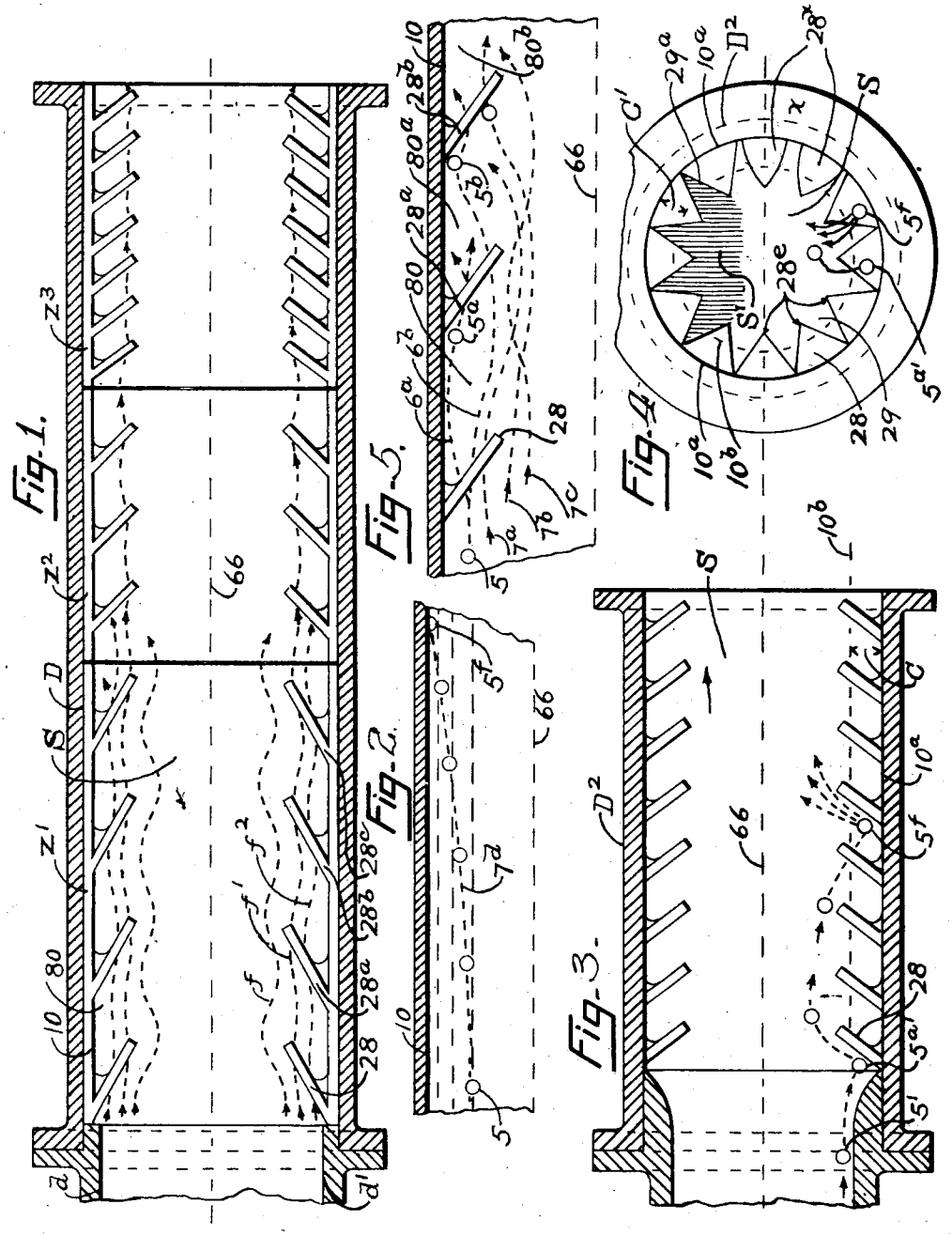
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STREAM UNIFYING APPARATUS

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STREAM-UNIFYING APPARATUS.

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One of the leading objects of the present invention is to provide means whereby to effectively treat a flowing stream of air previously charged with a comminuted liquid fuel, for thereby producing and maintaining (during the flowage thereof in a tubular conduit), a highly uniform quality of admixture and distribution, while continuously restoring to the central stream such materials as may normally tend to segregate or separate outwardly therein or therefrom during such flowage.

A further object of the present improvements is to furnish conduits for subjecting a forwardly flowing and charged stream of air or other gas, during the passage thereof through or along in the conduit, to a unifying treatment or conditioning process for increasing therein the uniformity of the distribution therein of comminuted ingredients with which the stream shall have been charged; and, to accomplish this object, together with a further comminuting and interassociation (or interblending) of a liquid or vaporizable ingredient, while the charged stream is flowing with a uniform velocity or pressure or both, or with accelerations or retardations of velocity, or both, or with fluctuations of pressure; and, also, whether the said stream, during a period of operation, shall be continuous or intermittent in the forward flowage thereof.

A further object is to provide apparatus for such service as just described, by the use of some of the cruder and less costly of the petroleum elements, or mixtures thereof, and which are not readily completely comminuted by the appliances usually employed for atomizing the lighter and less viscous of the liquid fuels, such as ordinary kerosene and gasoline. The said cruder petroleum products, as is well known, comprise a variety of kinds and qualities, and some of these, when in the form of globules carried along in the air, supply stream, require for their effective comminuting, an intensive impacting and disintegrative treatment. This will be evident when it is considered how, when the air-stream is initially charged with such fuels in spray form, the globules of the liquid as distributed into the said stream, necessarily have, however minute they may be, a wide range as to sizes and weights.

This present application is in part in the nature of a continuance of my prior application for patent on mixing devices, which has become Patent No. 1,584,046, dated May 11, 1926.

Fig. 1 is a longitudinal sectional view of a conduit embodying the said improvement disclosed in my Patent No. 1,584,046 extended into a series of combinations operable for unifying the condition of the forwardly flowing central stream, as hereinafter more fully explained; in this view, three zone tubes Z^1, Z^2, Z^3, are shown assembled within a larger conduit tube, D.

Fig. 2 is a diagram for illustrating the explanation regarding the segregative tendency of the heavier fluid globules, as hereinafter further explained.

Fig. 3 is a longitudinal sectional view of a conduit length, D^2, having therein a special arrangement of the annuli, these having a mode of action hereinafter more fully described, for maintaining the condition of the central stream while this is rapidly flowing within a more slowly advancing stream-enclosing gaseous tube-wall.

Fig. 4 is a diagrammatic view illustrative of certain of the dynamic and globule-treating features of the conduit constructions described in connection with Figs. 1 and 3.

Fig. 5 is a diagram drawn showing a portion of Fig. 1, somewhat enlarged, for further illustrating the complex inter-flowages of materials in and forming the central stream and its wing-streams, as hereinafter described in connection with the preceding figures.

Similar characters designate like parts in all the views.

In considering the operation of this class of conduit apparatus, it should be remembered that it is well-known that when a full size stream flows along normally in that part of a conduit which has a uniform sectional area, there is naturally (in accordance with well-known physical laws) a higher rate of movement in the center-zone of the stream than at or near the outer surface of the stream. Thus in the improved apparatus herein described, the resistance afforded as against the forward movement of the outer part of the stream, by the use of a concentric series of incisor devices or blades, operates to retard this movement, and this restriction tends to centralize the flowage and thus accelerate the forward velocity of the central portion of the stream, (as at S, Fig. 1), thereby producing a greater than normal difference in rate of flow as be-

tween the forward velocities of the inner and outer portions respectively of the flowing materials.

One well-known effect of that mode of flowage is herein illustrated diagrammatically in Fig. 2, where a heavier body, or droplet, as 5, carried in a floating manner in the outer portion of the stream, is gradually carried outwardly, and thus into a slower moving outer zone and against tube surface 10. This progressive segregative action thus leads such droplet from an initial position, through a curved path, on the principle indicated by dotted line, 7^d, to a final position, as at 5^f, against the tube wall.

The improved stream-treating conduit herein more fully illustrated in Fig. 1, may be associated with the apparatus illustrated in my Patent No. 1,584,046. It should, however, be understood that for suitably supplying the said conduit of Fig. 1 with initially-charged air in proper quantity and grade of admixture, any of the well-known kinds of liquid-spraying devices, these including jet-pumps and carburetors, may be used, these being suitably proportional, connected and operated therefor.

In the aforesaid disintegrative treatments, here more particularly described in connection with Figs. 2, 3 and 4, the modes of action follow the principles illustrated in my Patent No. 1,584,046.

The described operation illustrated in my Patent No. 1,584.046, whereby the heavier bodies in the outer zone of the main stream, may be driven outward and then intercepted by impact against flat inclined surfaces for their further disintegration and diffusion, is indicated as being initially accomplished in the conduit shown in Fig. 1, by the more widely spaced-apart interceptor members, or annuli, as 28, 28^a, 28^b, and 28^c, each of the interceptor members constituting a circumferential series of dispersive interceptors, and the several interceptor members 28, 28^a, 28^b and 28^e constituting a successive series or plurality of circumferential series. These circumferential series are furthermore arranged in sets, see Fig. 1, the series formed on the section Z^1 constituting one set, the series on the section Z^2 constituting another set, the series on the section Z^3 constituting still another set, and so on according to the length of the conduit to be provided. On the further advance along this conduit, said bodies having been partially reduced, naturally are more quickly thrown outward, and hence in the mid-length zone, Z^2, the said interceptors may have a more abrupt angular position and may be placed more frequently; and, on the same principle, are shown placed in a still closer and more abrupt relation (and in relatively greater numbers in a given tube length), in the terminal zone, Z^3, of said conduit, for there subjecting the already highly comminuted matter to an extreme comminution of substantially a mist or vapor character. Thus, in this organization of the conduit, there are successive portions, or tube-lengths, Z^1, Z^2, Z^3, especially equipped and adapted for treating with successive intensities the described disintegratable materials, and bodies therein, during successive stages, respectively, of their progressive reduction.

For convenience, only three of the tube-length zones are shown in Fig. 1, these being contained preferably in a conduit pipe, as shown; but it will be evident a larger number may be used, and may also be arranged in longer conduits, to suitably provide for the requirements in any particular class of service. For instance, in the operation of certain furnaces, the air supply must be increased and diminished from time to time, and also the degree of the fuel-charging thereof. These conditions are met in a particularly effective manner by this multi-zone conduit system, in which the variations in the velocity and intensity of the flowage, and, in the distribution of the actions longitudinally of the said zones, are automatically modified, and for harmonious and effective coaction, (these features are hereinafter more fully explained).

In Fig. 5, the angularly-disposed interceptors 28 are arranged in a series, and separated longitudinally of the conduit to form between them the relatively long merging chambers, 80, 80^a, and 80^b, and function in the manner elsewhere herein described, more in detail. In this view, Fig. 5, a series of flowage lines are shown for graphically indicating in a diagrammatic and approximate manner, how the successive members of the said series of interceptors coact for meeting the several conditions and purposes of the system. For instance, a globule, as 5, starting on line 6^a, may pass between two interceptors in the annulus at 28, and be carried against the next successive interceptor 28^a as the droplet 5^a; or, in passing said interceptor 28, said globule may follow a line about as shown at 6^b, and thus be finally impacted at 5^b against the more advanced interceptor 28^b, of the said series of them. In a similar manner the lines 7^a, 7^b, and 7^c represent a variety of flowage paths which may occur as regards the movements of entrained particles or globules, or of portions of flowing material comprised in the main-stream, or starting forward in or near to one or another of the wing-streams thereof; but, in all such cases, it will now be evident, that the interceptor annuli, and the blade-members thereof, are positioned and operable for concurrently coacting in or by pairs, as 28 and 28^a, or 28^a and 28^b, and that such coaction also extends to triples thereof, and that these varying flowages and co-

actions, may be continually occurring and be repeated, in such varying ways at different points throughout the length of the interceptor system, and throughout the circumferences of the several annuli of interceptor members.

Thus the deflective paths and flights of the said heavier bodies are continuously modified by the fluctuating pressure and enlarging of the central stream, and by the excess of this velocity of the central stream S, over the advance of the material comprised within the merging-zone, so that many of these bodies will normally be carried in differently modified paths, and thereby distributed to and among successive annuli and their intervening chamber-spaces, and so that a quantity of these bodies initially deflected at or near some one said annulus, are finally or further, treated, some at a next or near-by annulus, and others at one or another annulus and chamber-space at various distances in advance of the point of said initial treatment. In many such instances a relatively soft globule, as 5^t, Fig. 3, may be impacted against an interceptor face under a stream-pressure sufficient to spread the material thereof into a film, which by the force of the flowage of said stream, will be spread out and thinned down, and so be blown off the edges of the said face, and be thereby forced into a forming wing-stream in a fine state of subdivision.

For further illustrating the said disintegrative processes indicated as described in connection with Fig. 3, a cross-sectional, or end view of an interceptor annulus is shown in Fig. 4, being there located in axial alinement with Fig. 3, as indicated by line 66. In this view (Fig. 4) the interceptors, as 28, are shown as being, in this instance, of a triangular shape and with the points 28^e thereof extending toward the center, and beyond a line $10^{b'}$ that corresponds with the zone-line 10^b in Fig. 3; also, the several interceptors are here shown placed close together at their outer ends, thereby forming, in the outer portion of the chamber-zone C (of Fig. 3), a substantially or nearly continuous impactive zone or wall, whereby to limit or reduce the forward flowage in this outer zone, and thus coact in determining the character and extent of the peculiarly complex and tumultuous inter-flowages within said chamber C. The "drop" or globule $5^{a'}$ shown in Fig. 3, also the globule 5^t, are here shown in positions, and by lines designated by the same characters as in Fig. 3, so that by comparison, the operation and dispersing thereof may be more readily perceived.

In the segregative manner already described, many of the small particles of the usual spray-form air-charge of liquid fuel, may be brought to the tube-surface, and be thus carried along in a relatively sedimentary condition. One such particle, assumed to be of a resistant character, is indicated at 5′ in Fig. 3, as having arrived at the entrance end of the first conduit zone, corresponding to zone or portion Z^1 of Fig. 1, and there impacted, at $5^{a'}$, against the surface of an interceptor blade 28, and thence diverted, and thus thrown back into a more central portion of the main-stream. Instead of this directness of action, such a body may pass (be carried in a wing-stream) between interceptor blades in one or more circuits of them, and thus come into contact with a more advanced interceptor, as at 5^t; and instead of being then thrown back bodily into the main-stream, this body may be only slightly resistant, (or of a small size and highly fluid character), and be disintegrated into a spray-form of a finely divided character, as indicated by the dotted lines leading up from said position 5^t. In this general manner, the described impactive, disintegrative, dispersive and diffusive actions occur rapidly and at many points in close succession and many of them simultaneously, and are continuously distributed and repeated throughout the extent of the interceptor system.

In Fig. 4, the tube D^2 is shown provided with an annular series of the interceptor blades 28 (or an annulus thereof) which are shown in edge-views thereof and so designated in Figs. 1 and 3. Said interceptors, or blades, as 28, are exposed to the oncoming mixture-stream, and this stream, in being forced through such an annulus of pointed blades, is thereby shaped in cross-section, as indicated in Fig. 4, into the form of a wing-stream, as at 29^a. For this purpose, the passages, as 29, between said blades 28, operate as channels for the series of the non-contiguous outer portions, or "wings", of the main-stream which, on passing through the said annulus (as 28, Fig. 1), enter into the chamber space 80, just forward thereof and back of the next annulus, as 28^a, and are there merged into, and with, the mass of materials in this merging chamber, and are thereby interblended, and violently admixtured in the described tumultuous manner; and this process is repeated at each succeeding annulus of the series of them and so results in producing to the required uniformity of distribution in the stream, of all the materials thereof. For more clearly indicating the character of said wing-streams, the upper portion of the stream is shown in Fig. 4 as being shaded, as at S′, to indicate the unity of the central stream with said wing-stream thereof.

Said interceptor blades, 28, are shown in Fig. 4 as having straight side-lines, or edges, and with sharp points, and also of a width at their bases, at the circle, to come close together. This form of face outline, has the advantage of being readily delineated, and also of a form convenient to construct, but it

has a tendency, in some instances, to prevent a sufficient rate of forward flow of the surge-mass between the lines f^1, f^2, (Fig. 1), and to provide against this objection it will generally be preferable so to make or shape the annulus as to have some space between said blades at the said outer and wider ends thereof. In this preferable construction, the said blade edges may be made curved, or otherwise deviate sufficiently from the said triangular form, thereby to secure a moderate space between the adjacent said blades at the outer ends thereof. The nature of this feature is illustrated in Fig. 4, in one said form thereof, by showing two of said blades, as 28^x, made with the curved edge-line formation there shown, so that two adjacent said interceptors have between them the space at the said circle 10^a. By means of such a modification, extended preferably to the entire series of an annulus, and the parts being properly proportioned for the requirements in any given instance, (as may be readily found by trial), an undue restriction of said surge-stream rate of flowage at the conduit-surface can be effectively prevented or regulated.

A series of the interceptor blades arranged circumferentially in the conduit, or in any tubular space or chamber, is regarded as constituting an "annulus". For simplicity of illustration, these annuli are herein indicated by showing in the longitudinal sectional views, only two of that series of blades of any one annulus, one blade being shown at the upper side, and another at the lower side of the said space or chamber, the other blades of such annulus being omitted.

Also, for simplicity as stated, the said interceptors are shown as if formed integrally with the tube or wall from which they inwardly project; in practice, however, any suitable and convenient mode of construction may be adopted for the said purpose. For instance, the zone tubes Z^1, Z^2, and Z^3, of Fig. 1, may be made together with the annuli thereof, by the well-known die-casting method; or, the annuli blades, or members, may be made separate from the said tubes and afterward attached thereto by welding, riveting, or otherwise, according to the size and character of the apparatus; these explanations apply also to apparatus of the forms and arrangements indicated in Figs. 3 and 5. A preferable mode of organizing the said members, for use in some kinds of service, is to form each series of the blades integral with a ring of suitable size and width, and assemble these annuli rings in a tube or holder, in a manner analogous to the assembling of the tubes, or rings, Z^1, Z^2, and Z^3, in the apparatus of Fig. 1; and, a further improvement for such purpose constitutes subject-matter in a separate application to be copending herewith.

An important feature of the said wing-stream forming and operating is the location of the outer-edges of the said wings, close to the conduit-wall inner face 10, and the enclosing of the merge-mass in the chamber, as a tubular mass held against and within said inner face 10 while held outwardly by the pressure of the central portion of the stream, so that at the forming as described of the wing-stream the material of the stream as a whole is crowded inward by the said annulus, as 28^a, (Fig. 1), thereby modifying the path or location of the flowage lines, as f, f^1, f^2, which indicate a normally fluctuating stream velocity at successive points therein on the principle indicated by the inward curves of these lines as will be clear from the delineations thereof in Fig. 1. And, owing to the said formation of said wings, these have a greatly extended surface (as compared with the circumference of the tube-surface 10), and thus on passing through an annulus, interblend with the merge-mass by a greatly extended surface contact with the material thereof. Also, while these processes are continuing during the forward flow of the central stream, S, the faces of said interceptors continue to act as dispersive devices in the manner and for the disintegrative purposes as elsewhere herein more fully explained. Thus the outer zone of the stream is shaped into the sectionally pointed form illustrated, (see Fig. 4), then passes into the interblending stage, and is then reshaped into a newly-formed series of wing-streams which again flow forward and are destroyed by the interblended material, these operations being repeated as many times as the material and the final conditioning thereof may require.

When the air-supply is initially charged, either in part or wholly, with a finely divided, or comminuted fuel-spray, this may normally tend to gather in the stream, at or near to, and flow along close to or against the inner surface of the main-stream, conduit, as for instance, against the tube-surface at 10^a, (Fig. 3). Thus said fuel-spray is led into the enlarged and annular chamber space C, here indicated by its inside line 10^b, and is therein carried along against and among the numerous interceptor surfaces, passing on from one to another, and by contact therewith under the attritional action due to the complex interflowages produced by said surfaces and their intervening spaces in the content of this chamber, until the whole of such comminuted air-charge becomes reduced to such extremely small droplets, that these are not capable of being thrown or diverted into the main-stream by a deflective projecting thereof away from the interceptor surfaces, so that these surfaces under such conditions can only act mainly by the filming method of liquid disintegration. For utilizing this limiting, or restrictive condition in a favorable manner, the said chamber C, may be made of such

length and proportions as necessary in any particular instance, and may be inserted in a pipe-line at intervals, and thus each may constitute a stream-surrounding and tubular merging-chamber wherein to accomplish the completion of the air-changing process. In practice, of course, in such cases, the pipe-line fittings will be selected and arranged for suitably connecting the several parts; such requirements and methods being well-known to mechanics, do not need to be here described in detail. This merging-chamber system is also especially applicable as the terminal zone, as Z^3, in conduits of the class and arrangement illustrated in Fig. 1; and these, in practice may be separate in construction, and connected by plain tubes of suitable lengths and diameters.

The described forward flowages of the materials in the merging-chambers, as 80, 80^a, 80^b, of the first conduit zone, designated by Z^1 in Fig. 1, are there relatively free and rapid owing to the considerable distance apart, longitudinally of the conduit, of the several annuli, 28, 28^a and 28^b. The corresponding distances in the next following zone, as Z^2, are materially less, as clearly shown by the lines of the drawing, while the several interceptor faces, are also clearly shown as being placed on a steeper angle, thereby reducing the normal rate of said forward flowage in the surge-chamber of said zone Z^2, as compared with that in said prior zone Z^1. A further reduction of the same kind is herein shown as being made as between the said equipment of zone Z^3 as compared with that of zone Z^2, since in the former of these zones, Z^3, the annuli are placed still nearer to each other, while the interceptor faces are shown located on a still steeper and more resistant angle, so that the surge-mass flowage is further resisted in passing from zone Z^2 into and through zone Z^3. One important result obtained by the means here described, is to cause the surge-mass at the end of one zone, as Z^1 or Z^2, to meet with a partial stoppage, or resistance whereby to force the stream of material constituting that mass, to tend to accumulate a surplus and pressure at said position and so be forced inwardly and so be merged more rapidly into the outer part of the forwardly-flowing central stream; thus the materials of these two streams (initially comprised in one stream) are thereby reassociated into a single main-stream.

The aforesaid successive reduction in the rate of flowage in the surge-stream, is illustrated in Fig. 1, as being provided for at only two points, as stated; but, in practice, said zones, as Z^1, and following may be made of less length, also of greater number, and may be constructed as a continuously-reducing series of lengths for the whole length of the conduit-tube. However, the use of only a few of said surge-flow-resisting means, has the practical advantage of intensifying those resistances, and the consequent force of the over-flow, or outward back-flow, into the central stream.

In the described merging-chamber system when arranged as in Figs. 1 and 3, the normal size of the main stream may be considered as corresponding to the diameter, d to d^1, of the inlet tube, (Fig. 1), and as then following along in accordance with the principle illustrated by the dotted flowage-lines f, f^1, and f^2 to the discharge end. This chamber, (as C, Fig. 3), is thus much longer than the said inlet tube and the main-stream diameter so that the points, as 28^e, Fig. 4, of the numerous interceptor blades, project slightly into an outer zone of said central free-flowing and continuous main-stream, and thus act to agitate, or stir, the material of this outer stream-zone. Said interceptors being placed in the annular arrangement shown, (Fig. 4), and the interceptor annuli so formed being closely following each other in said chamber C, Fig. 3, the chamber zones become filled with a gaseous content (in the nature of an intermediate and adjunctive stream) normally having, as a whole, only a slow formed movement, while kept in a state of surge, or intermixturing flowage; this surging action also obtains in the said outer zones (as f to f^2, Fig. 1) of the main-stream which, however, flows forwardly more rapidly. Thus the said main-stream is relieved from the usual resistance friction of a fixed tube-surface, and has a pecular and important mode of coaction with the actively inter-flowing material of the said outer surge-zone, (this being in Fig. 1 between the lines f and f^1), whereby there is a constant exchange of such material, from each of said zones to the other one thereof. In this manner, the material with which the air within the surge-chamber (or blending chambers) may be charged, and which may be reduced to a true mist or vapor, becomes continuously charged into the central-stream by an inter-exchanging of the substances thereof, so that this restoration, or re-supplying to the main-stream of segregated materials is effected without the aid of any momentum of such transferred particles, and hence is effectively accomplished notwithstanding the attainment of a truly vaporized condition of the air-charge.

From the foregoing description, it will now be evident how the present improvements and equipment arranged in the amplified form and organization illustrated in Figs. 1 and 3, constitutes a means for, and the operation thereof, a method for eliminating, (during the period of interblending), the tube-surface adherent-flowage which otherwise normally occurs while the main stream flows in contact with the inner tube-surface of an inclosing conduit tube; and how the said method consists in forming in a main-stream-enclosing

annular chamber, a tubular surge-layer of gas restricted in forward movement by dispersive-interceptors arranged in closely following series, and these so proportioned and located thereby to produce a continuous surging action throughout the length of said annular chamber, and for continuously therein first interchanging material from the main-stream outer zone to the surge-stream inner zone and at the same time from the surge-stream inner zone into said outer zone of the main-stream, and also continuing by impact and projection the throwing of unreduced air-charge material from the said chamber-stream into the interior of the main-stream.

Having thus described my invention, I claim:

1. In a stream unifying apparatus, the combination with an initial conduit, of a main stream unifying conduit forming a continuation of said initial conduit and having a greater inner diameter than the inner diameter of said initial conduit, dispersive interceptors arranged in a plurality of circumferential series in said main stream unifying conduit and forming a main stream channel and an annular tubular area surrounding said channel, the diameter of the main stream channel conforming substantiallly to the diameter of said initial conduit, the successive series being spaced from one another a distance less than the diameter of said main stream conduit, the series being also arranged in sets, the distance between successive series of successive sets progressively decreasing as they recede from said initial conduit.

2. In a stream unifying apparatus, the combination with an initial conduit, of a main stream unifying conduit forming a continuation of said initial conduit and having a greater inner diameter than the inner diameter of said initial conduit, dispersive interceptors arranged in a plurality of circumferential series in said main stream unifying conduit, the series being spaced from one another by annular merging chambers to form an annular tubular chamber and an inner main stream channel surrounded by said annular tubular chamber, the series being also arranged in sets, the distances between the successive series of each set being spaced from one another at a different distance relative to the spaces between the successive series of the other sets, the sets being arranged in a progressive order so that the sets having the greater spaces are nearest to the initial conduit.

3. In a stream unifying apparatus, the combination with a main stream unifying conduit having therein a main stream channel, of a plurality of annular sections disposed in said conduit, dispersive interceptors in a plurality of circumferential series and extending inwardly from said sections to form an annular tubular chamber surrounding said main stream channel, the distance between the successive series of each section being spaced from one another at a different distance relative to the spaces between the successive series of the other sections, the sections being arranged in a progressive order so that the stream will be progressively engaged by the sections having the series arranged closer to one another.

4. In a stream unifying apparatus, the combination with a main stream unifying conduit having therein a main stream channel, of a plurality of annular sections disposed in said conduit, dispersive interceptors in a plurality of circumferential series and extending inwardly from said sections to form an annular tubular chamber surrounding said main stream channel, the interceptors extending inwardly from the periphery of said sections and at acute angles to form abrupt impacting faces, the angles of the interceptors of each section being different relative to the angles of the interceptors of the other sections, the sections being arranged in a progressive order so that the stream will be progressively engaged by the sections having the steeper angles.

5. In a stream unifying apparatus, the combination with a main stream unifying conduit having therein a main stream channel, of a plurality of annular sections disposed in said conduit, dispersive interceptors in a plurality of circumferential series and extending inwardly from said sections at acute angles to form abrupt impacting faces and an annular tubular chamber surrounding said main stream channel, the distance between the successive series of each section being spaced from one another at a different distance relative to the spaces between the successive series of the other sections, the angles made with the sections by the interceptors of each section being different relative to the angles made by the interceptors with the other sections, and the sections being arranged in progressive order so that the stream will be engaged by the sections having the series arranged closer to one another in a progressive order and engaged by the sections having the steeper angles with the interceptors in a progressive order.

6. In a stream unifying apparatus, the combination with a main stream unifying conduit having therein a main stream channel, of a plurality of annular sections disposed in said conduit with successive sections having their abutting ends engaging one another and thus positioning them, said conduit having an inner periphery in size and dimension corresponding to the outer periphery of said annular sections to receive and positively position said annular sections against lateral displacement and dispersive interceptor blades formed on said sections in a plurality of circum-

ferential series and extending inwardly from each of said sections to form an annular tubular chamber surrounding said main stream channel.

7. In a stream unifying apparatus, the combination with a main stream unifying conduit having therein a main stream channel, of a plurality of annular sections disposed in said conduit with successive sections having their abutting ends engaging one another and thus positioning them, and dispersive interceptor blades formed in a plurality of circumferential series and extending inwardly from said sections to form an annular tubular chamber surrounding said main stream channel, the distance between the successive series of each section being spaced from one another at a different distance relative to the spaces between the successive series of the other sections, the sections being arranged in progressive order so that the stream will be engaged by the sections having the series arranged closer to one another in a progressive order.

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