

H. KOCOUREK.
ELECTRIC JACK.

APPLICATION FILED AUG. 26, 1914.

1,224,652.

Patented May 1, 1917.

2 SHEETS—SHEET 1.

Fig. 1

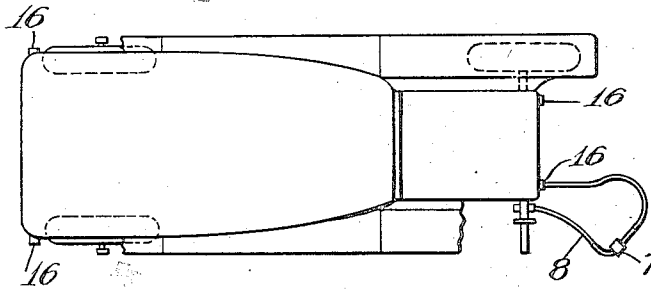
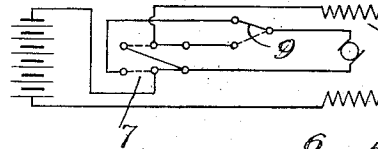


Fig. 5.

Fig. 2.

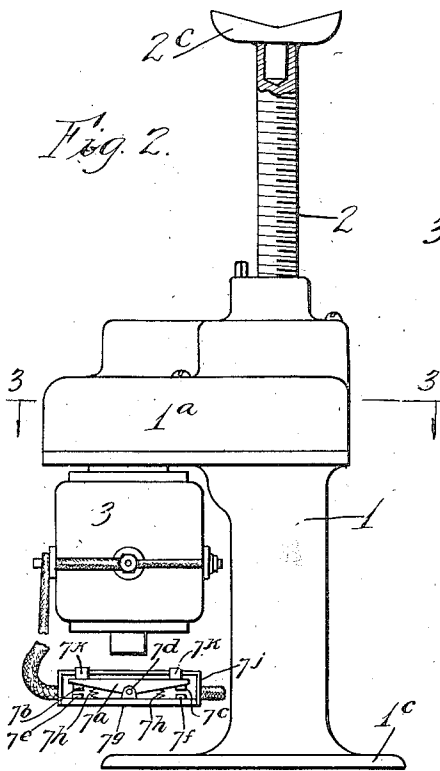
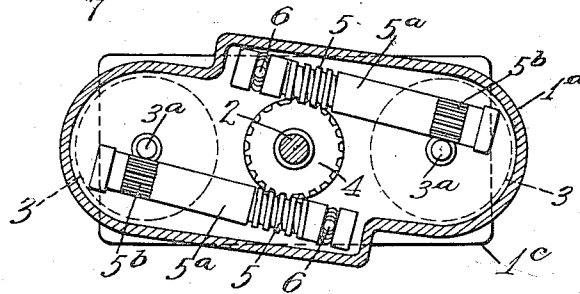


Fig. 7.

Fig. 6.

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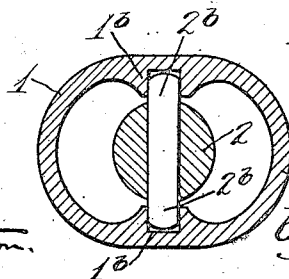
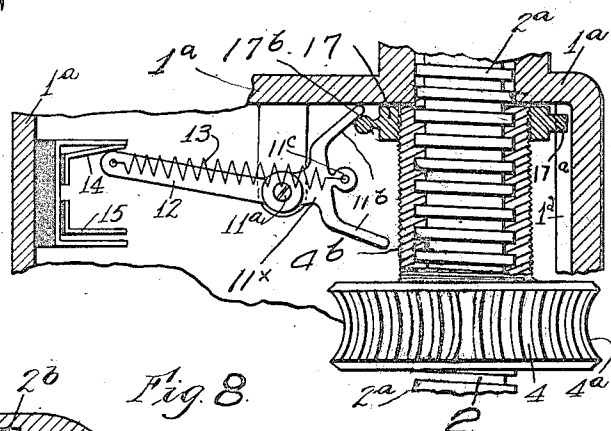


Fig. 8.



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1,224,652.

2 SHEETS—SHEET 2.

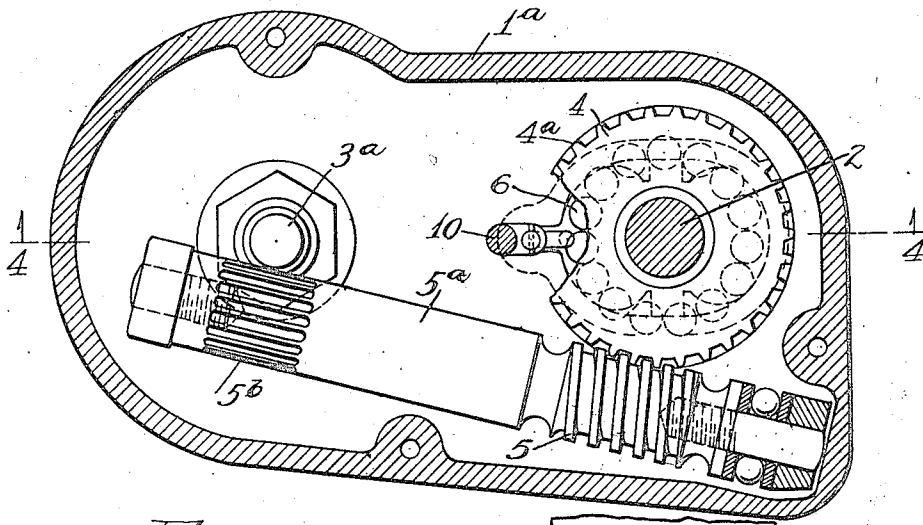
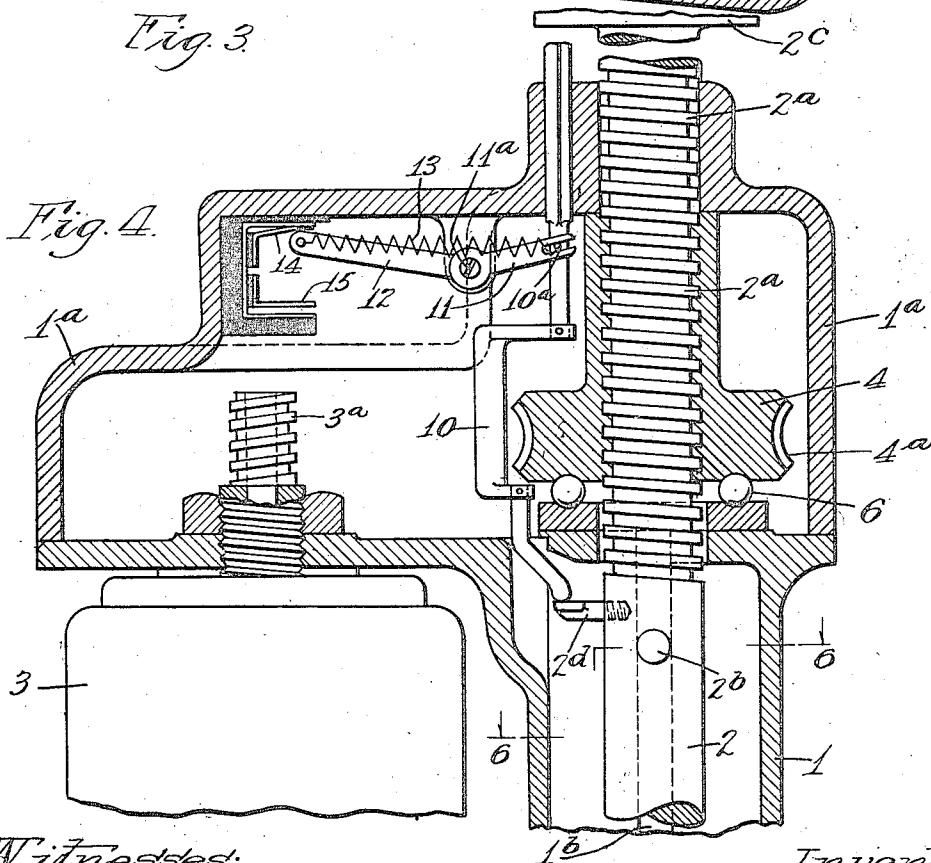


Fig. 3.



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ELECTRIC JACK.

1,224,652.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HENRY KOCOUREK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Electric Jacks, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

10 This invention relates to a portable jack designed to be operated by means of an electric motor permanently associated with the jack, and having suitable control means connected at a distance therefrom. The invention comprises various features of construction and their combinations described and shown in the drawings as indicated by the claims.

In the drawings:—

20 Figure 1 is a diagrammatic plan view of a motor vehicle showing the use of an electric jack in connection therewith.

Fig. 2 is an elevation of the electric jack in connection therewith.

25 Fig. 3 is a detail section taken as indicated at line 3—3 on Fig. 2.

Fig. 4 is a detail section taken as indicated at line 4—4 on Fig. 3.

30 Fig. 5 is a wiring diagram for the jack illustrated in Fig. 2.

Fig. 6 is a detail section taken as indicated at line 6—6 on Fig. 4.

Fig. 7 is a detail section of a modification.

35 Fig. 8 is a detail section of another modification.

Referring first to Figs. 2, 3 and 4, it will be seen that the standard, 1, of this jack carries the vertically movable ram, 2, and also a small electric motor, 3, together with gearing operatively connecting the motor with the ram. Such gearing is illustrated in detail on Figs. 3 and 4, in which is shown a nut, 4, having a worm gear, 4^a, formed on its periphery and meshing with a worm, 5, extending horizontally in the gear casing, 1^a, of the standard, 1. The worm, 5, is formed on a shaft, 5^a, at whose opposite end there is cut a fine toothed gear, 5^b, arranged to mesh with a worm, 3^a, on the shaft of the motor, 3. By means of this double worm reduction a high-speed motor of comparatively small dimensions may be employed to produce a large lifting power at the ram, 2. The ram, 2, is shown with a heavy square thread, 2^a, by which it en-

gages the nut, 4. The nut, 4, is carried on a ball thrust bearing at, 6, while the ram, 2, is held against rotation by a transversely extending key pin, 2^b, engaging the vertical grooves, 1^b, in the standard, 1.

60 The motor, 3, is preferably, though not necessarily, series wound, as indicated in the wiring diagram, Fig. 5, and is arranged for control by a 6-pole reversing switch, 7. Preferably this switch is designed to maintain an open circuit normally, its movable conductor being in the form of a rocker, 7^a, having contact points, 7^b and 7^c, arranged at opposite ends and equidistant from its fulcrum pivot, 7^d, together with cooperating contact points, 7^e and 7^f, mounted on the base block, 7^g. The contacts of the rocker, 7^a, are normally held away from the contacts on the base, 7^g, by springs, 7^h. Preferably a housing, 7ⁱ, completely incloses the mechanism, with the exception of operating buttons, 7^k, by the depression of one of which the electrical connections are made for operating the motor in one direction, while the depression of the other button will cause reversed rotation of the motor. The switch device, 7, being connected with the motor, 3, through a cable, 8, may be located at some distance from the motor and may be held in the hand for controlling the movement of the jack up or down as may be required. When pressure is applied to neither of the buttons, 7^k, the motor will remain at rest and the ram, 2, will be locked in whatever position it happens to stand by means of the nut 4.

To avoid the overloading and stalling of the motor, which would result from running the ram to one limit of its movement without opening the motor circuit, there is provided an automatic "cut-off" switch located in the upper portion of the housing, 1^a, and connected into the circuit as indicated at 9, in Fig. 5. This device consists of a thrust bar, 10, slidably mounted in the casing, 1^a, and having its upper end positioned for contact with the pad, 2^c, of the ram, while its lower end stands in the path of a pin, 2^d, fixed in the ram near the lower end of its thread, 2^a. The thrust bar, 10, has a cross pin, 10^a, which engages the forked end of a rocker, 11, journaled on a common pivot with a switch lever, 12. A spring, 13, whose opposite ends are connected, respectively, to the rocker, 11, and lever, 12, tends to fold

these elements together. When the rocker, 11, trends obliquely upward from its pivot the lever, 12, will trend obliquely upward in the opposite direction, and as the ram, 2, descends so that its pad, 2^c, engages the upper end of the thrust bar, 10, the downward movement of the latter will swing the rocker, 11, to a position trending obliquely downward, and the spring, 13, being carried past the axis of the pivot, 11^a, will pull the lever, 12, to a corresponding position trending obliquely downward in the opposite direction. In its upward position the lever, 12, closes the motor circuit through a contact member, 14, and in its downward position engages a contact, 15. By the breaking of the circuit at 14, further downward movement of the ram, 2, is prevented, but the circuit afforded through the contact, 15, will permit of movement in the reverse direction when the reversing switch, 7, is thrown to a corresponding position. Similarly, as the ram, 2, approaches its upper limit of movement the pin, 2^a, engaging the lower end of the thrust bar, 10, causes the rocker, 11, to be swung upward again, and the switch lever, 12, to be thrown to the contact, 14. By means of this device it will be seen that a quick break of the electric circuit at contacts, 14 and 15, is assured in spite of the fact that the movement of the ram, 2, is comparatively slow.

This type of jack is particularly designed for use in connection with a motor vehicle to which it will usually be applied under one of the axles and near to one of the wheels, as for supporting the vehicle in changing a wheel or changing a tire. It will be understood that the vehicle will be equipped with a source of electrical energy usually serving other purposes, but available for operating the jack; and to reduce the necessary length of connecting cable, 8, the vehicle may be provided with electrical couplings, 16, disposed in the vicinity of each of the four wheels, as indicated in Fig. 1. The application and operation of the jack will then become a simple and easy matter.

It will be noted that in the design illustrated in Fig. 2 the motor, 3, and the gear casing, 1^a, overhang the foot, 1^c, of the standard, 1, and that it is even necessary to extend the foot at this side beyond its effective bearing area simply to furnish support for the motor when there is no load applied to the ram, 2. It will be evident that a relatively more compact machine will result from the employment of twin motors disposed at opposite sides of the ram, 2, as indicated in Fig. 7, and operatively connected thereto by duplicated

gearing of the same type as that illustrated in Figs. 3 and 4. Obviously for a jack of the same capacity as that with the single motor these motors would be somewhat smaller than motor, 3, shown in Fig. 2, but if of the same size the jack would be twice as powerful without much increase in its dimensions.

Fig. 8 illustrates a modified trip mechanism associated with the ram, 2, for throwing the cut-out switch lever, 12. In this form the hub of the nut, 4, has a fine thread cut upon it at 4^b, and a follower nut, 17, is engaged with this thread. A lug 17^a, extending into a guide slot, 1^d, in the standard, 1, holds the follower against rotation, while a rounded lug 17^b, projecting from the opposite side of the follower engages one or other of the forks, 11^b, of the modified rocker 11^{*}. The remainder of the construction may be substantially like that shown in Fig. 4, the spring, 13, being connected to the lever, 12, and to the lug, 11^c, of the lever, 11^{*}, so as to operate as previously described. It will be understood that the pitch of the thread at 4^b, will be such as to cause the up and down travel of the follower nut, 17, at such a rate as to trip the switch lever, 12, just as the ram, 2, reaches one or the other limit of its possible travel. This construction has the advantage of being entirely contained inside the housing, 1^a.

I claim:—

In an electric jack in combination with a standard, a jack screw mounted therein for longitudinal movement, the standard being apertured between two bearings of the jack screw therein; an operating nut on the jack screw between said bearings and longitudinally stopped in both directions thereby; an electric motor operatively engaged with said nut for rotating it to propel the jack screw, said operating nut having an exterior thread finer than the jack screw engaging thread; a follower nut engaged with said finer thread for travel on the outside of the operating nut; two electric circuits in which said motor is energized, and a snap switch device mounted in the standard having terminals positioned for encounter by the follower nut at the limits of its travel for opening one circuit and closing the other at said limits.

In testimony whereof witness my signature at Chicago, Illinois, this 24th day of August, 1914.

HENRY KOCOUREK.

Witnesses:

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