(No Model.)

C. SCHUMACHER.

RATCHET DRILL.

No. 297,171. Patented Apr. 22, 1884.

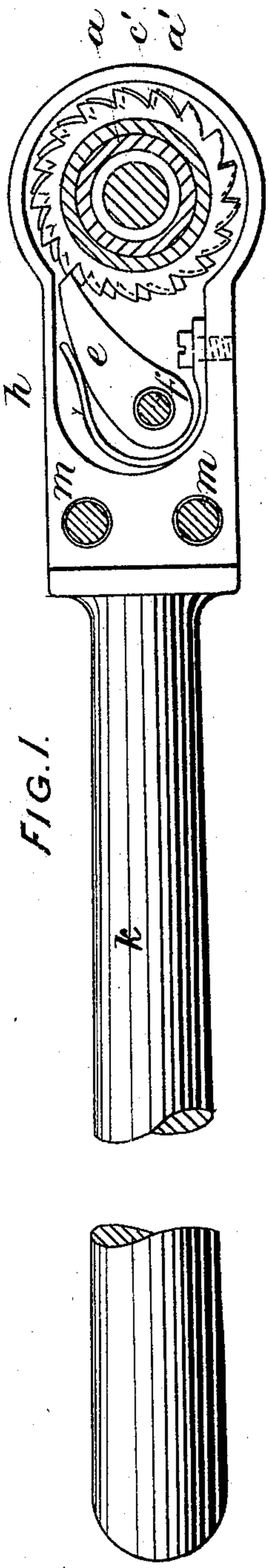

FIG. 1.

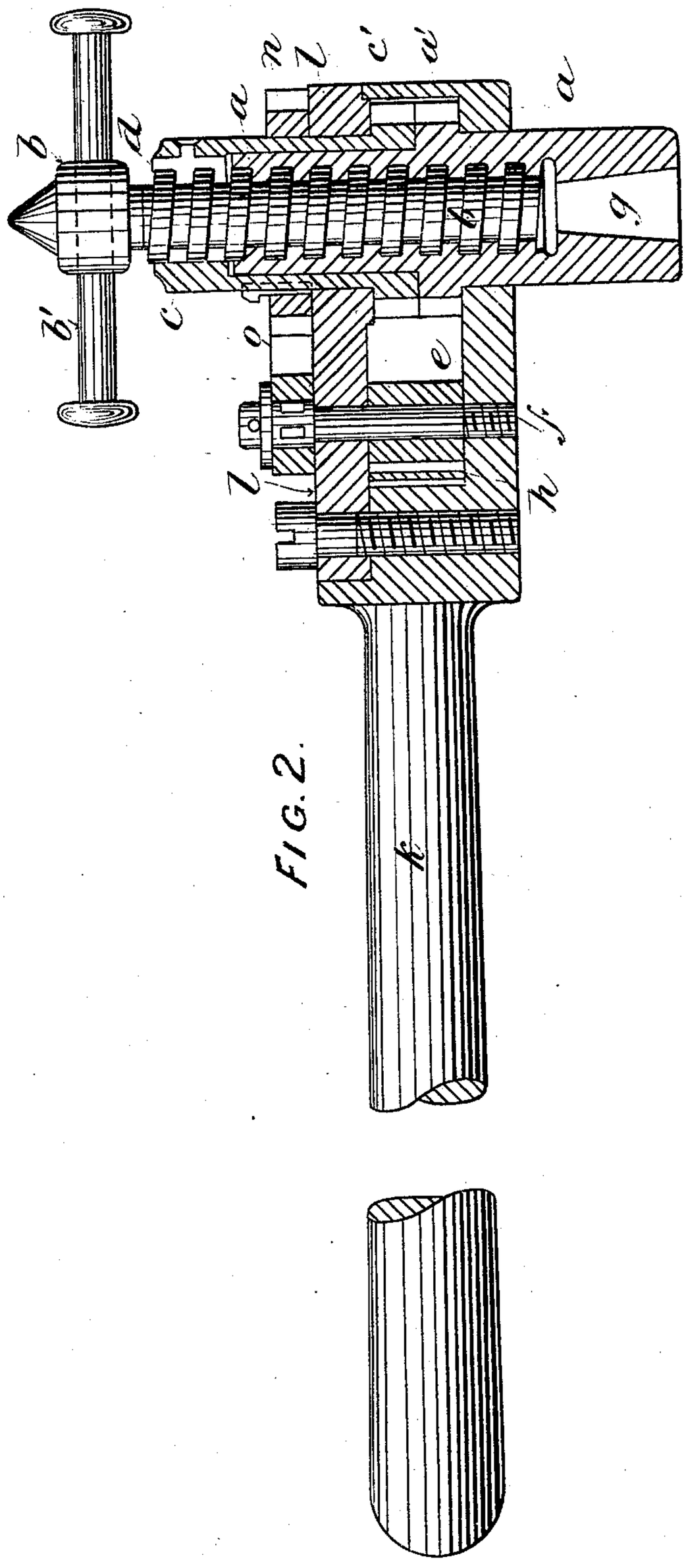

FIG. 2.

Witnesses
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per H. Staddan
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UNITED STATES PATENT OFFICE.

CASPAR SCHUMACHER, OF KALK, GERMANY.

RATCHET-DRILL.

SPECIFICATION forming part of Letters Patent No. 297,171, dated April 22, 1884.

Application filed December 21, 1882. (No model.) Patented in Germany July 21, 1881, No. 17,477.

To all whom it may concern:

Be it known that I, CASPAR SCHUMACHER, of Kalk, Germany, have invented a new and useful Improvement in Ratchet-Braces, (for which I have obtained a patent in Germany, bearing date July 21, A. D. 1881, No. 17,477,) of which the following is a specification.

My invention has for its object to construct a ratchet-brace provided with automatic and variable feed.

In describing the invention, reference will be made to the annexed drawings, in which Figure 1 is a cross-section, and Fig. 2 a longitudinal section, of an improved ratchet-brace.

The construction of the tool is as follows: A drill-holder, *a*, is provided at one end with an opening, *g*, for the drill, and at the other end with a screw-thread, in which the screw-spindle *b* may be turned by means of the lever *b'*. Over the upper end of the drill-holder fits an adjusting-sleeve, *c*, forming at the lower end a ratchet-wheel, *c'*, facing the ratchet-wheel *a'*, formed on the drill-holder *a*. To the inside of the adjusting-sleeve *c* is secured a feather or key, *d*, serving to attach the sleeve to the spindle *b*. The ratchet-wheel *a'* has a tooth more than the wheel *c'*, and both may be turned by a pawl, *e*, pivoted on a pin, *f*. The pawl is pressed against the wheels by a spring, *h*. The whole mechanism is held by a lever, *k*, provided with a recess for the ratchet-wheels, ratchet, and spring, which recess is covered with a lid, *l*, secured to the lever by screws *m m*. Outside the lid *l* there may be keyed on the sleeve *c* a third ratchet-wheel, *n*, having one or two teeth less than the wheel *c'*. A pawl, *o*, gearing into the ratchet-wheel *n*, may be turned aside and set out of action when desired.

The operation of the tool is as follows: The drill is held upon the piece of work, and the screw-spindle is turned out of the adjusting-sleeve until the pointed head of the spindle abuts against the counter-plate, which forms the necessary support in drilling. The lever *k* is then turned to and fro, whereby the drill-holder *a* and the sleeve *c* are turned in the same direction, but through different lengths of travel, owing to the difference in the number of teeth of the ratchet-wheels *c'* and *a'*. After every forward motion of the lever *k* for more than one division of the ratchet-wheels, (more than one tooth,) the pawl will be found in contact with two superposed teeth of the two ratchet-wheels, the contact-faces of these two teeth being in one vertical plane, while the contact-faces of all other teeth of one wheel are intermediate between the contact-faces of the other wheel. If, now, the lever *k* is turned back for several teeth, the pawl will slide over the teeth of both wheels, and when the forward motion commences the pawl will first come in gear with a tooth of the ratchet-wheel having the smaller pitch—that is to say, the upper wheel, *c'*—and turn the same alone until the pawl comes also in contact with the nearest tooth of the wheel *a'*, after which both wheels turn together until the end of the stroke of the lever *k*. As the sleeve *c* is keyed on the spindle *b*, the latter turns in the drill-holder *a* as long as *a* remains stationary—that is to say, as long as the pawl is in contact with the upper wheel, *c'*, only. By this motion the spindle *b* will be screwed out of the drill-holder *a*, and thereby feed the latter forward until the pawl has come in contact with both ratchet-wheels, after which only a rotary motion of the drill takes place. The ratio between the rotary motion of the drill and its feed motion will remain approximately constant as long as there is only one ratchet-wheel (*c'*) on the sleeve *c*. In order to render such feed motion variable, a third ratchet-wheel, *n*, is keyed on the sleeve *c* outside the lid; or several such ratchet-wheels may be keyed on. As the outer ratchet-wheel has at least one tooth less than the wheel *c'*, it will commence to turn sooner and the feed motion will be greater.

What I claim is—

In ratchet-braces, the combination of a drill-holder, *a*, provided with internal screw-thread, and with ratchet-teeth *a'*, with a screw-spindle, *b*, and adjusting-sleeve *c*, secured to the screw-spindle, and having ratchet-teeth *c'*, spring-pawl *e*, hand-lever *k*, ratchet-wheel *n*, secured to the adjusting-sleeve *c'*, and having at least one tooth less than the sleeve *c*, and a pawl, *o*, adapted to be put in and out of gear with the wheel *n*, substantially as and for the purpose described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

C. SCHUMACHER.

Witnesses:

G. ADOLF HARTZ,

WILH. HARTMANN.