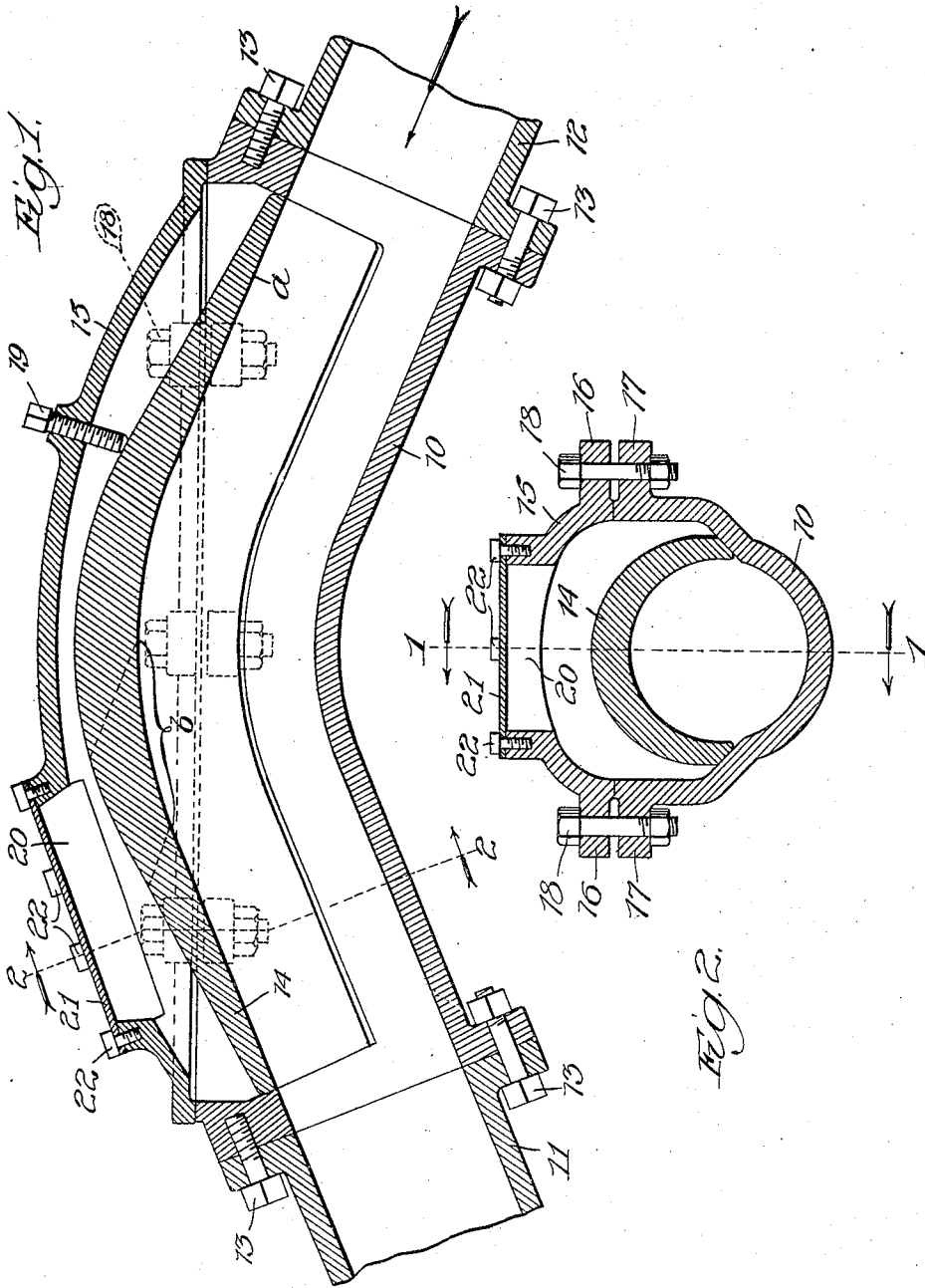


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ASH CONVEYING SYSTEM.
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1,305,491.

Patented June 3, 1919.



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UNITED STATES PATENT OFFICE.

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ASH-CONVEYING SYSTEM.

1,305,491.

Specification of Letters Patent.

Patented June 3, 1919.

Application filed March 21, 1918. Serial No. 223,802.

To all whom it may concern:

Be it known that I, HERMAN A. POPPENHUSEN, a citizen of the United States, residing at Hammond, in the county of Lake and State of Indiana, have invented new and useful Improvements in Ash-Conveying Systems, of which the following is a specification.

This invention relates to conveying systems for abrasive materials, such as ashes and the like.

Conveying systems of the kind mentioned generally comprise a pipe line made of a plurality of metal or other pipes connected end to end to form a conduit through which the ash or like material is moved pneumatically. Those portions of the pipe line where the ash current is distorted or its direction of flow abruptly altered or changed, as by elbow fittings or other bends, are subjected to an excessive and unequal degree of wear due to the increased abrasive action of the material against the inner surfaces of such pipe sections, brought about by changing or altering the direction of flow of the ash current. To relieve those pipe sections of such wear, it has been the practice to insert in the same wear resisting sections, such as liners and wearing backs, which are made of a material capable of withstanding such increased abrasive action longer than could the softer material or metal of which the pipe sections are usually made. Such wear resisting sections are usually made so that they may be removed from the pipe line when worn and be replaced by new ones, the pipe sections in which said wear resisting sections are placed being so constructed and arranged as to enable this to be done from the outside of the pipe line. Such wear resisting sections being subjected to an excessive wear during the operation of the system, makes it a condition to an economical maintenance of the system to frequently inspect such portions in order to guard against having the outer casing of the pipe line damaged by having a hole worn through the same by the abrasive material after a hole has been worn through the wear resisting portion. The class of labor employed about such systems is as a rule of very low intelligence, and it is the common practice to operate the system without any inspection being given to the same for the purposes noted. Consequently, no attention is given to the

condition of the wear resisting portions until there is an indication from the outside of the pipe line and that by the outer casing being worn through by the ash current after a hole has been worn through the wear resisting portion. Then it is too late, as the outer casing has been damaged and requires removal and replacement by a new one together with a new wear resisting portion, thereby increasing the maintenance cost of the system above what it should be if frequent inspection were made. This matter may best be illustrated by taking for example an elbow fitting or the like. The latter is usually provided with a removable wearing back, and it has been found in practice that the ash current concentrates more or less on one spot on the inner surface of said wearing back, such spot having an area of several inches in diameter. The result is that the constant impingement of the ash on such spot bores a hole through that portion of the back before any other portion of the back is worn through. When this happens the abrasive material flows through the hole just worn and acts against the outer casing of the elbow over the wearing back, with the result that said outer casing is very quickly worn through. Manifestly, when a hole is first worn through the back, a hole is very soon worn through that portion of the outer casing of the elbow over the worn portion of the back, with the result that the ash current is blown outside of the system through the hole worn in the outer casing of the pipe fitting, requiring, therefore, not only a replacement of the worn back but also a replacement of the whole or the damaged part of the outer casing, which in either case is an item of expense in the maintenance of an ash conveying system of this type.

It is among the objects of my invention to overcome the objections above noted and to provide means adapted to be applied to or associated with a pipe section having a wear resisting portion, or liner, or wearing back, as the case may be, so that such means may be quickly worn through after a hole has been worn through the wear resisting portion in order to indicate on the outside of the pipe section that the wear resisting portion has been worn through, and thereby prevent damage to the outer casing of the pipe section so that only the worn liner or the like and the means referred to are the

parts that need be replaced, and not any part of or the whole of the pipe section as has been the case heretofore. Consequently, with my invention applied to a pipe line, the system may be operated without fear of the outer casing of the pipe section embodying a wear resisting portion being damaged by the ash current wearing through the same, with the result that the maintenance cost of the pipe line is reduced to the minimum.

In the accompanying drawings—

Figure 1 is a longitudinal sectional view of a pipe section embodying the features of my invention and being taken on line 1—1 of Fig. 2; and

Fig. 2 is a transverse sectional view taken on line 2—2 of Fig. 1.

In the drawings, I have shown that portion of a pipe line of an ash conveying or like system embracing an elbow fitting 10, the latter being connected at its opposite ends with the pipe sections 11 and 12, respectively, the connection being made by any suitable form of clamping means, as for instance by clamping bolts 13, 13. Located within the elbow 10 is a removable wear resisting section or wearing back 14, the elbow 10 being formed to receive it. The opening formed in the wall of the elbow to permit the wearing back to be placed in and removed from the elbow is closed by a cover plate 15, which when in closed position forms a part of the wall of the elbow, as shown in the drawings. Said cover plate 15 is provided with outwardly extending side flanges 16, 16 positioned over similar flanges 17, 17 provided on the other portion of the elbow 10, as shown in Fig. 2. To clamp the cover plate 15 in closed position there is provided a suitable form of clamping means, which may take the form of clamp bolts 18, 18 inserted through said flanges. The wearing back 14 has its marginal edges bearing against the body portion of the elbow fitting 10, and is held in such position by one or more set screws 19 inserted through the cover plate 15 for that purpose. The current of ash or other abrasive material flows through the elbow 10 in the direction shown by the arrow in Fig. 1, and by reason of the curvature of the elbow it follows that the main impact of the ash current is concentrated against one spot on the inner curved surface of the wearing back 14. Such spot where maximum wear occurs can readily be predetermined or ascertained beforehand. With the degree of endwise curvature given to the inner face *a* of the wearing back 14 shown in Fig. 1, such spot would be at about the place marked *b* and cover an area of several inches in diameter. The wearing back 14 is first worn through in said spot, due to the boring effect of the increased abrasive action of the material constantly contacting

against that portion of the wearing back, and to prevent the cover plate 15 being damaged by having a hole worn therethrough after a hole has been worn through the wearing back, I provide in such cover plate an opening 20 located in substantial alignment with that portion *b* of the wearing back 14 which is worn through first. Said opening 20 is closed by a supplemental cover plate 21, preferably made from a relatively thin sheet of sheet metal or other material and clamped in closed position by a plurality of clamping screws 22 inserted through the plate 21 and into that portion of the main cover plate 15 about the opening 20, as shown in the drawings. Manifestly, after a hole has been worn through such portion *b* of the wearing back 14, the ash current acts against the supplemental cover plate 21 and soon wears a hole there-through, thus permitting the ash current to blow out of the pipe section 10 through such hole and serve as a means to indicate on the outside of the pipe line that said wearing back 14 has been worn through and needs replacement. Said plate 21 is preferably made of relatively thin material so that it may be worn through quickly and permit an indication to be given on the outside of the pipe line as soon as the wearing back 14 is worn through, and thus receive immediate attention before any damage is likely to be done to the pipe section proper. Furthermore, said plate 21 is made of relatively inexpensive material, so that when worn through it may be replaced by a new one at exceedingly small cost. It logically follows, therefore, that the maintenance cost of the pipe section 10 may be kept at the minimum, because by the provision of the inexpensive plate 21 the pipe section proper is not damaged when the wearing back 14 is worn through, and the only parts that need be replaced when worn are the wearing back and the plate 21, the latter being a negligible item of expense when compared with the cost of replacement of the cover plate 15 or the entire pipe section proper. As before stated, the spot where maximum wear occurs may be readily predetermined or definitely located beforehand in any installation, and the inexpensive removable cover plates 21 may be located in the outer wall of the pipe sections where needed, that is, in alignment with such spot or spots as the case may be. While I have shown and described in detail herein my invention as being applied to an elbow fitting, yet it is to be of course understood that my invention may be readily applied to any other portions of the pipe line where required, such as straight fittings having liners or other wear resisting portions.

Moreover, while I have shown and described herein in detail one preferred form

of device constructed in accordance with my invention, yet it is to be of course understood that the several details of construction and arrangement of parts shown may be variously changed and modified without departing from the spirit and scope of my invention, and I do not wish to be limited to the exact details of construction and arrangement of parts illustrated, except as pointed out in the appended claims.

I claim as my invention:

1. A pipe section adapted for use in an ash conveying or like system, and having a wear resisting portion therein, said pipe section having an opening in its outer wall, and a cover plate for said opening and adapted to be worn through after said wear resisting portion has been worn through.

2. A pipe section adapted for use in an ash conveying or like system, and having a wear resisting portion therein, said pipe section having an opening in its outer wall opposite a wearing area in said wear resisting portion, and a cover plate for said opening and adapted to be worn through after said wear resisting portion has been worn through in said wearing area.

3. A pipe section adapted for use in an ash conveying or like system, a wear resisting member in said pipe section, that part of the latter covering said wear resisting member being provided with an opening extending therethrough opposite a wearing area in said member, and a cover plate for said opening and adapted to be worn through after said member has been worn through in said wearing area.

4. A pipe section adapted for use in an ash conveying or like system, said pipe section being made in two longitudinal parts adapted to be clamped together, a removable wear resisting member in said pipe section between the two parts thereof, one of the parts of said pipe section being provided with an opening extending there- through opposite a wearing area in said member, and a covering for said opening.

5. A pipe section adapted for use in an ash conveying or like system, said pipe section comprising a body part and a detachable cover part, a liner in said pipe section and having said cover part extending over the back of said liner, said cover being provided with an opening therein, and a cover plate for said opening.

6. A pipe section adapted for use in an ash conveying or like system, said pipe section comprising a body part and a detachable cover part, a liner in said pipe section and having said cover part extending over the back of said liner, said cover being provided with an opening therein opposite that portion of said liner which is worn through first by the abrasive action of the material flowing thereagainst, and a cover for said opening.

In testimony that I claim the foregoing as my invention, I affix my signature in the presence of two witnesses, this 16th day of March, A. D. 1918.

HERMAN A. POPPENHUSEN.

Witnesses:

ARTHUR P. STRONG,

H. P. WILSON.