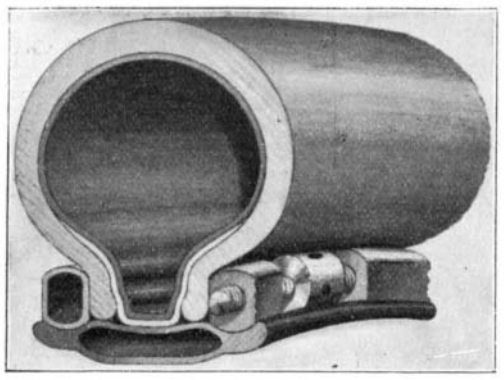
A NEW DETACHABLE TIRE.

Despite years of experience with bicycle tires and the large number of automobile tires invented, every year seems to bring still further improvements on this vital part of the automobile. The accompanying engraving shows one of the latest types of automobile tires, which has been brought out by the Hartford Rubber Works. This construction provides a simple means for removing the tire quickly and conveniently from the wheel. The wheel rim, it will be observed, is



IMPROVED DETACHABLE TIRE.

flat in cross section, with two grooves formed near the edges on the outer surface, to receive the retaining rings. The retaining rings are formed of metal tubing bent around the wheel rim, and closed at their ends by plugs firmly secured therein. These ends are tightly drawn together by a double-ended bolt with right and left-hand threads, which screws into the plugs, thus firmly holding the retaining ring in place. The tire, as shown, is held between the two retaining rings. When it is desired to remove the tire, it is only necessary to remove one of the rings, and this can be done by giving the bolt a few turns, which loosens the ring to such an extent that it can be removed from the rim, permitting the tire to be slipped off.

THE CADILLAC PLANETARY GEAR TRANSMISSION.

The transmission gear used on the Cadillac car may be taken as typical of all the planetary gear transmissions used at the present time. It consists, as will be seen from the annexed cut, of two drums, *H* and *K*, the former of which contains six studs, *L*, having mounted on them six spur pinions. Three of these pinions, *E*, are twice the width of the other three, *F*, and all mesh with a pinion the width of the *F* pinions and placed at *G* in the diagram, although it is not shown. This pinion is on a sleeve keyed to the hub of the drum, *K*. The main driving pinion, *D*, is keyed to the driving shaft, and meshes with the *E* pinions only, on the widened portion which projects beyond the pinions, *F*, as shown in the cut. The left end of the gear case, *C*, is fastened to *H* by screws. The drum, *B*, on which is the internal gear, is continued through the casing, and the sprocket, *A*, forms part of it. The operation of the transmission, the driving shaft of which is direct-connected to the crank shaft of the motor, is as follows: The brake drum, *H*, with the pinion studs upon it, is held stationary by a band brake; and when pinion, *D*, turns with the shaft in the direction of the arrow upon it, it drives pinion, *E*, in the direction shown by its arrow, and, since *E*'s stud is stationary, *E* in turn drives internal gear, *B*, in the opposite direction. This produces the reverse. To obtain the slow speed, the brake drum, *K*, is held by a brake band, and pinion, *D*, drives pinions, *E*, as heretofore. *E* in turn drives *F*, but as *G* is stationary, since it forms part of the drum, *K*, the pinions, *F*, travel round it with a planetary motion, thus turning the drum, *H*, slowly and causing the pinions, *E*, to turn the internal gear and drum, *B*, even more slowly, but in the same direction as that in which *D* is turning. For the high speed, a leather-faced disk keyed to the shaft is pushed against the smooth surface on the right-hand end of drum, *K*, thus locking *K* to the shaft, and causing the whole drum to turn as one unit without any of the gears revolving. When the car is standing still and the engine is running, all the gears are turning, and the drum is revolving idly about the shaft. Another form of planetary gear transmission that is now widely used has no internal gears whatever, but the form illustrated is a simple one, in that the internal gears are reduced to but one, which is used only for the reverse.

A COMBINATION TOOL FOR AUTOMOBILES.

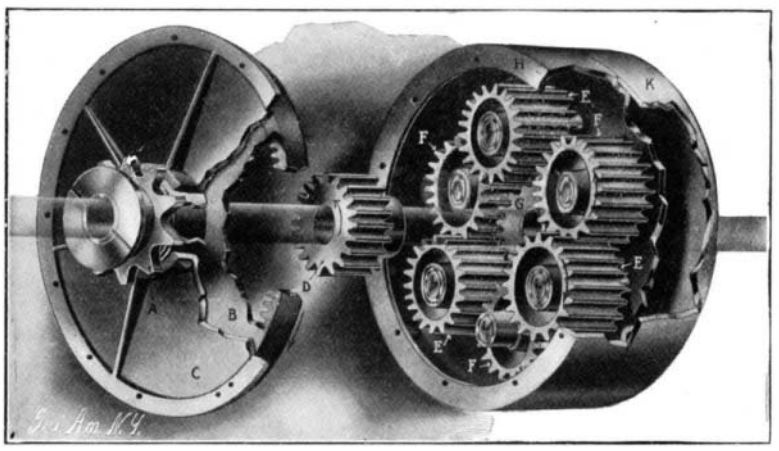
BY THE ENGLISH CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

A novel combination tool for automobilists has been devised by Mr. F. V. Dalton, of England, the feature of which is that therein are incorporated many of the tools which are often required on the road when a breakdown occurs, but are not carried on board, owing to their bulky nature. In this device, however, these tools have been ingeniously compressed. The new tool can be operated as a lifting jack; a handy, albeit powerful, vise; and a drilling machine. When dismembered and packed away, it requires no more space than is generally occupied by the ordinary lifting jack.

The device consists essentially of but seven pieces, which are shown disconnected in the first illustration. The letter *A* represents the largest portion of the tool, a malleable casting with its extremities comprising jaws, as in the ordinary vise. This portion is made in three pieces, the jaw pieces being hinged on either side of the central casting by means of detachable pins. The faces of the jaws are roughened in the conventional manner to insure a firm grip when the tool is used as a vise. It is equally serviceable for small parts, such as bolts, nuts, screws, and pipes.

Between the two jaw arms is hinged a link comprising the central casting, which is machined out to carry the small sleeve, *E*, which is held firmly in position when inserted by means of the setscrew, *a*. Through each jaw arm is another hole. When these arms are hinged over so as to form a vise, these holes are brought into the same horizontal plane, and through these works the feed-screw, *B*, which constitutes one of the vital parts of the whole tool, and in this particular instance serves to open and close the vise.

The feed-screw, *B*, is of the same gage as the thread in the piece, *E*, in which it works. It is made of steel and is hollow. Through this feed-screw extends a steel spindle, held in position to prevent any longitudinal movement, by a ball thrust bearing at the upper end and a collar at the lower extremity. The upper end of this spindle terminates in a broad block with a concave face, as in an ordinary lifting jack. In the center of this head is a square-cut hole to carry a drill. Just behind this head is the ball bearing, and then comes the casting, *b*, which is free, so as to turn



CADILLAC PLANETARY GEAR TRANSMISSION.

in either direction upon the feed-screw. This casting is fitted with a double pawl, which is so pivoted that it can be made to engage either to the right or left in the slots in the head, *e*, on the feed-screw, acting ratchet fashion, so that the feed-screw can be made to turn right or left as desired. The opposite end of the spindle in the feed-screw is squared.

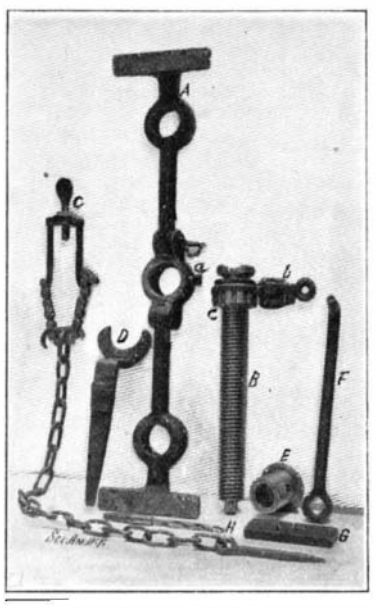
F is a forging bent at one end, flattened at the other end, and pierced with a square hole, to fit like a spanner upon the square end of the spindle in the feed-screw, *B*. The bend in the upper end forms a right angle, and has a reduced cut around it. This extremity is inserted in a hole in the small casting, *b*, forming a handle to operate the feed-screw, *B*. On the feed-screw is fixed a small spring projecting slightly over a hole parallel with the axis of the screw, and which engages on a narrow saw-cut around an inserted movable ratchet pawl, thus keeping the pawl in its proper working position. This spanner also fits the head of the setscrew, *a*, in the center casting of the piece, *A*.

C is a clamp fitted with a thumbscrew and two projecting pins, one on either side, with hooks attached. One of these hooks is made to engage in one end of a block chain, and the other hook is so fashioned that it will take any link in the chain, so that the latter may be shortened or lengthened as the exigency of the work in hand demands. Another chain of ordinary links is attached to the block chain by the fastening shown in the illustration, which enables an even or balanced purchase to be obtained. The other end of this second chain is provided with a pin which will pass through any link of the chain.

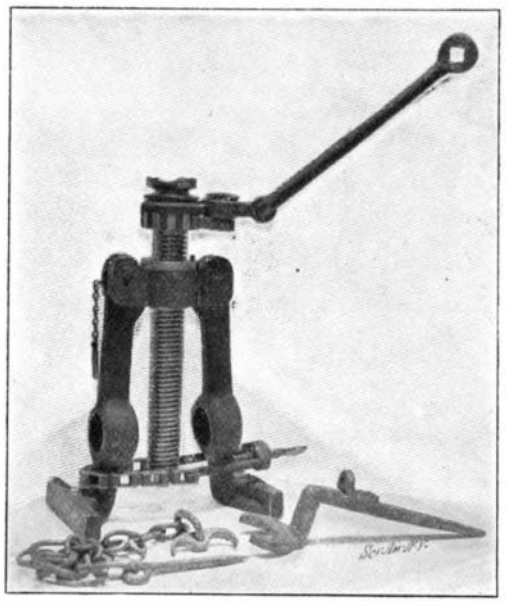
The remaining two pieces, *D* and *G*, are of minor character. The forging, *D*, is somewhat similar in shape to a spanner. The larger end encircles the feed-screw, *B*, while the other end has a blunt point. *G* is simply a bar of iron which can be used for any purpose that may arise, such as the bedplate in the drill, and is consequently not a necessary part of the outfit. *H* is the drill.

This tool can be accommodated to any of the functions which it is intended to fulfill with ease and celerity, and the accompanying photographs will show how it is accommodated to these respective operations. For use as a lifting jack the vise-jaw arms are bent over with the jaws outside, the sleeve, *E*, is inserted in the central hole of *A*, a shoulder on the sleeve preventing it passing right through. The vise jaws are converted into feet for the jack, giving it thereby a solid foundation, and are prevented from springing open by the clamp and block chain, *C*. The feed screw, *B*, is threaded into the sleeve, and the handle, *F*, attached as shown. This jack is both powerful and strong, and is sufficient to cope with any lifting operation that may arise with the general type of automobile, its maximum lifting capacity being two tons.

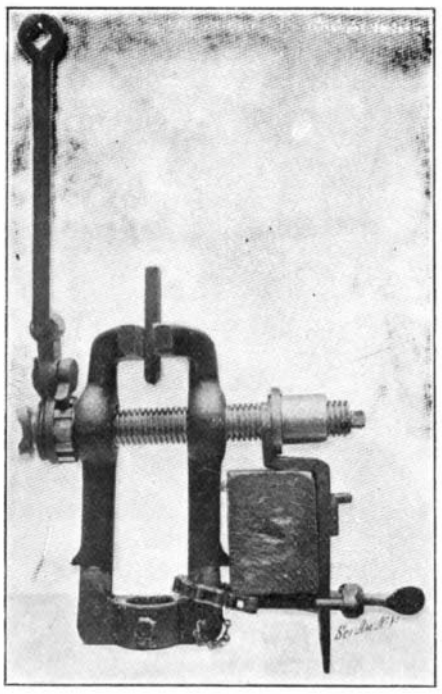
To employ the tool as a drill. the arrangement is slightly modified from that required for the jack, as may be seen by reference to the illustration. In this instance the feed-screw is reversed. and in



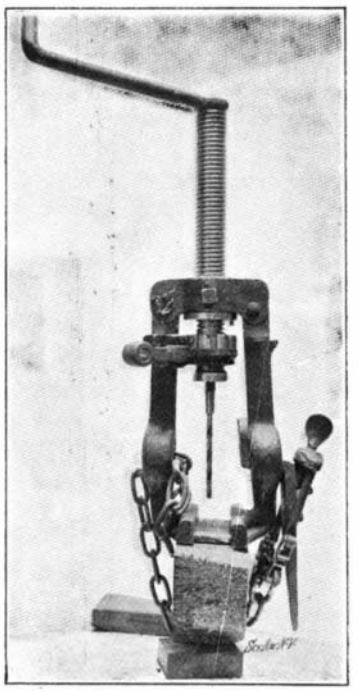
Component Parts of the Tool.



The Tool as a Lifting Jack.



How the Tool Forms a Vice.



The Tool Arranged as a Drill.

AN AUTOMOBILE TOOL THAT CAN BE USED IN SEVERAL WAYS.