March 4, 1958 E. C. HALE ET AL 2,825,388

DISPERSER FEED DEVICE

Filed May 31, 1956 3 Sheets-Sheet 1

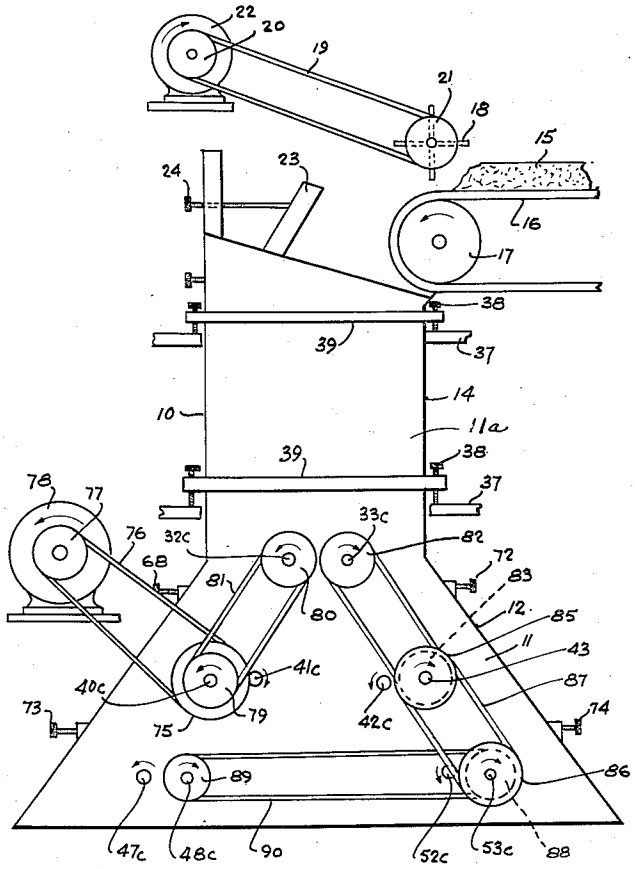


Fig. 1.

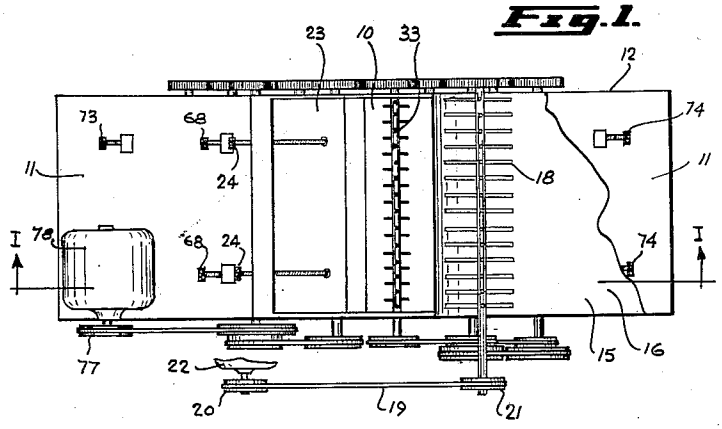


Fig. 2.

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DISPERSER FEED DEVICE

Filed May 31, 1956 3 Sheets-Sheet 2

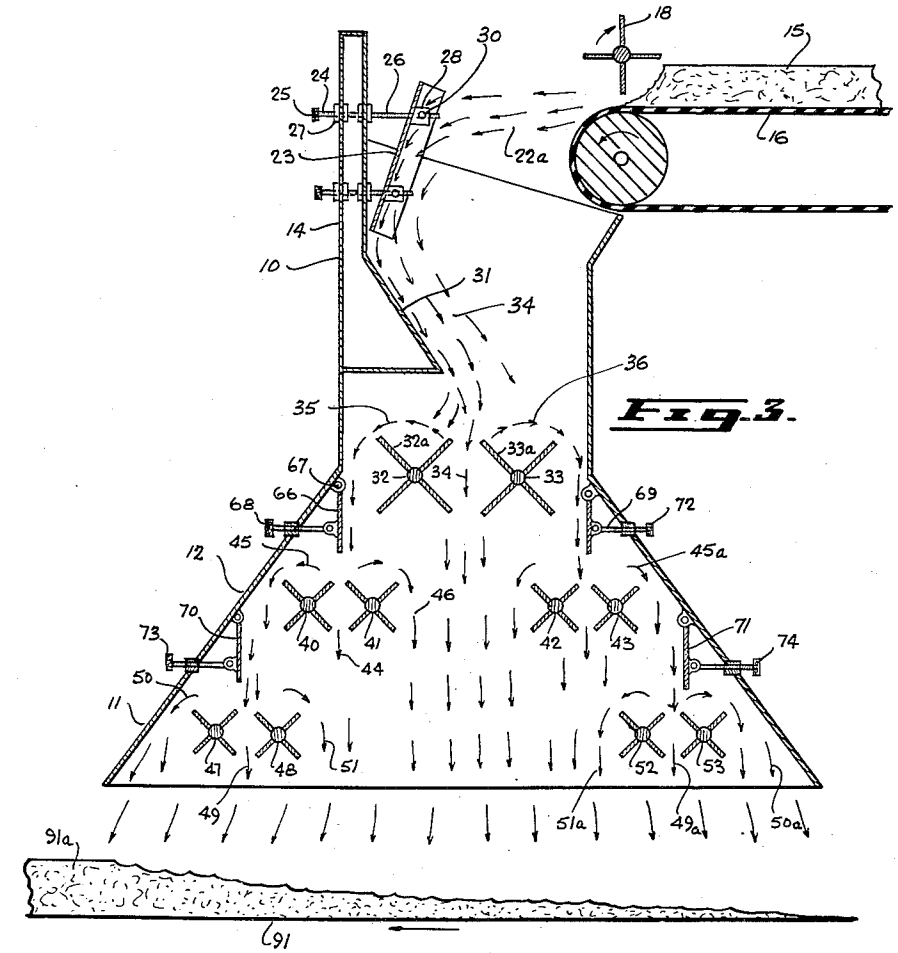


Fig. 3.

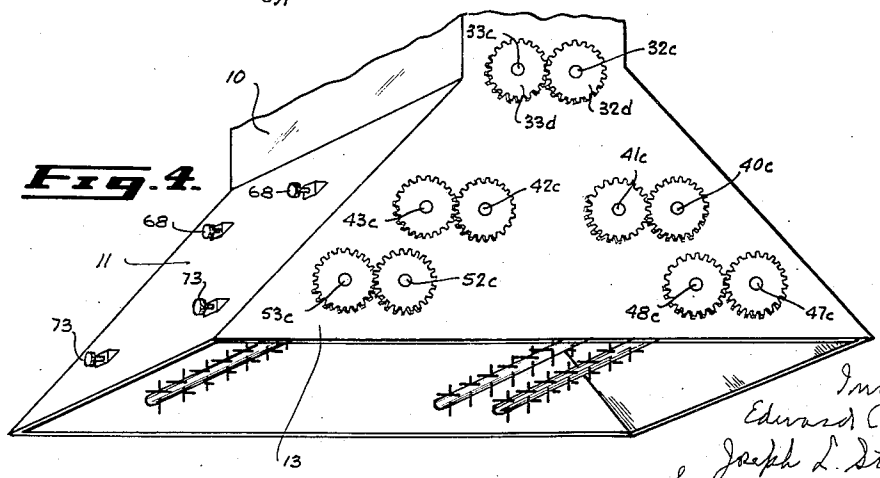


Fig. 4.

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DISPERSER FEED DEVICE

Filed May 31, 1956 3 Sheets-Sheet 3

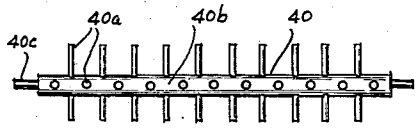


Fig. 5.

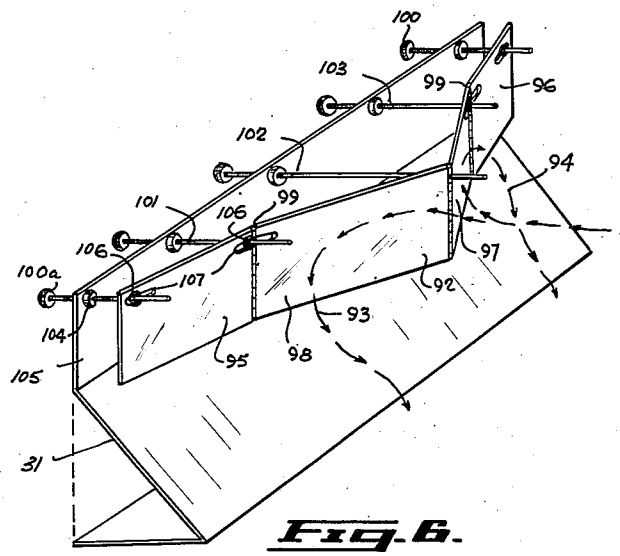


Fig. 6.

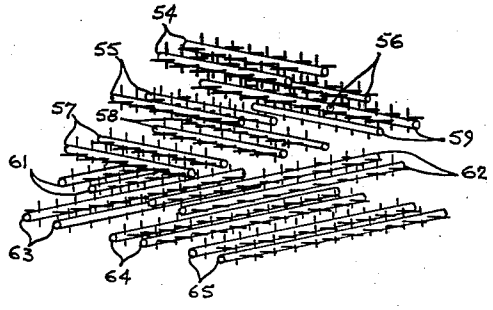


Fig. 7.

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2,825,388

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DISPERSER FEED DEVICE

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Application May 31, 1956, Serial No. 588,380

Claims priority, application Canada January 13, 1956

12 Claims. (Cl. 154—1)

This invention relates to a disperser feed device.

One of the main problems encountered in making a board from particulate material such as wood shavings, platelets or splinters is that of forming the pad prior to pre-pressing and hot pressing. It is important to avoid uneven formation leading to fluctuations in density and properties influenced by density such as surface appearance, strength, moisture resistance, workability, nail and screw holding. The problem of avoiding uneven formation is particularly serious in the case of platelets or shavings since they tend to remain in the position in which they are laid down, shifting little during pre-compression or hot pressing. If the pad is improperly formed patching is difficult.

A further problem is that of handling platelets or the like which have been coated with a binder and which have a strong tendency to clump and bridge. It is important that the forming unit should substantially inhibit this tendency and should act to break up any partially formed clumps.

An additional problem dealt with by the preferred embodiment of this invention is that of providing the fine degree of control necessary for obtaining proper formation under practical operating conditions in view of variations from time to time in the characteristics of the platelets or the like or the thickness of the pad which is to be formed.

Another problem is that of providing a convenient method of depositing the particulate material over a substantial distance in the direction of caul travel to avoid angular formation of oriented particulate material such as platelets. Angular formation is particularly a problem with thick boards due to the slow caul speed. In the latter case, if the area of deposition of the particles is not spread out in the direction of caul travel, unstable heaps of shavings which partially break away from the mat may be formed to give an unacceptable mat having a series of gouges across its width.

A further problem with material such as platelets is that of separating the furnish into discrete platelets so that they come to rest individually with their broad faces lying parallel to each other to give good gluing contact.

The object of this invention is to provide a disperser feed device adapted to contribute to the solution of the foregoing problems.

The invention is based on the idea of providing pairs of rotary deflector members such as intermeshing spike rolls which counter--rotate in a direction such that the deflector portions of the deflector members when intermeshing are moving upwardly, these pairs of intermeshing rotary deflector members being arranged in the form of an inverted V. Each pair of deflector members will

permit a portion of the material fed to them to pass between them and will deflect the remainder of the material upwardly and outwardly. The material deflected outwardly of at least one of the deflectors will provide the feed for the next lower pair of deflectors. Flexible control can readily be provided for by individually controlling the flow of material through said pairs of deflectors.

In the drawings which illustrate the preferred embodiment of this invention:

Figure 1 is an elevation view of a disperser in accordance with this invention.

Figure 2 is a plan view corresponding to Figure 1.

Figure 3 is a plan section view of part of the disperser on the line I—I of Figure 2.

Figure 4 is a perspective view of part of the disperser regarded from the other side from that of Figure 1.

Figure 5 is detailed elevation view of a spike roll.

Figure 6 is a perspective view illustrating a modification of the construction shown in Figures 1 to 4.

Figure 7 is a perspective view of a further modification.

Referring now to Figures 1 to 4 of the drawings, the disperser feed device comprises a housing provided by a rectangularly shaped shaft **10**, defined by upright side walls **14** and upright end walls **11***a*, and a lower portion **11** defined by sloping side walls **12** and upright end walls **13** so as to be in the shape of a truncated inverted V in vertical section. The material to be formed indicated at **15** is fed in the form of a flat mat of material at the upper end of shaft **10** by continuous feed belt **16**. Part of feed belt **16** and one of its supporting rollers **17** is shown in the drawings. Feed belt **16** is driven by a suitable motor (not shown). A kick off spike roll **18** is driven through belt **19** and pulleys **20** and **21** by motor **22** and is positioned at the end of belt **16** so as to expel material **15** into shaft **10** and to prevent the mat of material **15** from breaking off the end of belt **16** in clumps and falling into the forming device as such. Kick off spike roll **18** thus provides a spray indicated at **22***a* of substantially discrete particles of material. An inwardly sloped transverse control baffle **23** is positioned by adjustment members **24** to direct material expelled by kick off spike roll **18** down shaft **10**. Adjustment members **24** comprise control knobs **25** mounted at the end of screw threaded shafts **26**. Shafts **26** threadably engage collars **27** mounted in side wall **14** and have their ends rotatably journalled in collars **28** which are pivotally mounted in slots **30** of control baffle **23**. A ramp **31** is provided to guide material which has struck control baffle **23** towards the centre of the shaft **10**.

A pair of spike rolls **32** and **33** respectively are mounted at the lower end of shaft **10**, and are counter-rotated so that in Figure 3 spike roll **32** will be rotating counter clockwise and spike roll **33** will be rotating clockwise. The spikes **32***a* of spike roll **32** intermesh with the spikes **33***a* of the spike roll **33**. Part of the material fed to spike rolls **32** and **33** by baffles **23** and ramp **31** will pass between these spike rolls as indicated at **34**, part will be thrown upwardly and outwardly over spike roll **32** as indicated at **35** and part will be thrown upwardly and outwardly over spike roll **33** as indicated at **36**. Adjustment members **24** control the slope of baffle **23** and also can be used to move the entire baffle inwardly or outwardly. If baffle **23** is adjusted to direct the main flow of material centrally between spike rolls **32** and **33**, more material will pass between the rolls than if the

main stream is directed slightly towards either spike roll 32 or 33. Directing the stream slightly towards roll 33 will increase the proportion of material thrown over that roll and directing the stream towards roll 32 has a similar result. It will be appreciated that the stream of material diverges as indicated at 34. The positioning of baffle 23 gives some degree of control over the extent of this divergence. A narrow stream directed midway between spike rolls 32 and 33 will give a larger amount of material passing between the spike rolls than a more divergent stream. The flexibility of control is increased by providing adjustment of the height at which feed belt 16 projects material 15 against baffle 23.

This is most conveniently provided by adjustably mounting shaft portion 10 by means of bands 39 engaging shaft portion 10 and mounted on supporting frame members 37 by adjustment screws 38.

Material 35 and 36 which has been projected upwardly and outwardly by spike rolls 32 and 33 is directed between pairs of spike rolls 40 and 41 and 42 and 43 respectively, each pair of which counter-rotate similarly to rolls 32 and 33, to permit part of the material to pass straight down as indicated at 44, part to be directed upwardly and outwardly as indicated at 45 and part to be directed upwardly and inwardly as indicated at 46. Spike rolls 32, 33, 40, 41, 42 and 43 thus provide seven streams of material following separate paths, namely, streams between spike rolls 33 and 34, 40 and 41 and 42 and 43 and streams directed inwardly and outwardly respectively by each pair of spike rolls 40 and 41 and 42 and 43 of the second row of spike rolls. A third row of spike rolls is provided by spike rolls 47 and 48 which similarly separate material 45 projected upwardly and outwardly by rolls 40 and 41, into a straight through stream 49, an outer stream 50 and an inwardly directed stream 51. The third row also includes a pair of spike rolls 52 and 53 to separate material 45*a* passing over roll 43 into three streams 49*a*, 50*a* and 51*a*. Preferably, the spike rolls of the lower spike rolls act only on the material thrown upwardly and outwardly by the spike rolls of the row above but additional pairs of spike rolls can be used to sub-divide the inwardly directed streams of material as indicated in Figure 7 which shows a pair of spike rolls 54 of the first row, pairs 55 and 56 of the second row and three pairs of spike rolls 57, 58 and 59 in the third row. The material can be further sub-divided in the same manner by additional rows of spike rolls which, if desired, can be arranged as indicated in Figure 7 with their axes perpendicular to the upper rows of spike rolls to spread out the material in another direction. In Figure 7, pairs of spike rolls 61 and 62 form a fourth row and pairs of spike rolls 63, 64 and 65 provide a fifth row. The axes of pairs 54 to 59 are in one transverse direction and the axes of pairs 61 to 65 are in a transverse direction perpendicular to that of the axes of pairs 54 to 59.

Returning to Figures 1 to 5, the direction of flow of material 35 is controlled by a baffle 66 which is hinged at 67 and controlled by an adjustment control member 68 of similar structure to control member 24. Baffle 66 can be biased inwardly or outwardly to direct stream 35 midway between spike rolls 40 and 41, slightly towards spike roll 40 or slightly towards spike roll 41 to control the relative volumes of streams 44, 45 and 46. Similar baffles 69, 70 and 71 controlled by adjustment control members 72, 73 and 74 are provided for pairs of spike rolls 42 and 43, 47 and 48 and 52 and 53 respectively.

The preferred construction of a typical spike roll 40 is illustrated in Figure 5 which shows spike 40*a* projecting radially from a sleeve 40*b* mounted on a shaft 40*c*. Alternate rows of spikes 40*a* are preferably staggered as illustrated.

As illustrated in Figure 4, meshing pinions 32*d* and 33*d* are provided at one end of shafts 32*c* and 33*c* to give counter rotation for spike rolls 32 and 33 and similar pairs of meshing pinions are provided for shafts 40*c* and 41*c*, 42*c* and 43*c*, 47*c* and 48*c* and 52*c* and 53*c*.

As illustrated best in Figure 1, spike roll shaft 40*c* has a pulley 75 driven through belt 76 and pulley 77 by motor 78. Shaft 40*c* also carries a pulley 79 which drives a pulley 80 mounted on shaft 32*c* through belt 81.

Pinions 32*d* and 33*d* transmit the drive from shafts 32*c* to 33*c*. Pulley 82, pulley 83 on shaft 43*c* and belt 84 drive shaft 43*c* from shaft 33*c*. Pulley 85 on shaft 43*c*, pulley 86 on shaft 53*c* and belt 87 drive shaft 53*c* from shaft 43*c*. Pulley 88 on shaft 53*c*, pulley 89 on shaft 48*c* and belt 90 drive shaft 48*c* from shaft 53*c*. The intermeshing pinions at the opposite ends of each of shafts 40*c*, 43*c*, 48*c* and 53*c* transmit the drive to shafts 41*c*, 42*c*, 47*c* and 52*c*.

The disperser feed device deposits a shower of individual particles of material on a caul plate 91 which is moved in a direction perpendicular to the axes of the spike rolls. The board mat 91*a* is progressively built up on caul plate 91 as indicated in Figure 3.

Figure 6 illustrates a modified structure for control baffle 23. The baffle illustrated has a V-shaped inwardly directed central portion 92 to direct material impinging against it in divergent streams 93 and 94, and also has outer wing panels 95 and 96. V-shaped central portion 92 comprises a pair of panels 97 and 98. Each of the adjacent panels 95, 98, 97 and 96 is hingedly connected as illustrated at 99. Adjustment control members 100*a* and 100 engage the outer edges of wing panels 95 and 96 respectively. Adjustment control members 101, 102 and 103 engage the junctions between panels 95 and 98, 98 and 97 and 97 and 96 respectively.

The adjustment control members threadably engage threaded bosses 104 mounted in backwall 105 which in this embodiment provides part of the side wall of shaft 10, and are rotatably in engagement with bosses. The bosses 106 mounted on adjustment control members 100*a*, 101, 103 and 100 slidably engage transverse slots 107 at the outer edges of the wing panel members and at the junctions between the wing panel members and the central panel members. The transverse slots 107 permit the angles of inclination of the panel members to be adjusted without bending the adjustment control members. A baffle of the type illustrated in Figure 6 has the advantage of spreading out the material towards the edges of the board to compensate for the tendency of the central portion of the board mat 91*a* to be denser than the side edges thereof.

We claim:

1. A disperser feed device comprising a first pair of substantially parallel counter-rotating rotary substantially horzontally extending deflector members acting to separate particulate material fed to said rotary deflector members above and between said rotary deflector members into a stream of material passing between the rotary deflector members and streams of material projected upwardly and over each of said rotary deflector members and additional pairs of said rotary deflector members each located below a pair of said rotary deflector members and acting to separate a stream of material received from the last mentioned pair of rotary deflector members into a stream of material passing between the rotary deflector members of the additional pair of rotary deflector members and streams of material projected upwardly and over the rotary deflector members of said additional pair of said rotary deflector members, at least one of the streams of material separated by said additional pairs of rotary members being a stream of material projected upwardly and over a rotary deflector member of the first pair of rotary deflector members.

2. A disperser feed device as in claim 1 in which the pairs of rotary deflector members are arranged substantially in the form of an inverted V with the first pair of rotary deflector members at the apex of the V, each successive additional pair of rotary deflector members being

fed by an outwardly projected stream from the pair of rotary deflector members above said successive additional pair of rotary deflector members.

3. A disperser feed device comprising a first pair of substantially parallel counter-rotating rotary substantially horizontally extending deflector members acting to separate particulate material fed to said rotary deflector members above and between said rotary deflector members into a stream of material passing between the rotary deflector members and streams of material projected upwardly and over each of said rotary deflector members and additional pairs of said rotary deflector members each located below a pair of said rotary deflector members and acting to separate a stream of material received from the last mentioned pair of rotary deflector members into a stream of material passing between the rotary deflector members of the additional pair of rotary deflector members and streams of material projected upwardly and over the rotary deflector members of said additional pair of said rotary deflector members, and individual means for controlling the feed for pairs of said rotary deflector members to direct the feed alternatively predominantly midway between the rotary deflector members of the pair or displaced towards one or another of the rotary deflector members of the pair.

4. A disperser feed device as in claim 1 in which said rotary deflector members comprise intermeshing spike rolls.

5. A disperser feed device as in claim 3 in which said individual means for controlling the feed for pairs of said rotary deflector members comprises a pivotally mounted baffle adapted to deflect the direction of flow of the feed to a pair of rotary deflector members and means for adjusting the angle of inclination of said baffle.

6. A disperser feed device comprising a housing, means for feeding a continuous mat of particulate material into said housing, means for projecting said mat, as it is fed into said housing, in the form of a stream of substantially discrete particulate material, a first pair of counter-rotating deflector members acting to separate said stream of particulate material into a stream of material passing between the rotary deflector members and streams of material projected upwardly and over each of said rotary deflector members, means for directing said stream of substantially discrete particulate material alternatively predominantly midway between the rotary deflector members or displaced towards one or other of the rotary deflector members and additional pairs of said rotary deflector members each located below a pair of said rotary deflector members and acting to separate a stream of material received from the last mentioned pair of rotary deflector members into a stream of material passing between the rotary deflector members of the additional pair of rotary deflector members and streams of material projected upwardly and over the rotary deflector members of said additional pair of said rotary deflector members.

7. A disperser feed device comprising a housing, means for feeding a continuous mat of particulate material into said housing, means for projecting said mat, as it is fed into said housing, in the form of a stream of substantially discrete particulate material, a first pair of counter-rotating deflector members acting to separate said stream of particulate material into a stream of material passing between the rotary deflector members and streams of material projected upwardly and over each of said rotary deflector members, means for directing said stream of substantially discrete particulate material alternatively predominantly midway between the rotary deflector members or displaced towards one or other of the rotary deflector members and additional pairs of said rotary deflector members each located below a pair of said rotary deflector members and acting to separate a stream of material received from the last mentioned pair of rotary deflector members into a stream of material passing between the rotary deflector members of the additional pair of rotary deflector members and streams of material projected upwardly and over the rotary deflector members of said additional pair of said rotary deflector members and individual means for controlling the feed for said additional pairs of said rotary deflector members to direct the feed alternatively predominantly midway between the rotary deflector members of the additional pair or displaced towards one or other of the rotary deflector members of the pair.

8. A disperser feed device as in claim 7 in which the pairs of rotary deflector members are arranged substantially in the form of an inverted V with the first pair of rotary deflector members at the apex of the V, each successive additional pair of rotary deflector members being fed by an outwardly projected stream from the pair of rotary deflector members above said successive additional pair of rotary deflector members and in which said individual means for controlling the feed for pairs of said rotary deflector members comprises a pivotally mounted baffle adapted to deflect the direction of flow of the feed to a pair of rotary deflector members and means for adjusting the angle of inclination of said baffle, said means for adjusting the angle of inclination of said baffle being controlled exteriorly of said housing.

9. A disperser feed device as in claim 6 in which said means for directing said stream of substantially discrete particulate material comprises a baffle and means for both adjusting the angle of inclination of the last mentioned baffle and the relative positions of the last mentioned baffle and the means for projecting the mat in the form of a stream of substantially discrete particulate material.

10. A disperser as in claim 6 in which said means for directing said stream of substantially discrete particulate material comprises means for displacing part of said material towards the outer ends of the rotary deflectors.

11. A disperser feed device comprising a first pair of substantially parallel counter-rotating rotary substantially horizontally extending deflector members acting to separate particulate material fed to said rotary deflector members above and between said rotary deflector members into a stream of material passing between the rotary deflector members and streams of material projected upwardly and over each of said rotary deflector members and additional pairs of said rotary deflector members each located below a pair of said rotary deflector members and acting to separate a stream of material received from the last mentioned pair of rotary deflector members into a stream of material passing between the rotary deflector members of the additional pair of rotary deflector members and streams of material projected upwardly and over the rotary deflector members of said additional pair of said rotary deflector members at least one of the streams of material separated by said additional pairs of rotary members being a stream of material projected upwardly and over a rotary deflector member of the first pair of rotary deflector members and a caul plate beneath the lowest pairs of said additional pairs and continuously movable in a direction transverse to the axes of rotation of said rotary deflector members.

12. A disperser feed device comprising a first pair of substantially parallel counter-rotating rotary substantially horizontally extending deflector members acting to separate particulate material fed to said rotary deflector members above and between said rotary deflector members into a stream of material passing between the rotary deflector members and streams of material projected upwardly and over each of said rotary deflector members and additional pairs of said rotary deflector members each located below a pair of said rotary deflector members and acting to separate a stream of material received from the last mentioned pair of rotary deflector members into a stream of material passing between the rotary deflector members of the additional pair of rotary deflector members and streams of material projected upwardly and

over the rotary deflector members of said additional pair of said rotary deflector members at least one of the streams of material separated by said additional pairs of rotary members being a stream of material projected upwardly and over a rotary deflector member of the first pair of rotary deflector members and additional pairs of said rotary deflector members disposed with their axes of rotation transverse to the first pair of rotary deflector members.

References Cited in the file of this patent

UNITED STATES PATENTS

2,230,880	Brown	Feb. 4, 1941
2,635,301	Schubert	Apr. 21, 1953
2,676,694	Wyss et al.	Apr. 27, 1954