

The invention relates to a feeding device having having a charging hopper and a contiguous feeding chute, at the bottom end of which charging hopper there are provided charging rams for conveying refuse to a combustion plant.

A feeding device of this kind is known from DE 25 38 380 A1.

Refuse is an extremely heterogeneous fuel which occurs in a variety of compositions, so that difficulties can occur when charging the combustion plant. The difficulties are based on the fact that, according to its nature, the refuse slides more easily in one case and thus has the tendency to slide from the charging hopper into the combustion plant, and it is bulkier in the case of a different composition and does not slide well. The result of this is that, despite a uniform mode of operation of the charging rams, varying quantities of refuse are fed and, in conjunction with the varying heating values of the refuse, can lead to a greatly fluctuating release of heat and thus to a fluctuating heating power of the combustion plant.

The object of the invention is to design the feeding device of the type described initially in such a way that the refuse is prevented from sliding across the charging rams and uniform feeding of the refuse into the combustion plant is ensured.

In accordance with the invention, this object is achieved by the characterising features of claim 1.

The quantity of refuse introduced into the charging hopper is prevented from sliding across the charging rams in an uncontrolled manner by disposing at least one hold-back and compression member on at least one charging ram. In addition to this hold-back function, the refuse is compressed somewhat by this hold-back and compression member even during the

return stroke of the charging ram, so that the refuse is compressed, particularly in the case of very loose refuse, whereby the density of the refuse is increased, and improved metering of the pre-compressed refuse by the next forward stroke of the charging ram is possible.

Further advantageous developments of the invention result from the sub-claims.

The hold-back and compression members may be provided in the region of the front ends of the charging rams or directly at the front end of the charging rams. A plurality of hold-back and compression members may be disposed on each charging ram, and the hold-back and compression members may be disposed side by side or staggered relative to one another. Alternatively, however, it is possible for the hold-back and compression member of a charging ram to be in the form of a member extending over the entire width of the charging ram.

The hold-back and compression members of adjacent charging rams may be staggered relative to one another or in alignment with one another.

Differing designs of the hold-back and compression members may be advantageous according to the composition of the refuse and dependent upon the angle at which the flow of the mass of refuse moves onto the charging rams.

In a specific combination of these conditions, a first advantageous development for achieving the hold-back and compression action may reside in the hold-back and compression members having a steeply inclined flank towards the rear end of the charging ram and a less steeply inclined flank towards the front end of the charging ram. As a result of this, the driving action exerted by these members on the refuse lying loosely on the charging ram during the forward stroke of the

charging ram is smaller than the hold-back and compression action during the return stroke of the charging ram.

In a different combination of the above-mentioned conditions, it may be advantageous if, in accordance with another development of the invention, the hold-back and compression members have a less steeply inclined flank towards the rear end of the charging ram and a more steeply inclined flank towards the front end of the charging ram.

The hold-back and compression members may be designed as flat members disposed on edge and having a rectangular, trapezoidal, triangular, or arcuate outline in side elevation. Alternatively, however, the hold-back and compression members may be designed in the manner of a pyramid, a truncated pyramid, a cone, a truncated cone or a spherical cup.

The invention will be further described hereinafter with reference to embodiments illustrated diagrammatically in the drawings.

In the drawings:

Fig. 1 is a section through a feed device having charging rams;

Fig. 2 is a front elevation of the charging ram of Fig. 1;

Fig. 3 is a plan view of the charging ram of Fig. 2; and

Fig. 4 is a plan view, corresponding to Fig. 3, of a modified embodiment.

As will be seen in Fig 1, a feeding device comprises a charging hopper 1, a feeding chute 1 contiguous thereto, a feeding table 3 and charging rams 4 which are movable back and

forth on the feeding table 3 and which push the refuse, introduced into the charging hopper 1 and sliding down in the feeding chute 2, over the charging edge 5 onto a grating 6 of a combustion plant.

As will be seen in conjunction with Figs. 2 and 3, hold-back and compression members 7 are disposed on each charging ram 4 in the front region of each charging ram. Some of these hold-back and compression members 7 have a less steeply inclined flank 8 directed towards the front end of the charging ram, and a steeply inclined flank 9 directed towards the rear end of the charging ram 4. It is thereby ensured that, during its forward stroke, the ram conveys the refuse predominantly by its front face 10, that is, it pushes ahead only the refuse lying on the supporting table 3, whilst two different actions are to be achieved by the steep, rearward flank 9 of the hold-back and compression members. The first action resides in the fact that the refuse, sliding downwardly in the feeding chute 2, does not slide over charging rams 4 in an uncontrolled manner, and the second desired action resides in compressing the refuse, sliding downwardly in the feeding chute 2, by a respective hold-back and compression member during the return stroke, the refuse being carried along only during the next, forwardly directed stroke of the ram. The compressing of the refuse results in a greater mass density of the refuse and thus of the fuel, and, moreover, the quantity fed is more readily controllable and is thus homogenized.

Some other hold-back and compression members 7 have a steeply inclined flank 12 directed towards the front end of the charging ram 4, and a less steeply inclined flank 11 directed towards the rear end of the charging ram 4. This may be advantageous if the feeding chute lies at a very steep angle to the charging rams, so that there is less possibility of the risk of uncontrolled sliding through, although the refuse is relatively loose and has to be subjected to compression. The flank inclined less steeply to

the rear produces a compression component directed substantially in the opposite direction to the refuse sliding down, whereby the refuse is adequately pre-compressed. During the following forward stroke of the charging ram, the steeply inclined flank increases the feed possibility of the charging ram which, in the case of a less steep front flank, is chiefly performed only by the front face 10 of the charging ram.

Corresponding to the illustration in Figs. 2 to 4, the hold-back and compression members 7 may have a wide variety of shapes. Some examples of various possibilities for the shapes of the hold-back and compression members are shown in the drawings on the individual charging rams disposed side by side on the feeding table 3, although, in practice, a single embodiment is chosen for all charging rams for a feeding device.

For the purpose of explaining the various shapes, the individual charging rams are provided with the reference numeral 4 and an additional letter, and the hold-back and compression members are provided with the reference numeral 7 and likewise with an additional letter. Nine charging rams 4a - 4i are provided in the illustrated embodiment, a different variant of a hold-back and compression member being provided on each charging ram.

Two hold-back and compression members 7a constructed in the manner of a truncated cone are provided on the charging ram 4a in the vicinity of the front edge of the charging ram 4a, the forwardly directed flank 8 of which hold-back and compression members is inclined less steeply than the rearwardly directed flank 9, as will be seen in Fig. 3. This likewise applies to all other embodiments, with the exception of the hold-back and compression members 7g on the charging ram 4g. Two identical hold-back and compression members 7b are again provided on the charging ram 4b and are in the form of narrow members standing on edge. The outer outline of

these hold-back and compression members 7b is substantially trapezoidal in side elevation, wherein, here also, the forwardly directed flank 8 is substantially less steep than the flank 9 directed towards the rear end of the charging ram.

The hold-back and compression members 7c on the charging ram 4c are constructed in the manner of a pyramid, whilst the hold-back and compression members 7d on the charging ram 4d are designed as spherical cups. The hold-back and compression members 7e on the charging ram 4e are designed in the manner of a truncated pyramid, wherein, here also, as in the case of the other hold-back and compression members described previously, the forwardly directed flank 8 of these members is substantially less steeply inclined than the flank 9 directed towards the rear end of the charging ram. Flat hold-back and compression members 7f are disposed on edge on the charging ram 4f and have side walls at right angles to the surface of the ram and are triangular in side elevation with a front, less steeply inclined flank 8 and a flank 9 inclined steeply to the rear. The hold-back and compression members 7h on the charging ram 4h are likewise designed as flat members with an arcuate outline. A single hold-back and compression member 7i is disposed on the charging ram 4i and extends over the entire width of the charging ram and has a triangular cross section with a less steep front flank 8 and a steeper rear flank 9. Flat hold-back and compression members 7h disposed on edge and having a triangular outline in side elevation are disposed on the charging ram 4h and, in contrast to the other hold-back and compression members, their rearwardly directed flank 11 is inclined less steeply and their forwardly directed flank 12 is steeply inclined.

With one exception, the same hold-back and compression members as in Fig 3 are provided in Fig. 4, although these hold-back members are staggered relative to one another on one and the same charging ram in each case, so that, with regard to all the charging rams, two rows of hold-back and

compression members in alignment with one another ensue, whilst, in the embodiment of Fig. 3, all hold-back and compression members are disposed in alignment with one another. The charging ram 4i in Fig. 4 carries only a single hold-back and compression member 7k., although, in contrast to the development shown in Fig. 4, its longitudinal axis is disposed in the longitudinal direction of the charging ram. It has a rectangular outline in side elevation.



Patent Claims

1. A feeding device having a charging hopper (1) and a contiguous feeding chute (2), at the bottom end of which charging hopper there are provided charging rams (4) for conveying refuse to a combustion plant, characterised in that there is disposed on the top of at least one charging ram (4) at least one hold-back and compression member (7) having a hold-back and compression surface (8, 9) effective in and/or opposite to the conveying direction of the charging ram (4).
2. A feeding device as claimed in claim 1, characterised in that the hold-back and compression members (7) are provided in the region of the front ends of the charging rams (4).
3. A feeding device as claimed in claim 1 or 2, characterised in that the hold-back and compression members (7) are provided directly at the front end of the charging rams (4).
4. A feeding device as claimed in one of the claims 1 to 3, characterised in that a plurality of hold-back and compression members (7) is disposed on each charging ram (4).
5. A feeding device as claimed in claim 4, characterised in that the hold-back and compression members (7) are disposed side by side.
6. A feeding device as claimed in claim 4, characterised in that the hold-back and compression members (7) are staggered relative to one another.
7. A feeding device as claimed in one of the claims 1 to 3, characterised in that the hold-back and compression member



(7i) of a charging ram (4) is in the form of a member extending over the entire width of the charging ram (4).

8. A feeding device as claimed in one of the claims 1 to 7, characterised in that the hold-back and compression members (7) of adjacent charging rams (4) are staggered relative to one another.
9. A feeding device as claimed in one of the claims 1 to 7, characterised in that the hold-back and compression members (7) of adjacent charging rams (4) are in alignment with one another.
10. A feeding device as claimed in one of the claims 1 to 9, characterised in that the hold-back and compression members (7) have a steeply inclined flank (9) towards the rear end of the charging ram (4) and a less steeply inclined flank (8) towards the front end of the charging ram (4).
11. A feeding device as claimed in one of the claims 1 to 9, characterised in that the hold-back and compression members (7) have a less steeply inclined flank (11) towards the rear end of the charging ram (4) and a more steeply inclined flank (12) towards the front end of the charging ram (4).
12. A feeding device as claimed in one of the claims 1 to 9, characterised in that the hold-back and compression members (7k) are designed as flat members disposed on edge and having a rectangular outline in side elevation.
13. A feeding device as claimed in one of the claims 1 to 11, characterised in that the hold-back and compression members (7b) are designed as flat members disposed on edge and having a trapezoidal outline in side elevation.



14. A feeding device as claimed in one of the claims 1 to 11, characterised in that the hold-back and compression members (7f) are designed as flat members disposed on edge and having a triangular outline in side elevation.
15. A feeding device as claimed in one of the claims 1 to 11, characterised in that hold-back and compression members (7g) are designed as flat members disposed on edge and having an arcuate outline in side elevation.
16. A feeding device as claimed in one of the claims 1 to 11, characterised in that the hold-back and compression members (7c, 7e) are designed in the manner of a pyramid or a truncated pyramid.
17. A feeding device as claimed in one of the claims 1 to 11, characterised in that the hold-back and compression members (7a) are designed in the manner of a cone or a truncated cone.
18. A feeding device as claimed in one of the claims 1 to 11, characterised in that the hold-back and compression members (7d) are designed in the manner of a spherical cup.