No. 762,759. PATENTED JUNE 14, 1904.

W. REUTER.

MAGNETIC GRAPPLE.

APPLICATION FILED FEB. 16, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

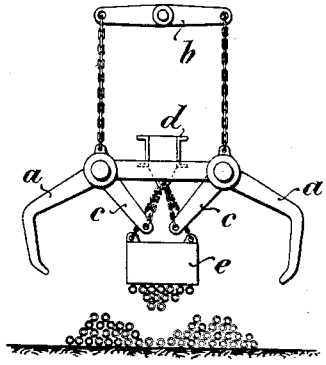


Fig. 3.

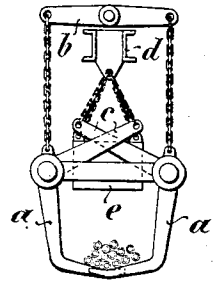


Fig. 2.

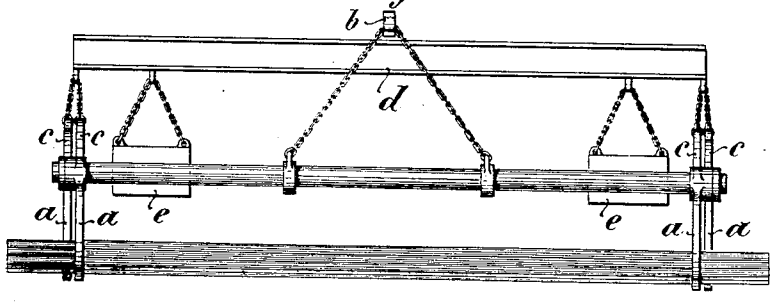


Fig. 4.

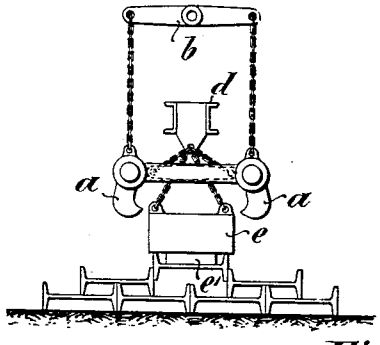


Fig. 6.

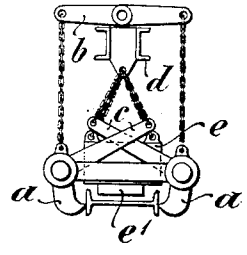
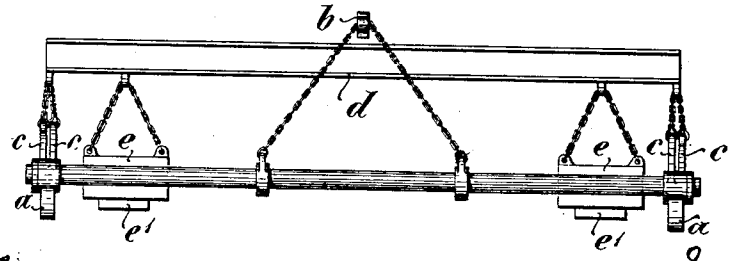


Fig. 5.



Witnesses:
P. Fennerly
S. J. Hoeptner.

Inventor:
Wolfgang Reuter
By Knight Bros
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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MAGNETIC GRAPPLE.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 8.

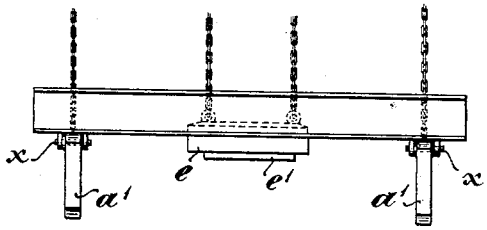


Fig. 7.

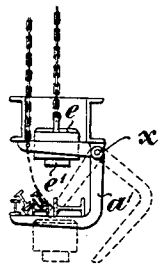


Fig. 10.

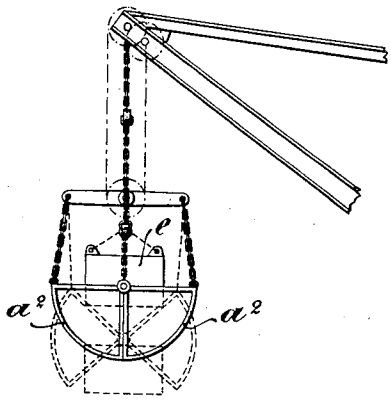
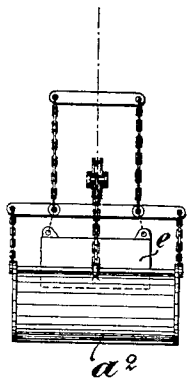


Fig. 9.



Witnesses:
P. F. Smith
S. J. Hooper

Inventor:
Wolfgang Reuter
By Knight & Bros
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 762,759. Patented June 14, 1904.

UNITED STATES PATENT OFFICE.

WOLFGANG REUTER, OF WETTER, GERMANY.

MAGNETIC GRAPPLE.

SPECIFICATION forming part of Letters Patent No. 762,759, dated June 14, 1904.

Application filed February 16, 1904. Serial No. 193,903. (No model.)

To all whom it may concern:

Be it known that I, WOLFGANG REUTER, a subject of the King of Prussia, Emperor of Germany, whose post-office address is No. 5 Kaiserstrasse, Wetter-on-the-Ruhr, Kingdom of Prussia, German Empire, have invented a certain new and useful Magnetic Grapple, of which the following is a specification.

If certain objects—for instance, pipes, shaped iron, and similar objects—are to be transported from one place to another by means of cranes or any other kind of lifting device, it is sometimes found very difficult, if not quite impossible, for the ordinary engaging device of the lifting contrivance to grip them securely on account of their peculiar shape or the manner in which they lie or are stored. There are objections also to the use of a device which is solely magnetic and which when lowered attracts the particular objects to be lifted by the closing of the circuit and is then raised again with the objects attracted. The accurate and safe operation of these devices cannot be depended on, as it is always possible that the circuit may be interrupted from some reason or the other during the operation of lifting and transporting the objects and that the dropping of the objects lifted may cause serious accidents to persons or property. In the present invention these disadvantages are avoided by arranging inside or within the scope of an engaging device connected with a lifting contrivance an electromagnetic device which is lowered when the engaging contrivance is opened or turned aside into inoperative position and which device when in a lowered position attracts the objects to be lifted and hands them over after it has again been raised and the circuit interrupted to the engaging device, which in the meantime has been raised again or turned back into its original operative position. The objects can now be safely transported from place to place and on arriving at their destination can be put down either solely by the opening of the engaging device or, if desired, again by the help of the magnetic device.

The annexed drawings illustrate four different ways of carrying out the invention, of which—

Figure 1 is a front elevation of a grab with the arms in opened position; Fig. 2, a side elevation of the grab shown in Fig. 1 with the arms in closed position; Fig. 3, a front elevation of the grab shown in Fig. 1 with the arms in closed position; Fig. 4, a front elevation of a grab with differently-shaped arms in open position; Fig. 5, a side elevation of a grab as shown in Fig. 4 with the arms in closed position; Fig. 6, a front elevation of the grab as shown in Fig. 5 with arms in closed position; Fig. 7, a front elevation of a grab with ⊐-shaped arm; Fig. 8, a side elevation of the grab shown in Fig. 7; Fig. 9, a side elevation of a grab with tray-shaped arms, and Fig. 10 a front elevation of the grab shown in Fig. 9.

In Figs. 1 to 3 the grab *a* is suspended on the cross-piece *b*, and the arms *c* of it, which are turned inward and cross each other, are so joined to a vertically-movable longitudinal support *d*, with which the magnetic device *e* is likewise connected, that the grab opens when the support *d* and the magnetic device is lowered and closes if the parts mentioned are raised to a certain height.

The position of the contrivance shown in Fig. 1 is that which it would occupy if the longitudinal support *d* were lowered, the arms of the grab *a* opened, and if the magnetic device which has taken up its position between the arms of the grab had attracted a number of pipes. Thereupon the magnetic device is again raised, the grab closes, and when the circuit is interrupted the pipes lifted up drop from the magnetic device into the closed grab, where they can rest safely and in this manner be transported to their destination, Fig. 3, where they can be removed from the contrivance by the lowering of the longitudinal support *d*, which will bring about the opening of the grab.

In the second form of carrying out the invention, as shown in Figs. 4 to 6, it is assumed that the objects to be engaged, lifted, and transported are pieces of conveniently-shaped iron. If this is the case, it is not necessary for the arms of the grab to have the same shape as in the preceding form of carrying out the invention. In this case their shape is

such that they press against the flange of the piece of shaped iron when the longitudinal support is raised as soon as the magnetic device *e* releases the piece of shaped iron. To enable the device to grip securely **I**-beams, the lower surface of the magnet is provided with a narrowed projection *e'*, which enters between the flanges of the **I**-beam and attracts the connecting-bar while the broader part of the magnet is pressed against the longitudinal edges of the flanges.

It is obvious that it is permissible to give to the arms of the grab and to the magnet whatever shape appears to be most suitable for lifting the particular objects the contrivance is intended to lift and transport.

For the rest the construction and action of the device illustrated in Figs. 4 to 6 is practically identical with those of the device illustrated in Figs. 1 to 3.

In many cases it may be desirable to replace the grab illustrated in Figs. 1 to 6, which has two rotatory arms and works in connection with the magnet by a device with only one rotatory and suitably-shaped bent piece, which is so fashioned that the objects lifted up can easily glide from it and be put down in proper order. Such an arrangement has the further advantage of making it possible to place the lighter objects (pipes, small pieces of shaped iron, &c.) by hand in the bent piece after the heavier pieces have been attracted by the magnet. An example of such a form of construction is shown in Figs. 7 and 8. The bent piece in this instance is ⌐-shaped and rotates around the fixed point *x*. If the magnet *e* is lowered, the bent piece *a'* will likewise move downward until it occupies the position indicated by the dotted lines. After the magnet has attracted the objects to be lifted and has again been raised the bent piece *a'* returns to its horizontal position and is then ready to receive the pipes, pieces of shaped iron, and similar objects.

The form of construction illustrated in Figs. 9 and 10 may be used in all those cases in which goods in bulk—as, for instance, screws, rivets, scrap or pig iron, and small shot—are to be lifted and transported. In this instance the garb or the bent piece is replaced by a tray-shaped automatic engaging device a^2. It operates in the same manner as the devices already described. The automatic engaging device a^2 is opened and the magnet lowered onto the goods to be lifted. After the magnet is again raised the tray-shaped device closes beneath, and the goods can be transferred from the magnet to the tray-shaped device.

What I claim, and desire to secure by Letters Patent of the United States of America, is—

1. In an engaging device and magnetic lifting contrivance for cranes and the like the combination of an electromagnet, means for raising and lowering the electromagnet, arms connected with the means for raising and lowering the electromagnet and adapted to engage the objects, lifted by the electromagnet, substantially as described.

2. In an engaging device and magnetic lifting contrivance for cranes and the like the combination of an electromagnet, means for raising and lowering the electromagnet, arms connected with the means for raising and lowering the electromagnet, and adapted to engage the objects lifted by the electromagnet and to release them, substantially as described.

3. An engaging device and magnetic lifting contrivance for cranes and the like, the combination of an electromagnet, means for raising and lowering the same, arm or arms adapted to engage or hold the objects lifted by the electromagnet and means operated by the lifting and lowering of the magnet for moving the arm or arms in the position of engaging or holding the objects and in the position of releasing the same, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WOLFGANG REUTER.

Witnesses:
OTTO W. HELLMRICH,
J. CHRIST. HAFERMANN.