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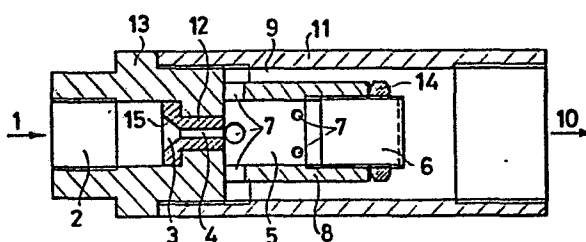
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⑤④ Equipment for stabilizing mixtures of coal, oil and water.

⑤⑦ A static equipment for stabilizing mixtures of coal, oil and water is disclosed, which comprises a feeding duct in communication with a convergent cone frustum shaped duct, which continues into a constant-section duct leading to a chamber [chamber (a)] whose transversal dimensions are greater than those of the constant-section duct, wherein the chamber (a) has a volume which can be varied as required, by means of a movable adjustable bottom and is provided on its side wall with a set of holes, said holes placing the chamber (a) in communication with a discharge chamber [chamber (b)] annular and coaxial with the chamber (a).

Fig.2



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The present invention relates to a static emulsifier for the production of stable mixtures of water, coal and oil.

In the present state of the art, no static emulsifiers exist for use for mixtures of coal and oil.

It is however known an emulsifying device suitable to produce stable emulsions of water in fuel oil.

For the description of such a device we avail ourselves of hereto attached fig. 1.

Such a device is constituted by a convergent conical duct (1), followed by a short length of constant-section duct (2) ending into a plenum chamber (3) of cylindrical section in communication with a discharge duct (4).

The mixture to be emulsified (5) delivered under pressure to the convergent duct runs, at high speed, through the short duct of constant section and enters then the plenum chamber; inside this chamber the emulsifying of the mixture occurs, the emulsified mixture leaving (6) the device through the discharge duct.

The device operates on the basis of the superimposition of a plurality of physical phenomena whose effect is of notably reducing the size of water drops, thus originating a homogeneous emulsion.

Said device is poorly suitable to stabilize mixtures of coal, fuel oil and water.

A static equipment suitable to homogenize above all mixtures of coal, oil and water has been found, which allows a stable mixture to be obtained.

The equipment which is the object of the present invention comprises a feeding duct in communication with

a duct of convergent cone-frustum shape, which continues into a duct of constant section, leading to a chamber [chamber (a)] whose transversal dimensions are greater than those of the constant-section duct, wherein the chamber (a) has a volume which can be varied as required by means of a movable adjustable bottom and is provided in its lateral wall with a set of holes, said holes placing the chamber (a) in communication with a discharge chamber [chamber (b)] annular and coaxial with the chamber (a).

The angle between the greater base and the lateral surface of the cone-frustum shaped duct is preferably comprised between 50° and 70° and more preferably is in the region of 60° .

The chamber (a), plenum chamber, is preferably of cylindrical shape.

The feeding duct, the convergent cone-frustum shaped duct and the constant-section duct can be provided in a single metal block or in two or more metal blocks.

The diameter of the chamber (a) and the diameter of the constant-section duct are so selected as to obtain between the inlet of the constant-section duct and the chamber (a) a drop of mixture pressure greater than 3 bar, more preferably of about 5 bar.

For simpleness' sake in equipment construction, it can be preferable to select the diameter of the plenum chamber equal to the diameter of the feeding duct.

The equipment being the object of the present invention shall be now illustrated with reference to hereto attached fig. 2 which represents an embodiment thereof, which is not to be considered as a limitation of the in-

vention.

The mixture of coal, oil and water (1) enters, delivered under pressure, the equipment, runs through the feed
ign duct (2), then through the convergent cone-frustum
5 shaped duct (3), subsequently at high speed through the
duct of constant section (4), and penetrates then into
the chamber (5) [chamber (a)], called plenum chamber, of
cylindrical shape with movable adjustable bottom (6), go
ing to collide with the same bottom of said chamber.

10 Because of the collision of the mixture with the bot-
tom of the chamber a fine suddivision occurs of the com-
ponents of the mixture, the homogenizing of the same mix-
ture being thus obtained. The mixture, after having been
homogenized, passes from the plenum chamber through a
15 plurality of holes (7) uniformly distributed in the lateral
wall (8) of said chamber into the discharge chamber
(9) annular and coaxial to the said plenum chamber and
leaves (10) the device.

The discharge chamber is bounded by the outer wall
20 of the plenum chamber and by a cylindrical manifold (11).
The feeding duct, the cone-frustum shaped duct and the
duct of constant section are made in two blocks (12) and
(13).

The movable adjustable bottom allows the length and
25 obviously the volume of the plenum chamber to be varied
above all on the basis of the flow rate and of the com-
position of the mixture.

There is schematically shown with (14) a nut for the
locking of the movable bottom of the plenum chamber,
30 with (15) the angle comprised between the major base
and the lateral wall of the cone-frustum shaped duct.

An example is now reported having the purpose of illustrating the use of the equipment which is the object of the invention.

Example

5 A coal has been ground down to the following granulometry:

100%	100 mesh
80%	200 mesh
40%	325 mesh

10 The ground coal has been mixed first with an amount of water of about 22.2% by weight relatively to the coal and then with heavy fuel oil; the mixture formed has been homogenized by stabilization in the equipment described in fig. 2.

15 The most representative dimensions of the equipment are:

	diameter of the constant-section duct	2	mm
	length of the constant-section duct	10	mm
	diameter of cone-frustum shaped duct major base	12,4	mm
20	length of the cone-frustum shaped duct	3	mm
	diameter of the holes	5	mm
	length of the plenum chamber	35	mm
	diameter of the plenum chamber	15	mm
	angle between the major base and the lateral wall of the cone-frustum shaped duct	60°	

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The diameter of the plenum chamber and the diameter of the constant-section duct have been so selected, as to obtain a 5 bar drop in mixture pressure between the inlet of the constant-section duct and the plenum chamber.

30 A stable mixture with the following composition has been obtained:

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fuel oil

45% by weight

coal

45% by weight

water

10% by weight

C l a i m s

1. Static equipment for stabilizing mixtures of coal, oil and water, characterized in that it comprises a feeding duct in communication with a duct of convergent cone-frustum shape, which continues into a duct of constant section, leading to a chamber [chamber (a)] whose trans-
5 versal dimensions are greater than those of the constant-section duct, wherein the chamber (a) has a volume which can be varied as required by means of a movable adjustable bottom and is provided in its side wall with a set of
10 holes, said holes placing the chamber (a) in communication with a discharge chamber [chamber (b)] annular and coaxial with the chamber (a).
2. Equipment according to claim 1, wherein the chamber (a) is a cylindrical chamber.
- 15 3. Equipment according to claim 1, wherein the feeding duct, the convergent cone-frustum shaped duct and the constant-section duct are provided in a single metal block.
4. Equipment according to claim 1, wherein the feeding duct, the convergent cone-frustum shaped duct and the
20 constant-section duct are provided in two or more metal blocks.
5. Equipment according to claim 1, wherein the angle between the greater base of the cone-frustum shaped duct and the lateral surface of said duct is comprised within
25 the range of from 50° and 70°.
6. Equipment according to claim 5, wherein the angle is in the region of 60°.
7. Equipment according to claim 2, wherein the diameter of the cylindrical chamber (a) is equal to the dia-
30 meter of the feeding duct.

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8. Equipment as disclosed and represented.

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