

(No Model.)

2 Sheets—Sheet 1.

F. B. HILL.

REFRIGERATING AND ICE MAKING MACHINE.

No. 507,004.

Patented Oct. 17, 1893.

Fig. 1.

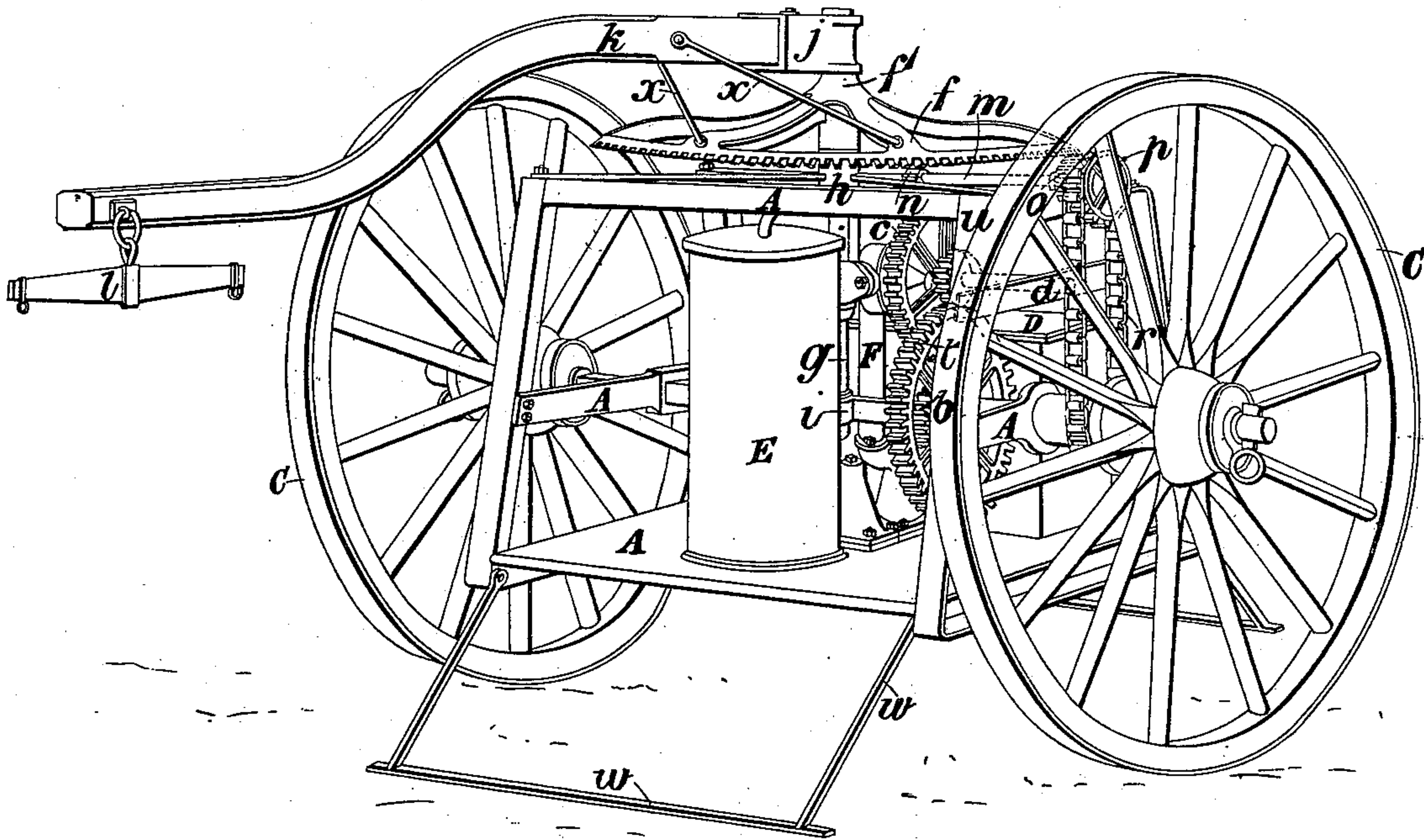
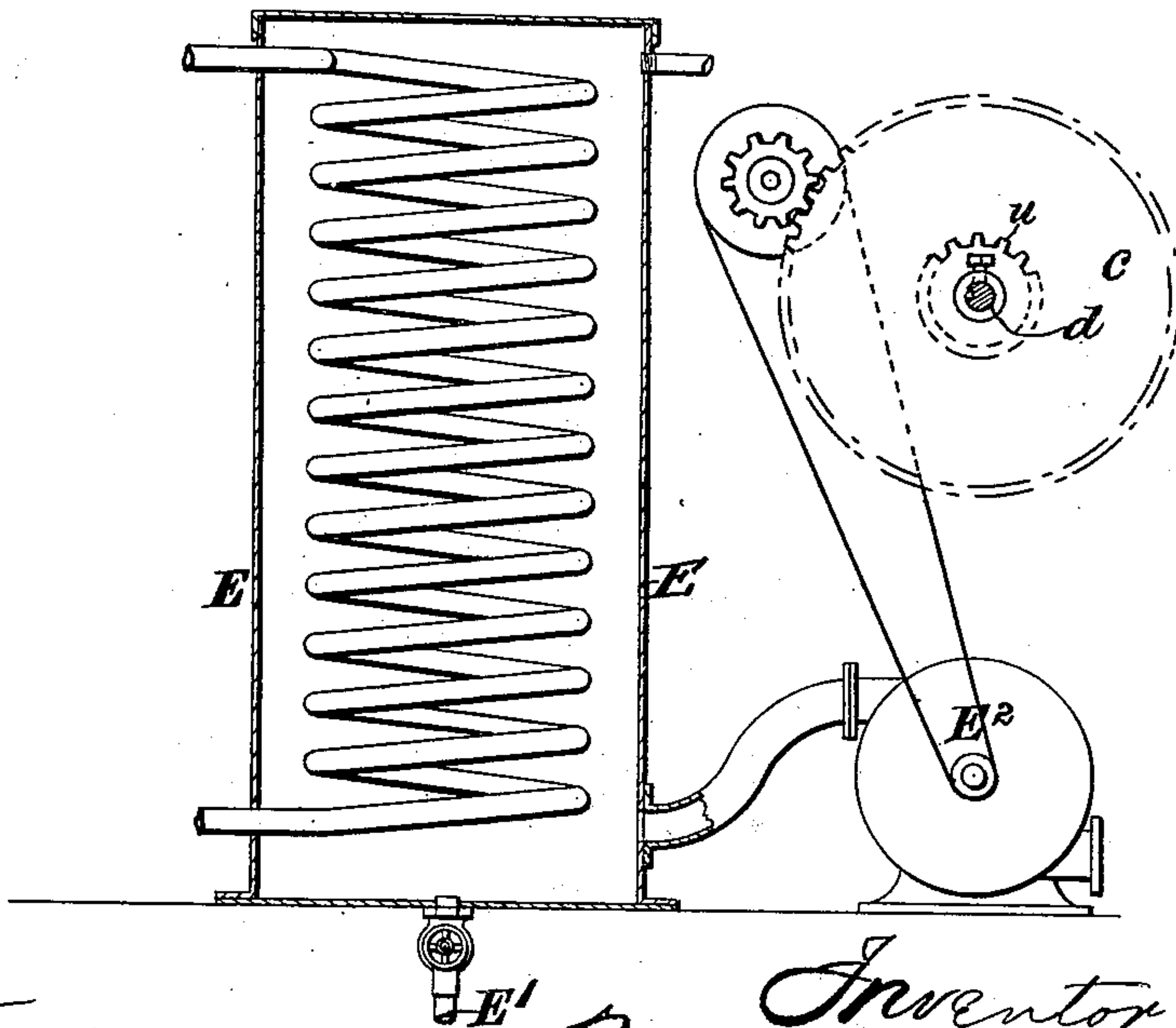


Fig. 3.



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(No Model.)

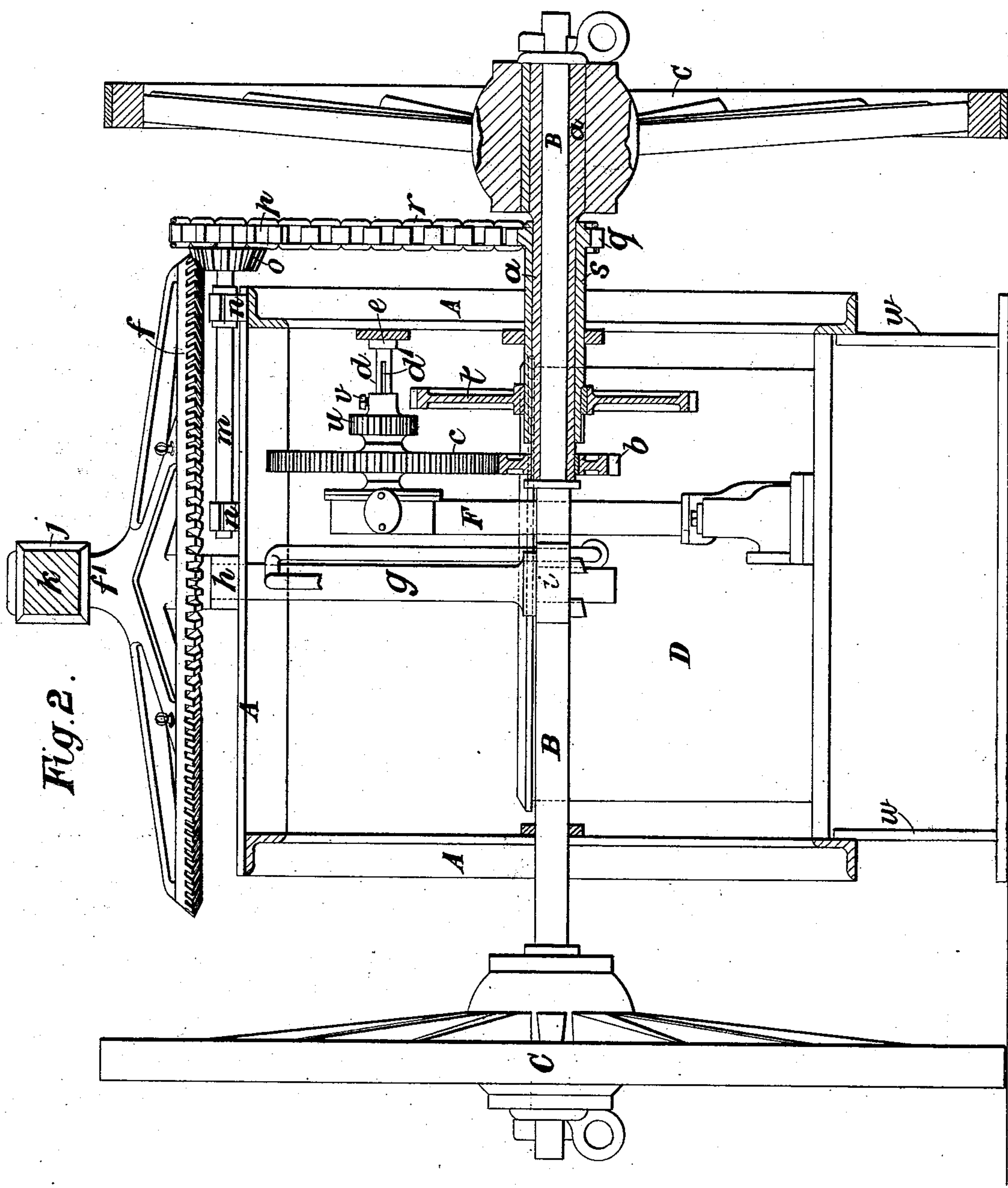
2 Sheets—Sheet 2.

F. B. HILL.

REFRIGERATING AND ICE MAKING MACHINE.

No. 507,004.

Patented Oct. 17, 1893.



Witnesses
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Robert Brant.

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UNITED STATES PATENT OFFICE.

FREDERICK BARKER HILL, OF LONDON, ENGLAND, ASSIGNOR TO THE HILLS
COLD STORAGE COMPANY, LIMITED, OF SAME PLACE.

REFRIGERATING AND ICE-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 507,004, dated October 17, 1893.

Application filed June 9, 1892. Serial No. 436,161. (No model.) Patented in England November 23, 1888, No. 17,071.

To all whom it may concern:

Be it known that I, FREDERICK BARKER HILL, engineer, a subject of the Queen of Great Britain, residing at London, England, have invented new and useful Improvements in Refrigerating and Ice-Making Machines, (for which I have obtained a patent in Great Britain, No. 17,071, bearing date November 23, 1888,) of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to refrigerating and ice-making machines and its main object is to provide machines of this kind or class which will be very advantageous for military and other purposes.

An important feature of my said invention is the construction of a refrigerating and ice-making machine mounted upon wheels so that it can be very readily transported or moved from place to place and provided with mechanism for producing cold, which mechanism can be driven, during transport, by the tractive force applied to the machine, and with suitable means whereby, while the machine is stationary, that is to say, when no tractive force is applied to it, the mechanism for producing the cold can be driven by a horse or other animal moving in a circular path around the said machine.

Another feature of my said invention is the provision of suitable means whereby the condensation of the ammoniacal gas or other refrigerating agent may be effected by means of either water or atmospheric air.

In the accompanying drawings I have shown how my said invention may be conveniently and advantageously carried into practice.

Figure 1 is a perspective view showing one form or modification of my improved apparatus. Fig. 2 is a transverse section drawn to an enlarged scale, showing details of construction, and Fig. 3 is a sectional elevation, showing a modification of part of my improved apparatus.

Like letters indicate corresponding parts throughout the drawings.

A is the frame of the machine.

B is the axle.

C C' are the road or traveling wheels.

D is the ice-box or cooling-chamber.

E is the condenser.

F is the pump.

The wheel C is firmly fixed on a sleeve *a* fitted to rotate freely upon the axle B which is rigidly secured to the frame A.

b is a toothed wheel keyed or otherwise firmly fixed upon the said sleeve *a*. The toothed wheel *b* is geared with another toothed wheel *c* mounted (as hereinafter described) upon the driving shaft *d* of the machine which is carried in suitable bearings *e* in the frame A and in the casing of the pump F. The said shaft *d* is arranged to work the pump F in any suitable manner, and may be rotated through the medium of the toothed wheels *b*, *c*, by the road-wheel C, during transport of the machine. I thus provide for very conveniently and advantageously producing cold while the machine is being moved from one place to another.

For imparting rotary motion to the said driving shaft *d* when the machine is stationary I provide the following mechanism, that is to say, a crown-wheel *f* is keyed or otherwise firmly fixed on a vertical shaft *g* supported in a suitable bearing *h* in the frame A and in a footstep bearing *i* provided in an enlargement of the axle B. *j* is a socket formed on or firmly attached to the boss *f'* of the said crown wheel *f*. *k* is a pole one extremity of which is fitted into the said socket *j*, and the other extremity of which is provided with a cross-tree or whiffle-tree *l* for the attachment thereto of a horse or other animal. *m* is a shaft or spindle supported in suitable bearings *n* upon the frame A and having keyed or otherwise firmly fixed thereon a bevel wheel or miter wheel *o* which is geared with the said crown-wheel *f*. *p* is a sprocket or chain wheel also fixed upon the shaft or spindle *m*. The sprocket or chain wheel *p* is connected by means of a suitable chain *r* to another sprocket or chain wheel *q* formed with or firmly fixed on a sleeve *s* arranged to rotate freely upon the sleeve *a*. *t* is a toothed wheel formed with or firmly fixed on the said sleeve *s*. *u* is a toothed wheel formed with or firmly attached to the toothed wheel *c*. The toothed wheels *u* and *c* are arranged to

slide longitudinally upon the driving-shaft d , but are prevented from turning thereon by means of a key fitted to slide in a groove d' in the said shaft. By shifting the said toothed wheels u and c upon the shaft d , either the toothed wheels c and b , or the toothed wheels u and t can be put into gear, and the shaft d thus connected either to the road-wheel C or to the crown-wheel f . v is a set-screw for securing the said toothed wheels u and c in either position upon the driving shaft d . w , w are hinged pieces or supports which are to be turned down into the position shown in the drawings when the machine is stationary, so as to support the platform A but which can be folded up out of the way when the machine is to be transported from one place to another. The driving-shaft d can therefore be operated by the road-wheel C while the apparatus is being transported, or by a horse or other animal attached to the pole k and moving in a circular path around the machine, when the said machine is not being transported. The pole k serves also for transporting the machine. In this case the said pole is secured to the crown-wheel f by straps or stays x to prevent or diminish vibration and a belt or pin is passed through holes provided in the frame A and in the crown-wheel f to secure the latter rigidly in position.

The ice-box or cooling-chamber D , condenser E and pump F may be of any suitable construction.

The manner in which the machine is operated will be readily understood from the foregoing description.

The refrigerating apparatus may be constructed in any convenient manner. I find it advantageous to make the condenser so that it can be used with either water or air as the cooling medium. An arrangement for this purpose is shown in Fig. 3, in which E' is a pipe for the supply of water to the tank in which the cooling coil is arranged, and E'' is a fan or blower connected with the said tank for the purpose of forcing air through the same when water is not available. Or I provide two condensers, one for use with water and the other for use with air. The fan or blower may be arranged to be driven from the driving-shaft d .

It is obvious that the construction and ar-

rangement of the mechanism may be somewhat modified without departing from the nature of my said invention.

What I claim is—

1. The combination, with the traveling-wheels and the driving-shaft of the refrigerating or ice-making mechanism, of a sleeve on which one of the said wheels is fixed, another sleeve fitted to rotate thereon, a crown-wheel on a vertical shaft adapted to receive a pole for rotating it, spur and chain gearing connecting the said crown-wheel with the outer sleeve, spur-gearing for connecting the said sleeves with the said driving-shaft and means for putting this shaft in gear with one sleeve and out of gear with the other sleeve, or vice versa, substantially as, and for the purposes above specified.

2. The combination, with the traveling-wheels and the driving-shaft of the refrigerating or ice-making mechanism, of a sleeve arranged to rotate about the axle of the said wheels, a crown-wheel mounted upon a vertical shaft and adapted to receive a pole for rotating it, spur and chain gearing connecting the said crown-wheel with the said sleeve and spur gearing for connecting this sleeve with the said driving-shaft, substantially as, and for the purpose, above specified.

3. The combination, with the traveling wheel C and the driving-shaft d of the refrigerating or ice-making mechanism, of the sleeve a on which the said wheel C is fixed, a toothed wheel b fixed on the said sleeve and geared with a toothed wheel c on the said driving-shaft d , a crown-wheel f adapted to receive a pole for rotating it, a bevel-wheel o geared with the said crown-wheel, a sleeve s fitted to rotate on the sleeve a , an endless chain r connecting the bevel wheel o with the sleeve s , a toothed wheel t fixed upon this sleeve and a toothed wheel u on the shaft d adapted to gear with the wheel t , the wheels c and u being movable longitudinally on the shaft d to bring one or the other of them into gear with the wheels b and t respectively.

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