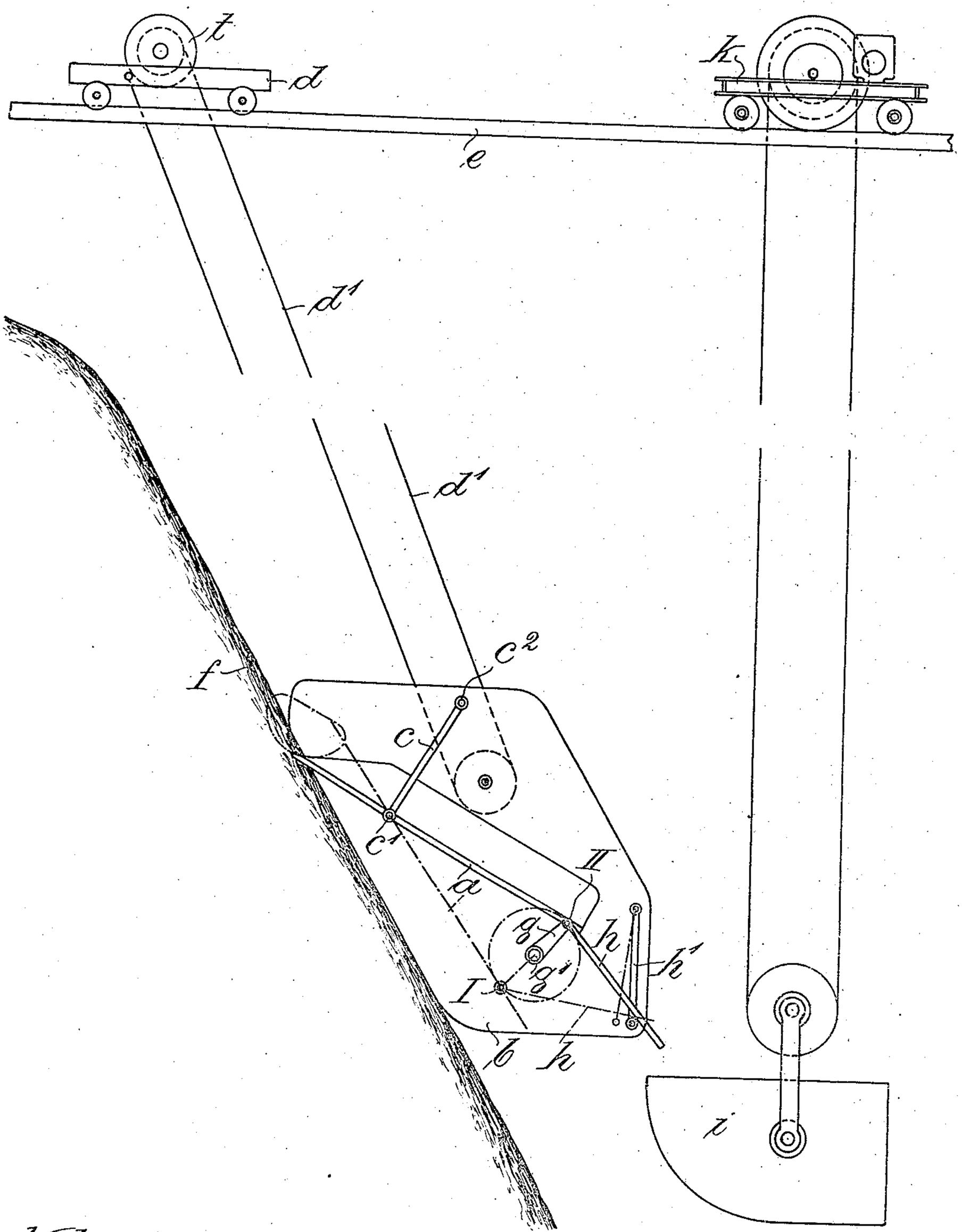
No. 843,786. PATENTED FEB. 12, 1907.

E. ARNST.

AUTOMATICALLY OPERATED SHOVEL.

APPLICATION FILED JULY 16, 1906.



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UNITED STATES PATENT OFFICE.

EMIL ARNST, OF BENRATH, NEAR DÜSSELDORF, GERMANY, ASSIGNOR TO THE FIRM OF BENRATHER MASCHINENFABRIK ACTIENGESELLSCHAFT, OF BENRATH, NEAR DÜSSELDORF, GERMANY.

AUTOMATICALLY-OPERATED SHOVEL.

No. 843,786. Specification of Letters Patent. Patented Feb. 12, 1907.

Application filed July 16, 1906. Serial No. 326,445.

To all whom it may concern:

Be it known that I, EMIL ARNST, a subject of the King of Prussia, German Emperor, and resident of Benrath, near Düsseldorf, in the German Empire, have invented certain new and useful Improvements in Mechanically-Operated Shovels, of which the following is an exact specification.

My invention relates to an automatically-operated shovel; and the novelty consists in pivotally suspending the shovel at its front end and connecting it with a crank or any other means suitable for moving the shovel at its rear end.

My improved shovel is intended for loading goods (as ores and the like) liable to stick together when piled up in mounds in a taking-up receptacle arranged behind the shovel. The shovel is arranged in some distance behind the goods to be conveyed and receives a to-and-fro motion toward and from the pile by a suitable moving device at the rear end of the shovel, so that during the motion toward the pile the front edge of the shovel penetrates into the goods to be conveyed in a taking-up receptacle.

An example how my improved shovel can be constructed in a preferable manner is illustrated in the accompanying drawing, in which my invention is represented in side elevation in a diagrammatical manner.

a designates the shovel, constructed at its front end to facilitate the penetration of the shovel in the goods piled up and designated with *f*. Near the front edge of the shovel the suspending-rod *c* is pivotally connected at *c'* with the shovel. The other end of the rod *c* is hinged at c^2 with a bearing-support *b*, which can be constructed in accordance with the special circumstances of the work to be done. *g* is a crank-lever, the shaft *g'* of which is also mounted in the support *b*, which may be operated by an electromotor or any other suitable driving means. The free end of the crank-lever *g* is pivotally joined to the rear end of the shovel. At the same end the conveying sheet-iron *h* is hinged with the shovel and carried at its other end by the rod *h'* in such manner that connection is always maintained between the shovel and the part *h* while the shovel is moving. The support *b* is suspended from a traveler *d* by means of a rope *d'* or any other suitable strain means. The drum *t* of the traveler *d* is driven by an electromotor or any other suitable means. The traveler *d* runs on a track *e*. Of course the suspension of the bearing-support *b* can be effected in a stationary manner.

Apart from the shovel a taking-up receptacle *i* is arranged, suspended from the traveler *k* and serving for receiving the goods hoisted by the shovel.

The arrangement as just described operates in the following manner: Owing to the suspension of the shovel *a* by means of the rods *c*, the shovel can effect when driven by the crank *g* a swinging motion toward and from the pile from which the goods are to be taken. The front edge of the shovel describes an ellipsoidal curve, as indicated in the drawing in dotted lines. The lowest position occupied by the shovel is also indicated in the drawing. During the motion of the shovel toward the pile the shovel is pushed in at an acute angle and a part of the goods separated from the pile. Due to the strongly-inclined position of the shovel, at its further motion the goods falls down on the sheet-iron *h*, from which it sinks down into the receptacle *i* when the crank *g* moves from the position I to the position II.

Instead of arranging a separated receptacle *i* the bearing-support *b* can be adapted to receive the goods. The shape of the shovel can be of different form. The shovel can be curved in different directions, and also its front edge can be curved or provided with teeth or points in order to facilitate the sticking in.

Having thus fully described the nature of my invention, what I desire to secure by Letters Patent of the United States is—

1. An automatically-operated shovel, comprising in combination the shovel proper, a suspension device at the front end of the shovel, a moving device at the rear end of the shovel, a bearing-support carrying the shovel and the moving device, and means for suspending the bearing-support.

2. An automatically-operated shovel, comprising in combination the shovel proper, suspending-rods pivotally joined to the front end of the shovel, a crank-lever pivotally joined to the rear end of the shovel, means for operating the crank-lever, a bearing-sup-

port carrying the shovel, and means for suspending the bearing-support.

3. An automatically-operated shovel, comprising in combination the shovel proper, suspending-rods joined to the front end of the shovel, a crank-lever pivotally joined to the rear end of the shovel, means for operating the crank-lever, a bearing-support carrying the shovel, a traveler carrying the bearing-support, a taking-up receptacle and means for conveying the goods to be supplied from the shovel to said receptacle.

4. An automatically-operated shovel comprising in combination the shovel proper, suspending-rods at the front end of the shovel, a crank-lever at the rear end of the shovel, means for operating the crank-lever, a bearing-support carrying the shovel, a traveler carrying the shovel, a traveler carrying the bearing-support, a taking-up receptacle, a traveler from which the receptacle is suspended, a conveying sheet-iron pivotally connected with the rear end of the shovel and adapted to follow the motion of the shovel.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

EMIL ARNST.

Witnesses:

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