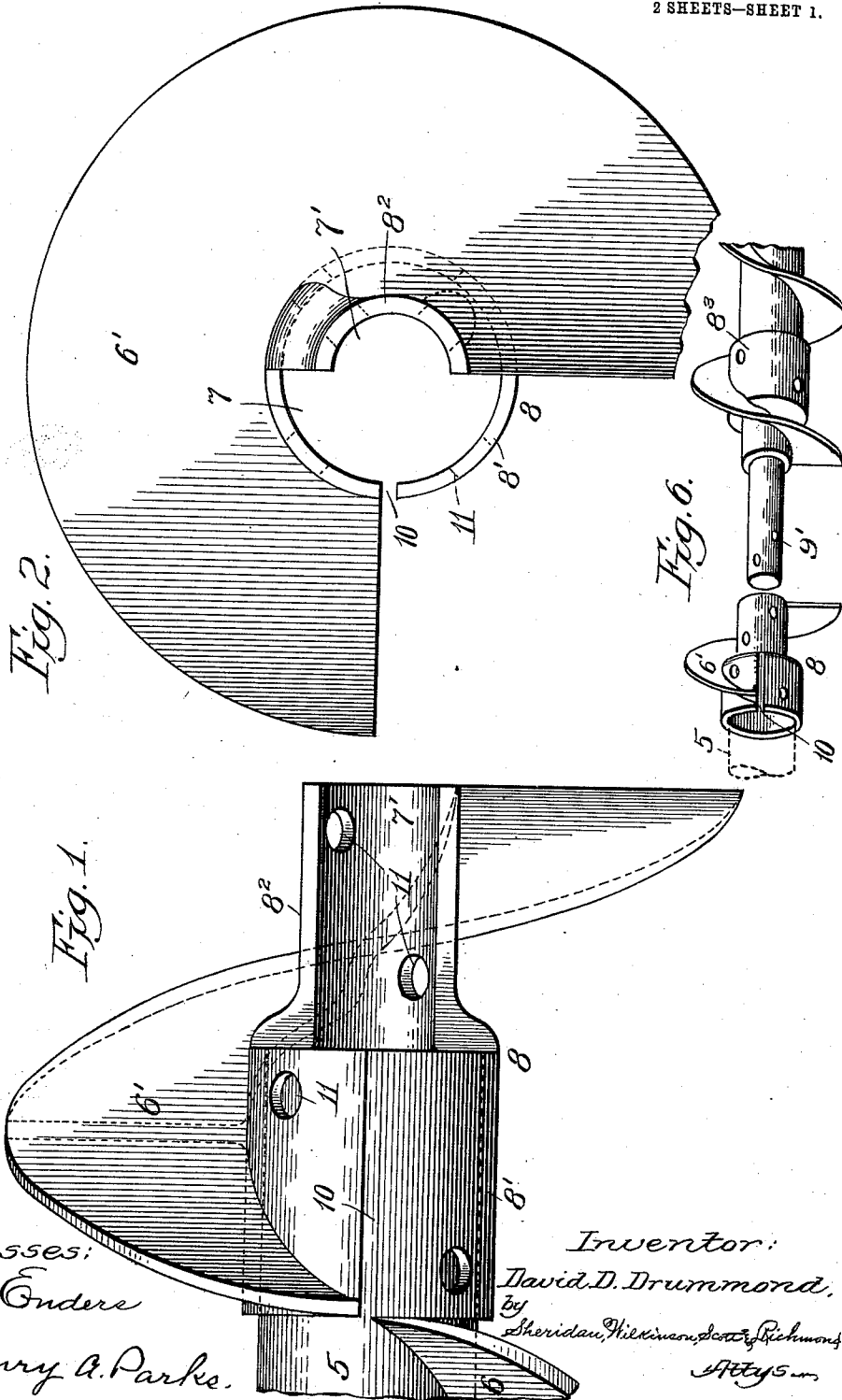


D. D. DRUMMOND.
SCREW CONVEYER.
APPLICATION FILED JULY 22, 1910.

1,019,438.

Patented Mar. 5, 1912.
2 SHEETS—SHEET 1.



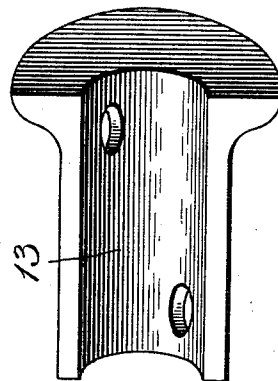
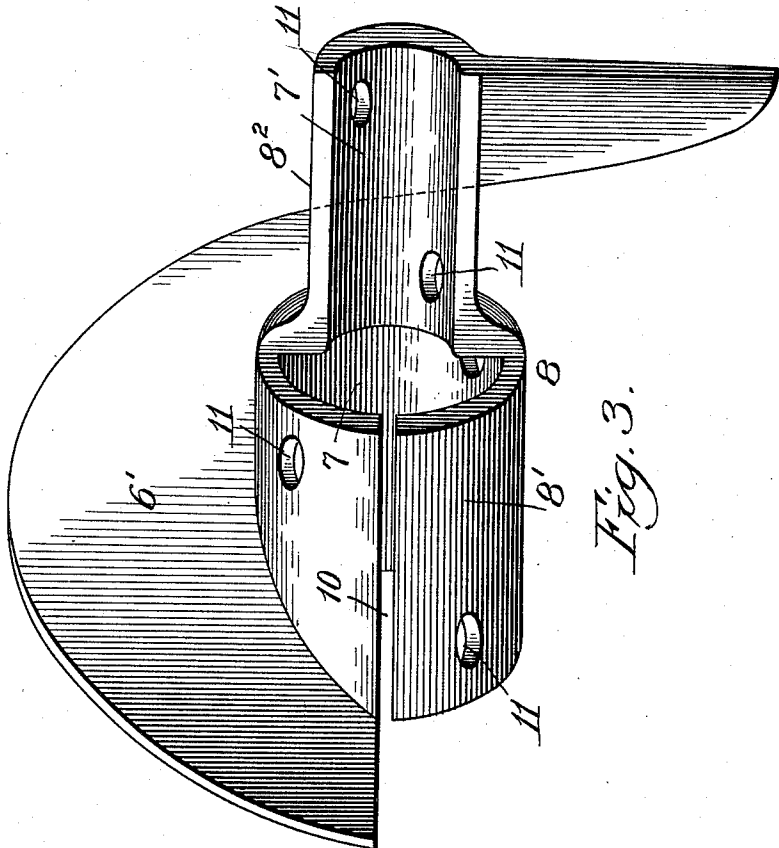
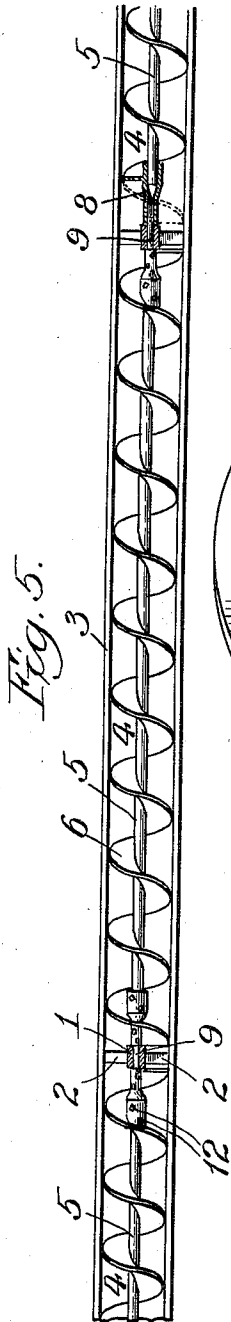
Witnesses:
John Enders
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UNITED STATES PATENT OFFICE.

DAVID D. DRUMMOND, OF OGLESBY, ILLINOIS.

SCREW CONVEYER.

1,019,438.

Specification of Letters Patent.

Patented Mar. 5, 1912.

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To all whom it may concern:

Be it known that I, DAVID D. DRUMMOND, a citizen of the United States, residing at Oglesby, in the county of Lasalle and State of Illinois, have invented certain new and useful Improvements in Screw Conveyers, of which the following is a specification.

My invention consists in an improvement in screw conveyers and is especially directed to means for joining together the sections of a conveyer which is constructed in separable parts, and means whereby the parts of the screw conveyer flight which are subjected to the greatest amount of wear may be easily replaced.

In the manufacture of cement and other lines of industry, screw conveyers of such length as to necessitate their construction in separable sections are used and by reason of the length of these conveyers they are supported by journal bearings at a plurality of points throughout their length, the journal bearings generally being located at the point of junction between the separable sections of the conveyer. The conveyers operate in conduits taking the form of troughs or pipes and the supports for the journal boxes form an obstruction to the material being conveyed. Furthermore the screw conveyer flight is necessarily discontinued at each journal box for a distance equal at least to the length of the bearing. Owing to the interruption in the screw conveyer flight at each of the journal boxes and the resistance offered by the journal box and its support there is a tendency for the material to accumulate at the delivery end of each conveyer section opposite the journal box and extending back therefrom in a direction opposite to that in which the material is conveyed. This accumulation of material imposes more wearing action upon the delivery end of each conveyer flight adjacent the journal box than upon other parts thereof, and the abrasive action of the material not only wears down the sides of the conveyer flight, but also wears away its edge. As the edge of the conveyer flight is worn away at its delivery end the accumulation of material above referred to increases and extends farther back from the journal box along the conveyer section by reason of the failure of the worn out end part of the conveyer flight to properly move the material. As the accumulation of material extends

back farther from the journal box the wearing action referred to extends to parts of the conveyer flight more remote from the end. By reason of this fact the abrasion and wearing away of the conveyer flight proceeds from the delivery end of the conveyer flight adjacent to the journal box in a direction opposite to the movement of the material, thus resulting in a worn conveyer taking a tapering form, its external diameter measured between the outside edges of the screw conveyer flight decreasing progressively toward the delivery end. The excessive wearing action, however, starts at the delivery end of the conveyer flight and the wearing action due to the accumulation of material resulting from the obstruction caused by the journal box and the interruption of the screw flight is confined in a new conveyer to the portion of the screw flight immediately adjacent the delivery end. Such excessive wearing action spreads to the other parts of the conveyer flight only as the end portion becomes worn away and permits the accumulation of material to extend backward by reason of the imperfect action of the worn part of the flight. It will, therefore, be apparent that the rapid deterioration of screw conveyers due to the causes above mentioned may be prevented by avoiding the excessive wear of the delivery end of the flight, or by replacing the part of the flight adjacent the delivery end before it has become so much worn away as to permit the accumulation of material and excessive wearing action to extend back to other parts of the conveyer flight.

My invention provides means for securing the purpose above referred to in both of the ways suggested, that is by making the delivery end of the conveyer flight readily replaceable and, if desired, by also constructing the delivery end whether replaceable or not of a metal of high resistance to wear such as manganese-steel or other hard mixture.

Owing to the high abrasive action of material handled in screw conveyers the bearings wear out very rapidly, thus necessitating frequent replacement. As ordinarily constructed the separate sections of a screw conveyer consist of pipes, or sometimes solid shafts, having the screw conveyer flight secured thereto. The adjoining ends of the several sections are joined together by

gudgeons which bear in the journal boxes. These gudgeons fit within the ends of the pipes or within sockets formed in the ends of the solid shafts. In order to renew these gudgeons it is necessary that either a large part of the conveyer be moved longitudinally to a sufficient extent to disengage the gudgeons from their sockets, or to forcibly bend the conveyer at the point where a gudgeon is to be replaced to a sufficient extent to disengage the gudgeon from its socket. Such replacement of gudgeons is a frequent necessity owing to the high abrasive action of the material conveyed and the operation of replacement occupies a considerable length of time, thus necessitating frequent "shut-downs" with the resulting loss of time both in the matter of machinery and labor.

The objects of my invention not only include means for renewing the part of the conveyer flight subjected to the greatest wear, but also include means for permitting such removal and the renewal of the gudgeons without the necessity of moving any part of the conveyer longitudinally or forcibly bending it outward at the point of renewal.

The objects and nature of my invention and the means whereby the purposes above set forth are accomplished will more clearly appear from the following specification and claims, taken in connection with the accompanying drawings, in which—

Figure 1 is an elevation of a coupling member bearing a section of the screw conveyer, and a portion of the connected conveyer section, the coupling member being shown with its detachable cap removed. Fig. 2 is an end view of the structure shown in Fig. 1. Fig. 3 is a perspective view of one of the coupling members with its detachable cap removed. Fig. 4 is a perspective view of the detachable cap. Fig. 5 is a diagrammatic view of a series of conveyer sections mounted in a conveyer box. Fig. 6 is a perspective view of a modified embodiment of my invention.

Referring to Fig. 5, the conveyer is shown rotatably mounted in journal boxes 1 supported upon braces 2 in the trough 3. The main body of the conveyer is made up of sections 4, each section comprising a shaft 5 upon which is secured a screw flight 6 which may consist either of a ribbon of sheet metal or a casting made in sections or otherwise. The flight 6 terminates at each end some distance short of the end of the shaft 5, leaving the ends of the shaft 5 free in order that they may be fitted within the cylindrical recesses or sockets 7 in the coupling members 8. Each of the coupling members 8 is substantially cylindrical in form and hollow and comprises the end 8' having the opening 7, in which the shaft 5 is received

and the reduced end 8² having the recess 7' in which the gudgeon 9 is received. Extending around and secured to or integral with the coupling member 8 is a screw flight 6' designed when the parts are assembled to form a continuation of the screw flight 6 upon the conveyer section 4, the screw flight 6' extending from end to end of the coupling member 8. The smaller gudgeon receiving end 8² of the coupling member 8 comprises two semi-cylindrical halves, one which is integral with the main body of the coupling member and the other separable therefrom. The larger end 8' of the coupling member 8 may be slotted longitudinally, as indicated at 10, and bolt holes 11 extend through the shell of the coupling member, there being preferably two bolt holes disposed at an angle to each other in each of the parts 8', 8² of the coupling member. Matching bolt holes are provided in the ends of the shafts 5 of the conveyer sections and in the ends of the gudgeons 9.

In assembling the structure the coupling sections 8 are fitted to the ends of the shafts 5 of the conveyer sections 4 and secured thereon by means of bolts 12 passing through the bolt holes in the coupler sections and shafts. The conveyer sections, with their attached coupling members, being in place in the trough 3, the separable caps 13 are removed from the smaller ends 8² of the coupling members, of which they form a part when the device is assembled. The gudgeons 9 are then inserted in the journal bearings 1 with their projecting ends lying in the semi-cylindric cavities 7' in the coupling members. The caps 13 are then fitted in position in the coupling members over the ends of the gudgeons and secured to the gudgeons and to the integral half of the gudgeon socket in the coupling member by means of bolts passing through the bolt holes in the cap 13, the gudgeon and the integral part of the shell of the gudgeon socket. In the event that it is necessary to replace one of the gudgeons by reason of its becoming worn it is only necessary to unbolt and remove the caps 13 and to open the journal box, thereby permitting the gudgeon to be lifted out and a new one substituted therefor. This operation consumes only a few minutes and is accomplished without disturbing any parts of the conveyer other than those mentioned. In the event of the necessity arising for renewing the end of one of the conveyer flights owing to the wear due to the causes above mentioned, such renewal can also be effected by simply taking out the gudgeon as above described, removing the bolts which secure the coupling member bearing the worn conveyer flight, slipping this coupling member off from the end of the shaft 5 and replacing it with a new one. The parts are then again

assembled as above described without disturbance of any other parts of the conveyer structure.

It is generally preferable that the gudgeons be separable from the coupling member as above described owing to the fact that they wear rapidly under the action of the abrasive material upon which the conveyer operates. In some instances, however, by reason of the nature of the material conveyed or from other causes, it may be permissible and desirable to construct the gudgeon integral with one of the two coacting coupling members. Such a construction is illustrated in Fig. 6 in which the gudgeon 9' is made integral with the coupling member 8³ and is adapted to be received in the coacting coupling member 8, which may be of the form above described. In this modification the coupling member 8³ will have the usual socket to receive the end of the shaft 5 of one of the conveyer sections, but the gudgeon 9', being made integral therewith, there will be no separable cap 13 thereon. In both forms the slot 10 in the part of the coupling member which receives the shaft 5 will allow the coupling member to be drawn inwardly by the bolts, thus securing a firm hold upon the end of the shaft. I prefer to construct the coupling member of some mixture such as manganese-steel which offers a high resistance to the abrasive action of the material operated on, thereby increasing the life of the portion of the conveyer flight which is subjected to the greatest wear, and also protecting the remaining parts of the conveyer flight against the destructive abrasion to which they are subjected when the delivery portion of the conveyer flight becomes worn and permits the accumulation of material at a point farther back upon the conveyer. Many of the advantages of my invention, however, are secured even when the coupling members and the conveyer flight mounted thereon are constructed of the same material as the remainder of the conveyer by reason of the fact that the structure is of such a character that the coupling members with their attached conveyer flights can be easily and speedily replaced as soon as they become worn and before there has been a destructive wearing action upon the main conveyer section 4.

While I have illustrated and described my invention in connection with the specific form thereof illustrated in the drawings, it will be understood that the structure shown and described is merely illustrative of one mode of applying my invention, and that the broad principle thereof may be embodied in mechanical structures of widely different form.

I claim:—

1. A coupling for spiral conveyer sec-

tions, said coupling comprising a head having a recess therein, a coacting member adapted to be received and secured in said recess, the part of said head on one side of said recess being detachable to permit separation of said head and coacting part without longitudinal movement thereof.

2. A screw conveyer comprising a plurality of sections, journals between the adjoining ends of said sections, coupling means bearing in said journals and secured to said conveyer sections, and conveyer flights upon said coupling means.

3. A screw conveyer formed in separable sections, connecting gudgeons, each conveyer section comprising a shaft with a screw flight mounted thereon, coupling members having sockets to receive the ends of adjoining shafts and gudgeons, each coupling member having a separable cap forming one side of one of the sockets therein, and means for securing said parts together.

4. A screw conveyer formed in separable sections, connecting gudgeons, each conveyer section comprising a shaft with a screw flight mounted thereon, coupling members having sockets to receive the ends of adjoining shafts and gudgeons, each coupling member having a separable cap forming one side of one of the sockets therein, screw flights on said coupling members, and means for securing said coupling members to said shafts.

5. A screw conveyer formed in separable sections, each section comprising a shaft having a screw flight mounted thereon, said shafts at their ends extending beyond said screw flights, gudgeons and coupling members, each of said coupling members having a socket in one end fitted over the adjoining shaft, and a socket in the opposite end fitted over one end of one of said gudgeons.

6. A screw conveyer formed in separable sections, each section comprising a shaft having a screw flight mounted thereon, said shafts at their ends extending beyond said screw flights, gudgeons and coupling members, each of said coupling members having a socket in one end fitted over the adjoining shaft, a socket in the opposite end fitted over one end of one of said gudgeons, and screw flights mounted on said coupling members.

7. A screw conveyer comprising separate sections having screw conveyer flights mounted thereon, journal boxes at the junctions of said sections, gudgeons bearing in said journal boxes, coupling members between said gudgeons and the adjoining ends of said shafts, each of said coupling members having sockets to receive the adjacent ends of one of said gudgeons and shafts, and screw conveyer flights mounted on said coupling members.

8. A screw conveyer comprising separate
sections having screw conveyer flights
mounted thereon, journal boxes at the junctions of said sections, gudgeons bearing in
5 said journal boxes, coupling members between said gudgeons and the adjoining ends
of said shafts, each of said coupling members having sockets to receive the adjacent ends
of one of said gudgeons and shafts, and
10 screw conveyer flights mounted on said cou-

pling members, one side of one of said sockets in said couplers consisting of a detachable cap to permit removal of said coupler without longitudinal movement.

In testimony whereof, I have subscribed 15 my name.

DAVID D. DRUMMOND.

Witnesses:

A. M. CORBUS,

R. G. CRESSMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
