from step (c) to obtain said particles of broken glass with sieve mesh sizes of grade 4 to grade 60, said particles of broken glass having sharp edges.



ABSTRACT:

The process for making an abrasive material consisting essentially of particles of broken glass, comprises steps of (a) burning recycled glass material including heterogeneous glass pieces, paper and cardboard but excluding fluorescent glass or similar to eliminate paper and cardboard; (b) submitting the glass material obtained from step (a) to an electromagnet to remove unwanted metal pieces; (c) grinding the glass material obtained from step (b) to produce broken glass material; and (d) sieving the broken glass material obtained from step (c) to obtain said particles of broken glass with sieve mesh sizes of grade 4 to grade 60, said particles of broken glass having sharp edges.

FIELD OF THE INVENTION

The invention relates to a glass material for treating hard surfaces by continually hurling the glass material at high velocity against the surfaces, and to a process for making particles of broken glass. More particularly, the present invention relates to an abrasive product made from flat glass or hollow recycled glass. The present invention also relates to glass material to be used as abrasive material on roads.

BACKGROUND OF THE INVENTION

In the field of sandblasting, there are several abrasive products on the market. Concerning down-market products, silica sand is used for most of the applications. It is desirable to replace this product because it is not recommended for several reasons. It has been found that the use of an abrasive containing more than 1% of free silica can cause silicosis as it is the case with the use of silica sand, different beach sands and olivine. Most of these abrasive products are characterized by a large granulometric distribution so that it produces a lot of dust during sandblasting, which is harmful for the health of the user.

Also known on the market, there is an abrasive product made of glass beads which are not harmful for the health for the user, but this product has a low abrasiveness because of its spherical shape without sharp edges and is much more expensive than silica sand.

It is an object of the present invention to provide an abrasive product that has a fairly good abrasiveness, that is not harmful for the health of the user, and that can be produced at a cost similar to the one for producing silica sand.

SUMMARY OF THE INVENTION

According to the present invention, there is provided a Process for making an abrasive material consisting essentially of particles of broken glass, comprising steps of:

(a) burning recycled glass material including heterogeneous glass pieces, paper and cardboard but excluding fluorescent glass and laminates to eliminate paper
10 and cardboard;

(b) coarsely screening the glass material obtained from step (a);

(c) submitting the glass material obtained from step (b) to an electromagnet to remove unwanted metal pieces;

(d) grinding the glass material obtained from step (c) to produce broken glass material; and

(e) sieving the broken glass material obtained from step (d) to obtain said particles of broken glass with
20 sieve mesh sizes of grade 4 to grade 60, said particles of broken glass having sharp edges.

BRIEF DESCRIPTION OF THE DRAWINGS:

Referring now to Figure 1, there is shown in a schematic diagram of the process for making particles of broken glass used for treating hard surfaces;

Figure 2 is an enlarged view of particles of broken glass according to the present invention; and

Figure 3 is an enlarged view of silica sand material that is currently on the market.

The objects, advantages and other features of the present invention will become more apparent upon reading of the following nonrestrictive description of preferred embodiment thereof, given for the purpose of exemplification only with reference to the accompanying drawings.

DETAILED DESCRIPTION OF THE DRAWINGS

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Referring now to figure 1, there is shown in a schematic view a process for making particles of broken glass used for treating hard surfaces by continually hurling the broken glass at high velocity against the surfaces, or used to be spread on roads, in accordance with the present invention. The process comprises steps of burning recycled glass material by means of a rotating burner 2 to eliminate unwanted material such as paper, cardboard, polymer, etc. to decontaminate the recycled glass material; screening coarsely by means of a coarse vibrating screen 4 the glass material obtained from the burning step; submitting the glass material obtained from the screening step to an electromagnet 6 to remove unwanted metal pieces; grinding by means of one or several grinders 8 the glass material obtained from the previous step to produce a broken glass material; and sifting by means of different screenings 10 the broken glass material obtained from the previous step to produce particles of broken glass having sizes of grade 4 (4.75mm) to grade 200 (.075mm), whereby the particles of broken glass can be used for treating hard surfaces, or to be spread on roads.

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By selecting sieve mesh having sizes of grade 4 (4.75mm) to grade 8 (2.36 mm), the particles of broken glass that are screened can be used as an abrasive material to be

spread on roads.

The screenings 10 comprise sieve mesh having sizes of grade 10 to grade 20 so that the particles of broken glass that are screened can be used against building walls.

5 By selecting sieve mesh having sizes of grade 20 to grade 40, the particles of broken glass that are screened can be used against steel girder.

By selecting sieve mesh having sizes of grade 40 to grade 50, the particles of broken glass that are screened
10 can be used against car surfaces.

By selecting sieve mesh having sizes of grade 50 to grade 60, the particles of broken glass that are screened can be used for making a finishing on hard surfaces.

By selecting sieve mesh having sizes of grade 60
15 to grade 200, the particles of broken glass that are screened can be used for making fine finishing on hard surfaces.

Broken glass material having sizes varying from grade 60 to grade 200 can also be incorporated in certain
20 resins used for making paint or glass fibre.

The present invention can be very useful for recycling glass products because it can use recycled glass material containing heterogeneous glass pieces. At the moment, possibilities for using recycled glass material
25 containing heterogeneous glass pieces are very limited. To produce broken glass material according to the present invention, there is no need for sorting out the recycled glass material, which can be very cumbersome.

Another advantage with the present invention
30 resides in the fact that it is possible to obtain abrasive products containing a very low concentration of dust so that the vision of the operator is not reduced by the presence of dust. Also, broken glass material has the advantage of being an inert material.

The particles of broken glass produced according to the present invention are an efficient abrasive for treating hard surfaces to scour, to remove the rust from the surface, to clean the surface, to engrave a hard surface, to
5 produce a given texture or to make the surface shiny so that it provides a better adhesion for paint, glue or similar products.

Referring now to Figures 2 and 3, where there are shown respectively enlarged views by 128 times the particles
10 of broken glass according to the invention, and silica sand material. Figure 2 shows particles of broken glass having sizes of grade 20 to grade 30. Figure 3 shows silica sand having a size of grade 24.

From these figures, the shape of the particles of
15 broken glass and silica sand can be easily examined. These figures show that the shape of the two products is very similar. The particles have sharp edges so that an efficient scouring can be obtained by continually hurling the material at high velocity against the surface. It has been found that
20 the particles of broken glass can be used for making outdoor works on faces of building or the surface of bridge structure that are considered difficult works. Also, the particles of broken glass can be used inside a shop and can be recycled for many uses. The method for using the
25 particles of broken glass as abrasive is substantially the same as the one used for silica sand. The particles are hurled at high velocity under a pressure of 60 to 100 PSI. The nozzle by which the particles are hurled is kept from the surface at a distance of 12 inches to 24 inches at an
30 angle of 30° to 60°.

The particles of broken glass can also be used as abrasive over icy surfaces by simply spreading the broken glass material over the icy surface. As the broken glass material has particles that are very small, there is no

danger for pedestrians. Also, this product is not harmful to surfaces made of cement which are eaten into by calcium but not by glass material. Also, it has been found that glass material made according to the present invention can be
5 incorporated into cement material to provide protection against vermin.

During preliminary production test, particles of broken glass having sizes of grade 10 to grade 20; and grade 20 to grade 30 have been produced. Granulometric
10 distributions of these products are shown respectively in Tables I and II. Table III shows the granulometric distribution of silica sand grade 24. These tables show clearly that the product according to the present invention is characterized by a very low concentration of dust with
15 respect to the silica sand material.

TABLE I

20	# Mesh sieve size	Product obtained
	10 (2mm)	0,1
	20 (850µm)	53,5
	30 (600µm)	36,5
	40 (425µm)	8,8
25	50 (300µm)	1,0
	<u>Smaller</u>	<u>0,1</u>
		100,0

TABLE II

30	# Mesh sieve size	Product obtained
	10 (2mm)	0,1
	20 (850µm)	0,3

	30 (600μm)	54,3
	40 (425μm)	40,3
	50 (300μm)	4,8
	<u>Smaller</u>	<u>0,2</u>
5		100,0

10

TABLE III

	# Mesh sieve size	Product obtained
	10 (2mm)	0,0
15	20 (850μm)	6,9
	30 (600μm)	28,4
	40 (425μm)	24,0
	50 (300μm)	18,0
	<u>Smaller</u>	<u>22,7</u>
20		100,0

Although the present invention has been explained hereinabove by way of a preferred embodiment thereof, it should be pointed out that any modifications to this preferred embodiment within the scope of the appended claims is not deemed to alter or change the nature and scope of the present invention.

WHAT IS CLAIMED IS:

1. Process for making an abrasive material consisting essentially of particles of broken glass, comprising steps of:

(a) burning recycled glass material including heterogeneous glass pieces, paper and cardboard but excluding fluorescent glass and laminates to eliminate paper
10 and cardboard;

(b) coarsely screening the glass material obtained from step (a);

(c) submitting the glass material obtained from step (b) to an electromagnet to remove unwanted metal pieces;

(d) grinding the glass material obtained from step (c) to produce broken glass material; and

(e) sieving the broken glass material obtained from step (d) to obtain said particles of broken glass with
20 sieve mesh sizes of grade 4 to grade 60, said particles of broken glass having sharp edges.

2. Process according to claim 1, wherein said step (e) is carried out to obtain said particles of broken glass with sieve mesh sizes of grade 10 to grade 20.

3. Process according to claim 1, wherein said step (e) is carried out to obtain said particles of broken glass with sieve mesh sizes of grade 20 to grade 40.

4. Process according to claim 1, wherein said step (e) is carried out to obtain said particles of broken
30 glass with sieve mesh sizes of grade 40 to grade 50.

5. Process according to claim 1, wherein said step (e) is carried out to obtain said particles of broken glass with sieve mesh sizes of grade 50 to grade 60.

6. Process according to claim 1, wherein said step (e) is carried out to obtain said particles of broken glass with sieve mesh sizes of grade 4 to grade 8.

7. An abrasive material consisting essentially of particles of broken glass, provided from heterogeneous glass pieces but excluding fluorescent glass, the particles
10 having sharp edges and having mesh sieve sizes of grade 4 to grade 60, whenever obtained by the process of claim 1.

8. An abrasive material consisting essentially of particles of broken glass to treat building walls, provided from heterogeneous glass pieces but excluding fluorescent glass, the particles having sharp edges and having mesh sieve sizes of grade 10 to grade 20, whenever obtained by the process of claim 2.

9. An abrasive material consisting essentially of particles of broken glass to treat steel girder, provided
20 from heterogeneous glass pieces but excluding fluorescent glass, the particles having sharp edges and having mesh sieve sizes of grade 20 to grade 40, whenever obtained by the process of claim 3.

10. An abrasive material consisting essentially of particles of broken glass to treat car surfaces, provided from heterogeneous glass pieces but excluding fluorescent glass, the particles having sharp edges and having mesh

sieve sizes of grade 40 to grade 50, whenever obtained by the process of claim 4.

11. An abrasive material consisting essentially of particles of broken glass to make a finishing on hard surfaces, provided from heterogeneous glass pieces but excluding fluorescent glass, the particles having sharp edges and having mesh sieve sizes of grade 50 to grade 60, whenever obtained by the process of claim 5.

10 12. An abrasive material consisting essentially of particles of broken glass for roads, provided from heterogeneous glass pieces but excluding fluorescent glass, the particles having sharp edges and having mesh sieve sizes of grade 4 to grade 8, whenever obtained by the process of claim 6.

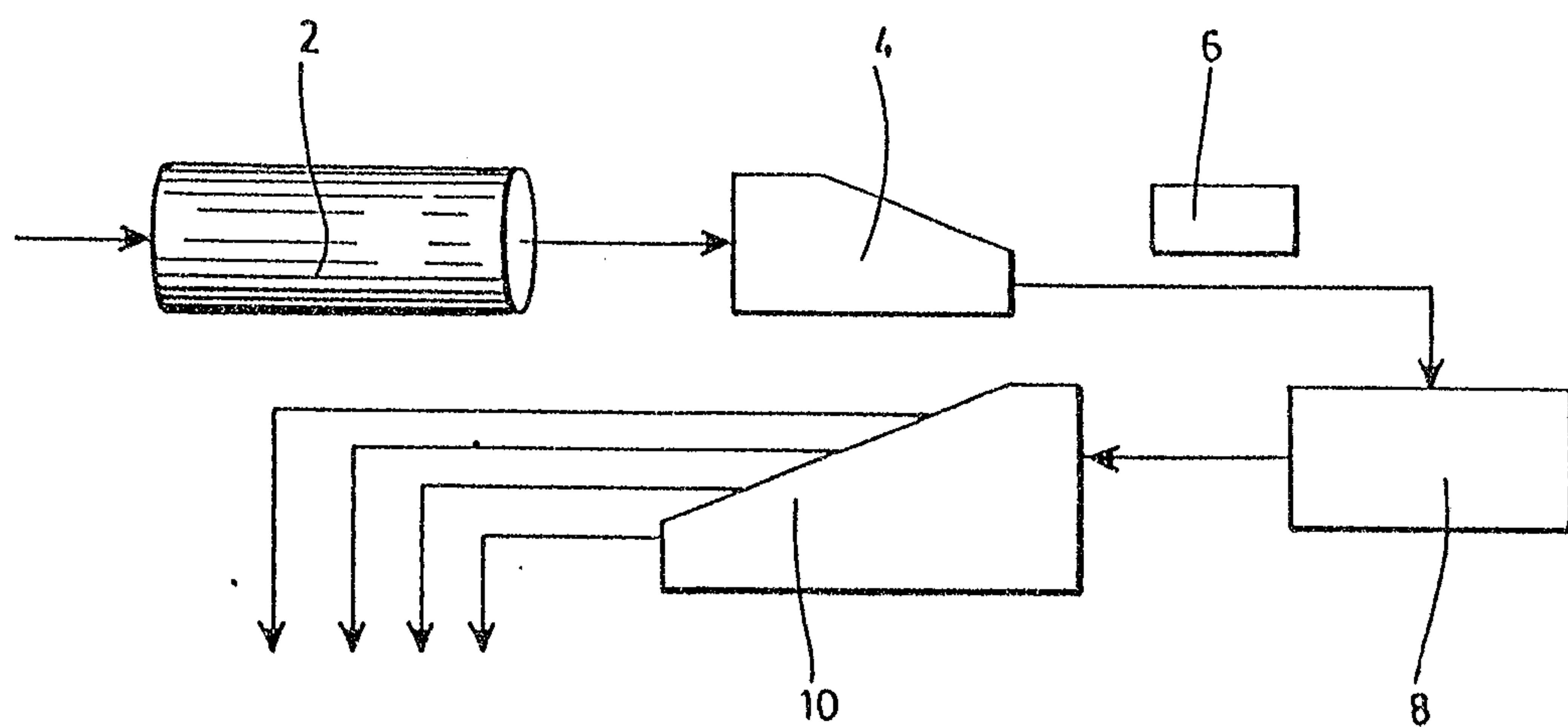


FIG. 1



FIG. 2



FIG. 3

