(No Model.)

2 Sheets—Sheet 1.

A. DESGOFFE.

CONVEYER.

No. 551,852. Patented Dec. 24, 1895.

Fig. 1.

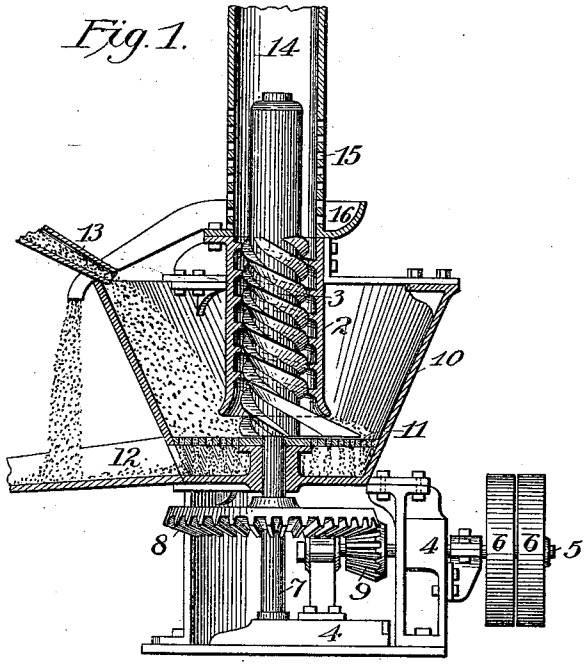


Fig. 2.

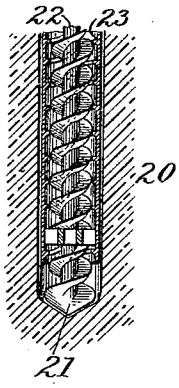


Fig. 3.

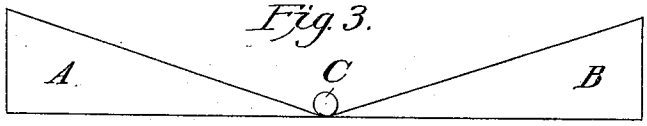


Fig. 4.

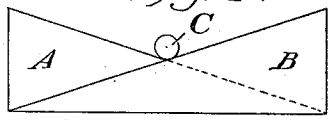
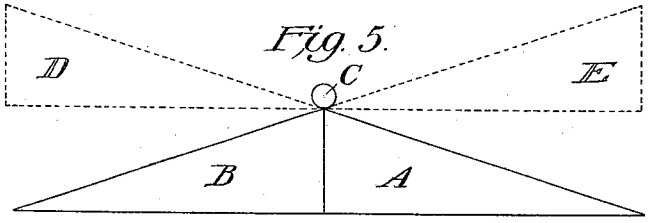


Fig. 5.



Witnesses.

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(No Model.) 2 Sheets—Sheet 2.

A. DESGOFFE.

CONVEYER.

No. 551,852. Patented Dec. 24, 1895.

Fig. 6.

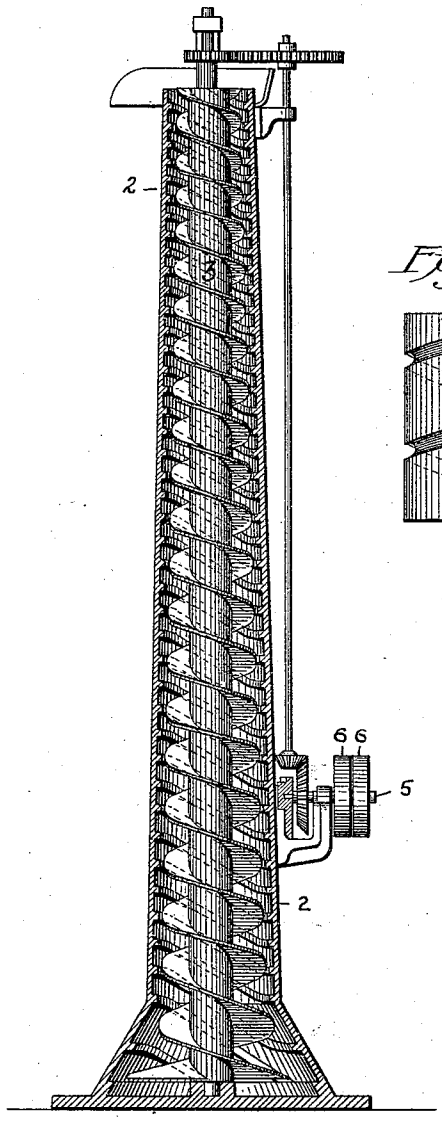


Fig. 7.

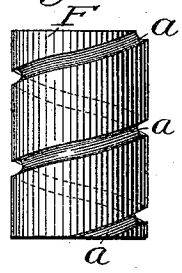


Fig. 8.

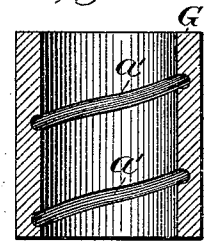
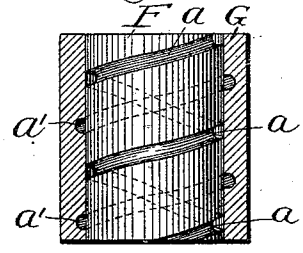


Fig. 9.



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UNITED STATES PATENT OFFICE.

AUGUSTE DESGOFFE, OF ODESSA, RUSSIA.

CONVEYER.

SPECIFICATION forming part of Letters Patent No. 551,852, dated December 24, 1895.

Application filed November 10, 1891. Serial No. 411,521. (No model.) Patented in Germany June 14, 1888, No. 43,452; in Belgium January 8, 1890, No. 89,115; in France January 23, 1890, No. 203,322; in England April 16, 1890, No. 5,768, and in Italy May 20, 1890, No. 27,538/81.

To all whom it may concern:

Be it known that I, AUGUSTE DESGOFFE, a citizen of France, residing at Odessa, in the Empire of Russia, have invented certain new and useful Improvements in Conveyers, of which the following is a specification, the same having been patented in France January 23, 1890, No. 203,322; in Belgium January 8, 1890, No. 89,115; in Italy May 20, 1890, No. 27,538/81; in Germany June 14, 1888, No. 43,452, and in Great Britain April 16, 1890, No. 5,768.

My present invention relates to conveyers; and it consists of certain novel parts and combinations of parts particularly pointed out in the claims concluding this specification.

In the accompanying drawings, Figures 1, 2 and 6 are vertical longitudinal sections through conveyers embodying the principles of my present invention. Figs. 3, 4, 5, 7, 8 and 9 illustrate the principles of the system involved in my present invention.

In each of the triangles A, B, D and E, Figs. 3, 4 and 5, the base may be regarded as representing the circumference of the cylinder internally and externally provided with a spiral thread or groove, the vertical side the pitch of said spiral thread or groove, and the hypotenuse the inclination of said thread or groove throughout one convolution. C illustrates a particle of fluid or any other substance acted upon by these threads. Assuming that the triangles A and B are placed point to point, as shown in Fig. 3, and that a particle of fluid rests between them at the point of juncture, if both these triangles be now moved toward each other, when they have reached the relative position indicated in Fig. 4—that is, when each has moved one-half its length—the particle C will have advanced to the position there indicated. When continuing the same motion, these triangles have reached the position indicated in Fig. 5 the particle C will have advanced to the position there indicated, where it rests between the approaching triangles D E, which operate in turn and in the same way upon the particle, until it is discharged from the system with a given velocity or at a given pressure. If these triangles represent the circumferences of two concentric cylinders (see Figs. 7, 8 and 9) and the inclination or pitch of the screw-threads engraved on their surfaces in opposite directions, it is obvious that, if both cylinders move, when each has made one complete revolution, any particle contained between the threads will be moved a distance equal to the common pitch of their threads, assuming that the pitch of the threads on both surfaces is the same. It will also be obvious that if one of said triangles remains stationary while the other moves, the particle will be moved a distance equal to one-half the pitch of the threads, when said moving triangle has moved a distance represented by its base; or, in other words, when one of said cylinders remains fixed and the other makes one complete revolution, the particle will have advanced one-half the pitch of the threads.

In Figs. 7, 8 and 9, F represents a cylinder, and A the threads engraved thereon. G represents an inclosing case, and a' the opposing threads engraved thereon. Fig. 9 shows these parts assembled.

I will now proceed to describe the various structures illustrated in the accompanying drawings, which read in connection with this description will contain sufficient information to instruct persons skilled in the art to practice my invention and to understand its nature.

2 2, Figs. 1 and 6, is a cylindrical case, the interior surface of which is provided with screw-threads inclined in one direction. 3 is a cylindrical piston provided with spiral threads inclined in the opposite direction. The opposing cylindrical surfaces of both piston and case are, therefore, provided with spiral threads inclined at an angle so as to cross each other, the external diameter of the threads on the piston being preferably slightly smaller than the internal diameter of the threads on the case, so that said piston is a moderately loose fit.

4 is a base-plate of the machine, in which is journaled a shaft 5, which carries fast and loose pulleys 6 6 to be operated by means of a belt from any suitable source of power.

7 is a piston-shaft having an end bearing on the base-piece 4.

8 is a beveled gear-wheel attached to the shaft, and 9 is a corresponding gear-wheel attached to the shaft 5. By means of these gears the power applied to the fast pulley 6 is transmitted to the piston.

Set upon the base-plate 4 is a hopper 10, in which the piston-shaft is journaled. This hopper is provided with a false perforated bottom 11 and with a discharge-chute 12.

13 is a delivery-chute by means of which the material to be elevated is fed into the hopper.

Set upon the upper end of the case 2 is an exit-tube 14, provided with perforations 15 about its base.

16 is an annular rim in the form of a saucer around the base of the tube 14, provided with a spout which delivers into the exit-chute 12.

The case 2 is supported on an extension from the sides of the hopper 10.

In operation the material to be elevated is fed through the delivery-chute 13 into the hopper. If the material be in a semi-fluid or moist condition a portion of the fluid contained in it will pass through the perforations in the false bottom 11 and be discharged through the exit-chute 12.

The essential features of antispire structures are a plurality of opposing surfaces, each provided with continuous threads, the threads on the opposing surfaces being inclined so as to cross each other. In such a structure the movement of one or both surfaces will cause matter to be propelled therethrough, and hence it is applicable to conveyers to raise all kinds of materials. The cylinder 2 and piston 3 are provided, as I have said, with such oppositely-inclined threads, the threads on the case being traced from left to the right, and the threads on the piston being traced from right to left. The lower threads on the piston terminate in flanges extending out below the lower end of the case, forming a gatherer, so as to more readily engage with the material contained in the hopper. This piston being revolved draws the material up from the hopper and lifts it through the exit-tube 14. If the material when it reaches the exit-tube still contains water, and it is desirable to remove it before it is delivered into the receptacle toward which it moves, perforations 15 may be made, as shown, in the lower end of the tube 14, in which tube the material is under considerable pressure due to the weight of the material above it and the friction between the moving matter and the walls. Hence, the water is expressed and, passing through such perforations, is collected into the flange 16 and flows down into the chute 12.

In Fig. 2 I have shown the application of this same principle to raising débris from the bottom of a shaft at the same time that the said material is being dislodged by a drill. In said figure the diagonal lines 20 indicate the soil or rock or other material, into which a hole is being drilled. 21 is a drill of ordinary construction. 22 is a shaft provided with continuous spiral threads, and 23 is a cylindrical case provided with continuous spiral threads inclined in the opposite direction. On the end of the shaft 22 the drill 21 is suitably attached, the drill being large enough to bore a hole slightly larger than the external circumference of the case 23. Power is applied to the shaft 22, causing it and the drill attached to its lower end to revolve, disintegrating the material on which it operates, which is then by the agency of the screw-threads on the cylinder and the case removed upward and discharged.

Any suitable drill or device for disintegrating or dislodging the material operated upon may be substituted for that shown in the drawings. If it operates by direct shock instead of by boring, the same device may also be employed for removing the material dislodged either by giving the shaft 22 a rotary motion, as well as a longitudinal motion, or by, at suitable intervals, imparting to it said rotary motion.

Experience has taught me that the most advantageous inclination for the threads is an angle of seventeen degrees forty minutes on both the piston and case, although other inclinations may be employed, if desired. The shape, number, and capacity of these threads, which may be the same or different on the piston and case, may vary almost indefinitely, the conditions of the material to be elevated being the most important factor in determining the form most advantageous.

The gatherer, which in Fig. 1 is formed of a lateral extension of the spiral threads, is especially desirable when fibrous, granulated, or similar matter is to be elevated, but any suitable form of gatherer may be employed in all cases, although in general I prefer the form shown.

These conveyers may not only be employed as above described, but they may be used as separators of substances of different density or of different fluidity by controlling the speed at which the parts operate. When running slowly they can only raise solid substances. An acceleration of speed will enable them to raise semiliquids also. A further acceleration of speed will enable them to raise liquids as well as solids and semiliquids.

Various other forms of conveyers still involving the antispire system may be described, but in all the general principles of operation will be the same, and a description of them is therefore unnecessary here. Even concerning these which are shown, it will be understood that my invention is not limited to the precise devices and combinations of devices shown, but that various modifications not violating the principles of my invention may be made without exceeding the scope of the claims concluding this specification.

Many of the combinations and details above described are not essential to the several features of my invention, separately and broadly considered. All this will be indicated in the

concluding claims, as in any given claim the omission of an element described, or the absence of reference to the details of the elements mentioned, is intended to be a formal declaration of the fact that the omitted elements or features are not essential to the invention therein covered.

Having thus described several machines embodying the features of my present invention in forms at present preferred by me, what I claim, and desire to secure by Letters Patent, is—

1. In a conveyer, the combination with a moving and a stationary part having continuous threads on their opposing surfaces, the threads on each surface being inclined so as to cross the threads on the opposing surface at an angle, and of a gatherer by means of which the material to be elevated is brought under the influence of said opposing threads.

2. In a conveyer, the combination with a moving and a stationary part having continuous threads on their opposing surfaces, the threads on each surface being inclined so as to cross the threads on the opposing surfaces at an angle, and of a gatherer for bringing the material under the influence of said threads, consisting of an extension of said threads.

AUGUSTE DESGOFFE.

Witnesses:
C. MEUERINE,
EUG. WAR.