(No Model.)

G. B. WOODRUFF & T. W. R. McCABE.

STOP MOTION.

No. 580,539. Patented Apr. 13, 1897.

Fig. 1

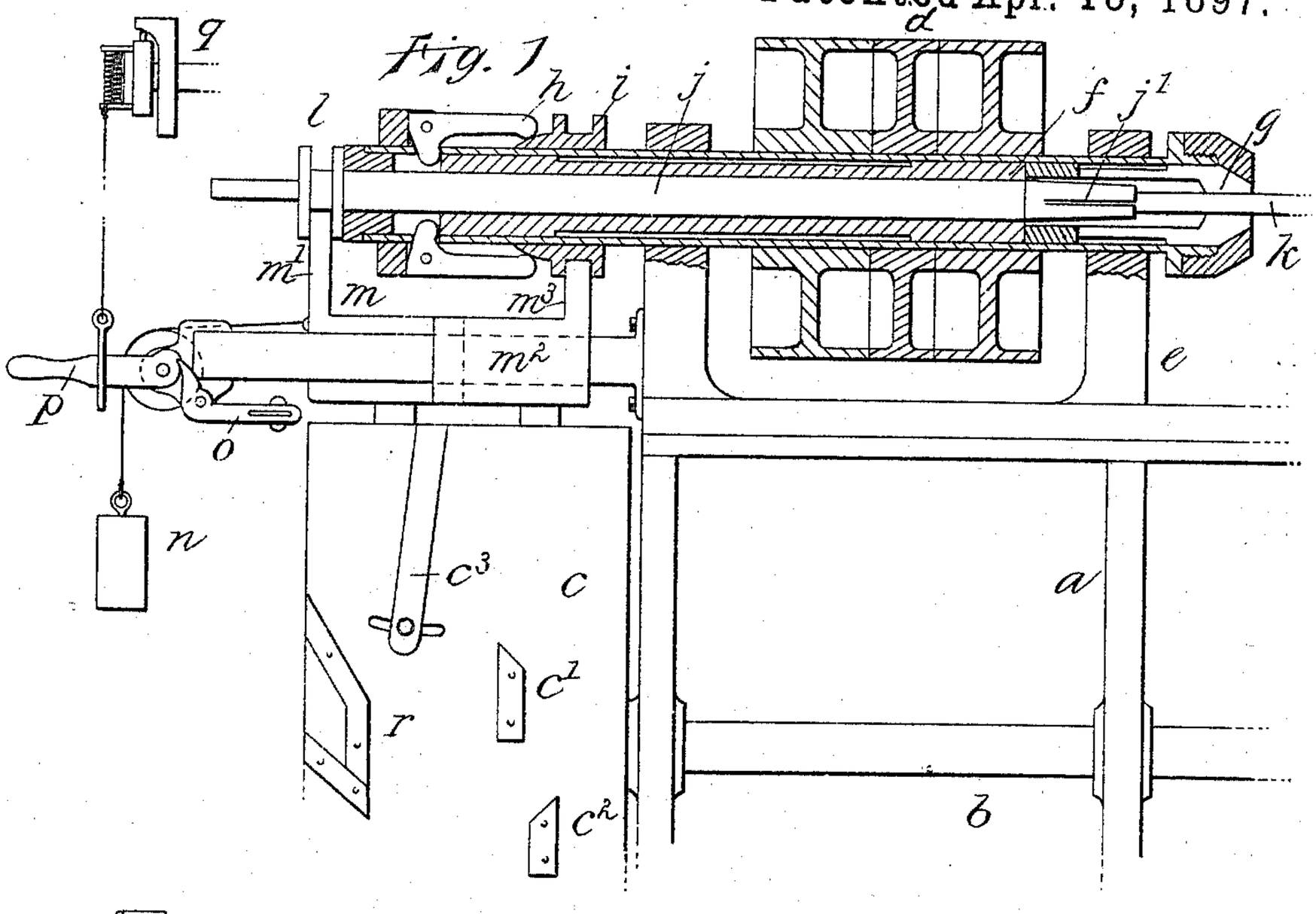
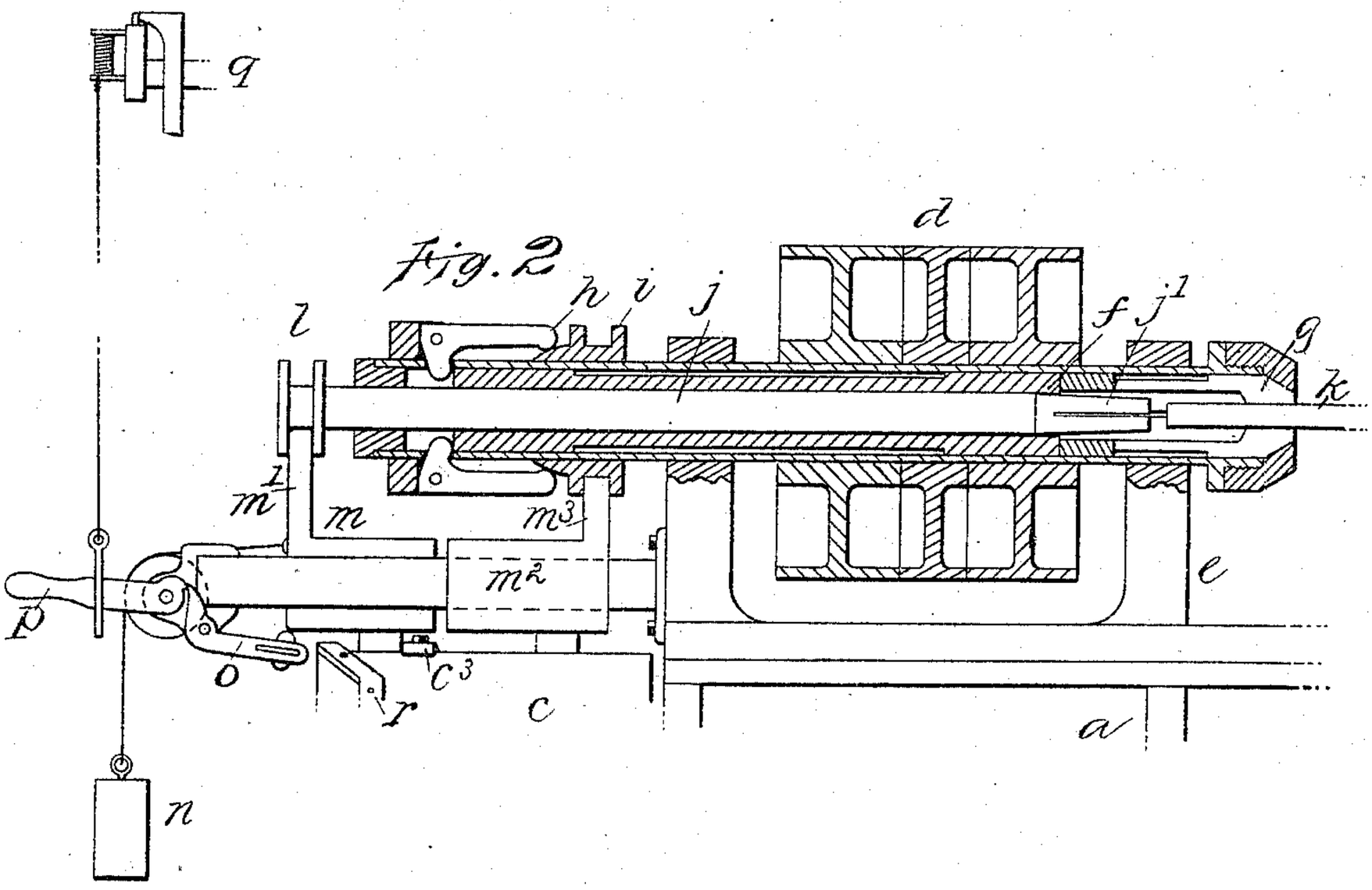


Fig. 2



Witnesses:
Arthur B. Jenkins.
C. E. Buckland.

Inventors:
George B. Woodruff.
Thomas W. R. McCabe.
by Chas. L. Burdett.
Attorney.

UNITED STATES PATENT OFFICE.

GEORGE B. WOODRUFF AND THOMAS W. R. McCABE, OF WINSTED, CONNECTICUT, ASSIGNORS TO THE HARTFORD MACHINE SCREW COMPANY, OF HARTFORD, CONNECTICUT.

STOP-MOTION.

SPECIFICATION forming part of Letters Patent No. 580,539, dated April 13, 1897.

Application filed February 28, 1896. Serial No. 581,133. (No model.)

To all whom it may concern:

Be it known that we, GEORGE B. WOODRUFF and THOMAS W. R. McCABE, citizens of the United States, and residents of Winsted, in the county of Litchfield and State of Connecticut, have invented certain new and useful Improvements in Stop-Motions, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

The object of our invention is to provide in a stop-motion mechanism for screw-machines and the like a device whereby the stock and feed-tube are held against backward movement, and especially at the time at which the chuck-jaws are released from their grasp upon the stock.

To this end our invention consists in the details of the several parts making up the device as a whole and in their combination, as hereinafter described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a view in side elevation of a portion of the frame of a machine and in central section of the chucking apparatus borne thereon. Fig. 2 is a like view of the principal part of the apparatus shown in Fig. 1 with the feed-tube shown as pulled off from the rod of stock and the stop-motion device in operation.

Our device relates to a machine in which a spring-operated belt-shifting device is used for controlling the movement of the machine, a cord connecting the belt-shifting mechanism with a trip device that is operated by the reciprocation of the chuck-operating mechanism. A cord and weight or equivalent device are connected to such parts, exerting power continuously to move them backward, said parts being held at their forward limit of movement by the frictional grasp of the feed-tube upon the rod of stock. In prior devices, however, where extremely light stock is used or where the rod of stock is nearly fed out a difficulty has been experienced from the fact that the feed-tube and stock are simultaneously pulled backward by the weight or like device, it being necessary to use a weight of sufficient size to accomplish this purpose in order that the trip device shall certainly operate under various conditions, and in order to prevent such a backward movement of the feed-tube and stock when the latter has become so reduced as not to resist the action of the weight we have illustrated and described herein a device for obviating this difficulty.

In the accompanying drawings the letter *a* denotes the frame of the machine; *b*, the cam-shaft; *c*, the chucking cam-wheel, and *d* the driving-pulleys of a reverse-motion mounted in bearings in standards *e* on the frame of the machine. This reverse-motion is of well-known construction, and a detailed description thereof is deemed unnecessary herein further than a statement that it includes a chuck-plunger *f*, connected at one end with the chuck-jaws *g* and at the other end to the pivoted chuck-levers *h*, located in the path of movement of a wedge *i*. Within the chuck-plunger is located a feed-tube *j*, provided at one end with frictional grasping-fingers *j'*, adapted to grasp a rod of stock *k* and at the other end with a grooved disk *l*. A sliding carriage *m*, having a projection *m'* in engagement with the grooved disk *l*, and a carriage m^2, having a projection m^3 in engagement with the groove in the wedge *i*, are mounted on a slide fast to the frame, and a weight *n* is connected with the carriage *m*, as by means of a cord passing over a pulley and tending normally to draw the carriage and chuck-plunger backward. This weight, however, is not powerful enough to overcome the frictional grasp of the fingers *j'* upon the rod of stock, and when these fingers are in contact with the stock some other power must be employed to move the carriage *m* backward. This means consists of a cam c^3, secured to the cam-wheel *c*.

The sloping face of a cam *r* is used to move the feed-tube, and with it the stock, forward, and cams *c' c²* operate to open and close, respectively, the chuck-jaws *g*.

The trip *o* is pivoted to the frame of the

machine in the path of movement of the sliding carriage m, and one end of the trip is in engagement with a latch p. A spring-operated belt-shifting device q of a well-known construction is so connected with the latch p, as by means of a cord, as to be operated by the latch when released by the trip o.

The mechanism above described is of old and well-known construction, and no claim is made, broadly, herein to it. In the use of such devices, however, with extremely light stock, as before stated, it has been found that there is a tendency on the part of the chuck-plunger j, after the stock has been sufficiently reduced, to move backward, carrying the stock with it, the weight of the stock being insufficient to resist the pull of the weight n when not held by the grasp of the chuck-jaws. To obviate this difficulty, we have provided the cam r with a holding-surface that remains in contact with the carriage m during such time as the jaws are released from the grasp of the rod of stock. This dwell commences coincident with the operation of the cam c' to release the grasp of the chuck-jaws and operates during such time as the chuck-jaws are free and until after the cam c^2 has operated on the carriage m^2 to close the chuck-jaws. After the chuck-jaws have regrasped the stock the dwell in the cam r passes beyond the lug on the carriage m, that is then free to move backward unless held by the frictional grasp of the fingers j' upon the rod of stock that is held in the jaws g, this backward movement operating the trip device to stop the machine.

The operation of the machine is as follows: The parts being in the position shown in Fig. 1 of the drawings a cutting operation on a rod of stock has just been completed, the chuck-jaws having a firm hold upon said stock. The cam c^3 moves the carriage m and the feed-tube j backward, the spring-fingers j' sliding upon the stock. As soon as the cam c^3 ceases to operate the cam c' acts on the carriage m^2 operating the cone, chuck-levers, and chuck-plunger to release the grasp of the jaws g upon the rod of stock. As soon as this grasp is released the sloping face of the cam r moves the carriage m forward, carrying with it the rod of stock. As soon as the feed-tube has been moved forward to its full extent the cam c^2 operates to again close the chuck-jaws upon the rod of stock, which then is subject to another cutting operation by the tools in the machine. At the time the cam r is relieved from engagement with the carriage m the latter will be held from backward movement by the frictional grasp of the fingers j' upon the rod of stock. If, however, the cam c^3 should have forced the feed-tube j backward far enough to disengage it from the rod of stock, then on the release of the cam r from the carriage m the latter flies backward, operating the trip device and the shifting device q to stop the machine.

In prior machines the cam r is released from engagement from the carriage m immediately after it has moved the carriage forward to its fullest extent, the weight of the rod of stock at this time only operating to hold the feed-tube from backward movement. In the use of machines on extremely light stock, such as used in watch and clock mechanism, it has been found that the weight of stock when nearly used up is not sufficient to hold the feed-tube j against the action of the weight n, and therefore the dwell in the cam r has been provided to prevent such backward movement of the feed-tube until the chuck-jaws have been operated to grasp the rod. After this dwell on the cam r has ceased to engage the carriage m, however, should the spring-fingers j be freed from the rod of stock the stop-motion mechanism is operated as in prior devices.

We claim as our invention—

1. In combination with the chucking mechanism of a screw-machine or the like including chuck-jaws with means for opening and closing them, and a feed-tube, means for continuously exerting a backward pull on said feed-tube, a cam for giving the feed-tube a forward movement only and adapted to prevent backward movement of the feed-tube during the release of the chuck-jaws, and an automatic stop mechanism operatively connected with the feed-tube, all substantially as described.

2. In combination with the chucking mechanism of a screw-machine or the like including chuck-jaws with means for opening and closing them, and a feed-tube, means for continuously exerting a backward pull on said feed-tube, a sliding carriage in engagement with the feed-tube, a cam for giving the feed-tube a forward movement only and adapted to hold the carriage against backward movement during the release of the chuck-jaws, and an automatic stop mechanism operatively connected with the feed-tube, all substantially as described.

3. In combination with the chucking mechanism of a screw-machine or the like including chuck-jaws and a feed-tube, means for continuously exerting a backward pull on the feed-tube, a sliding carriage to operate the chuck-jaws, a cam-wheel bearing cams for operating the carriage, a cam borne on the cam-wheel and adapted to hold the feed-tube against backward movement during the release of the chuck-jaws, and an automatic stop mechanism operatively connected with the feed-tube, all substantially as described.

4. In combination with the chucking mechanism of a screw-machine or the like including chuck-jaws and a feed-tube, means for

continuously exerting a backward pull on the feed-tube, a sliding carriage operatively connected with the feed-tube, a sliding carriage for operating the chuck-jaws, a cam-wheel, cams borne on the wheel for opening and closing the chuck-jaws, cams for reciprocating the feed-tube carriage, a cam also borne on the cam-wheel and adapted to engage the feed-tube-operating carriage during the release of the chuck-jaws, and an automatic stop mechanism operatively connected with the feed-tube, all substantially as described.

GEO. B. WOODRUFF.
T. W. R. McCABE.

Witnesses:
JAMES G. WOODRUFF,
SAML. A. WETMORE.