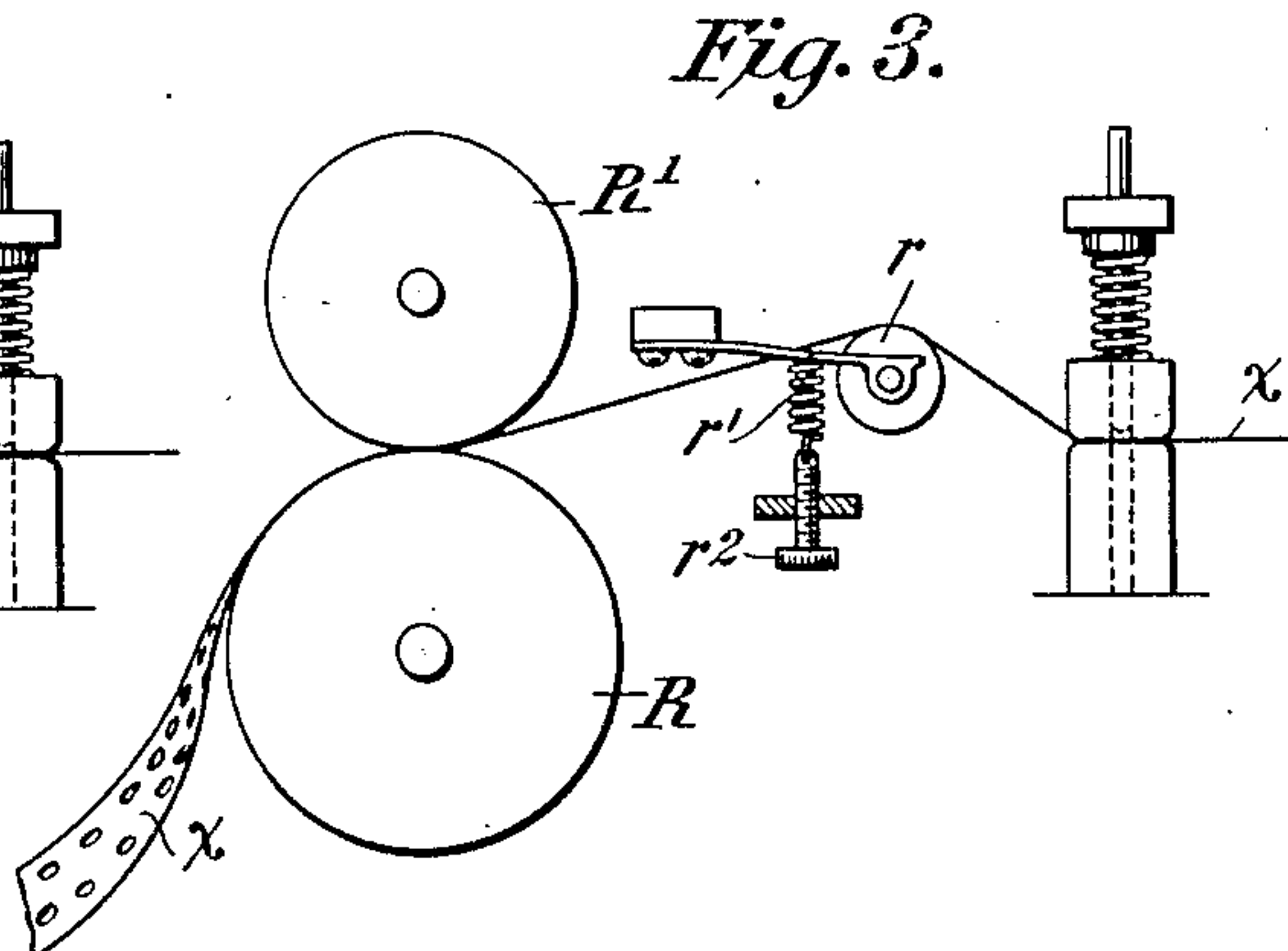
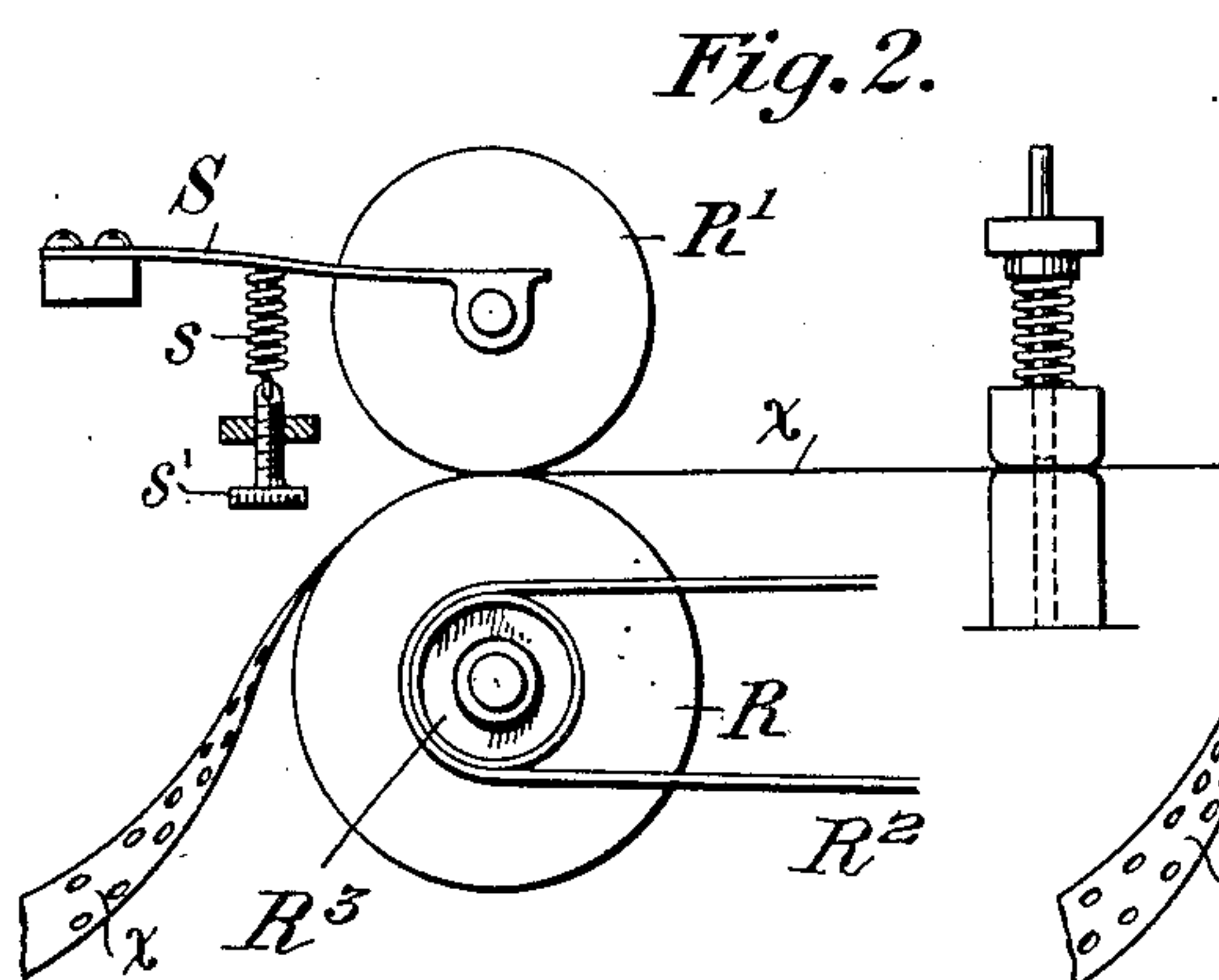
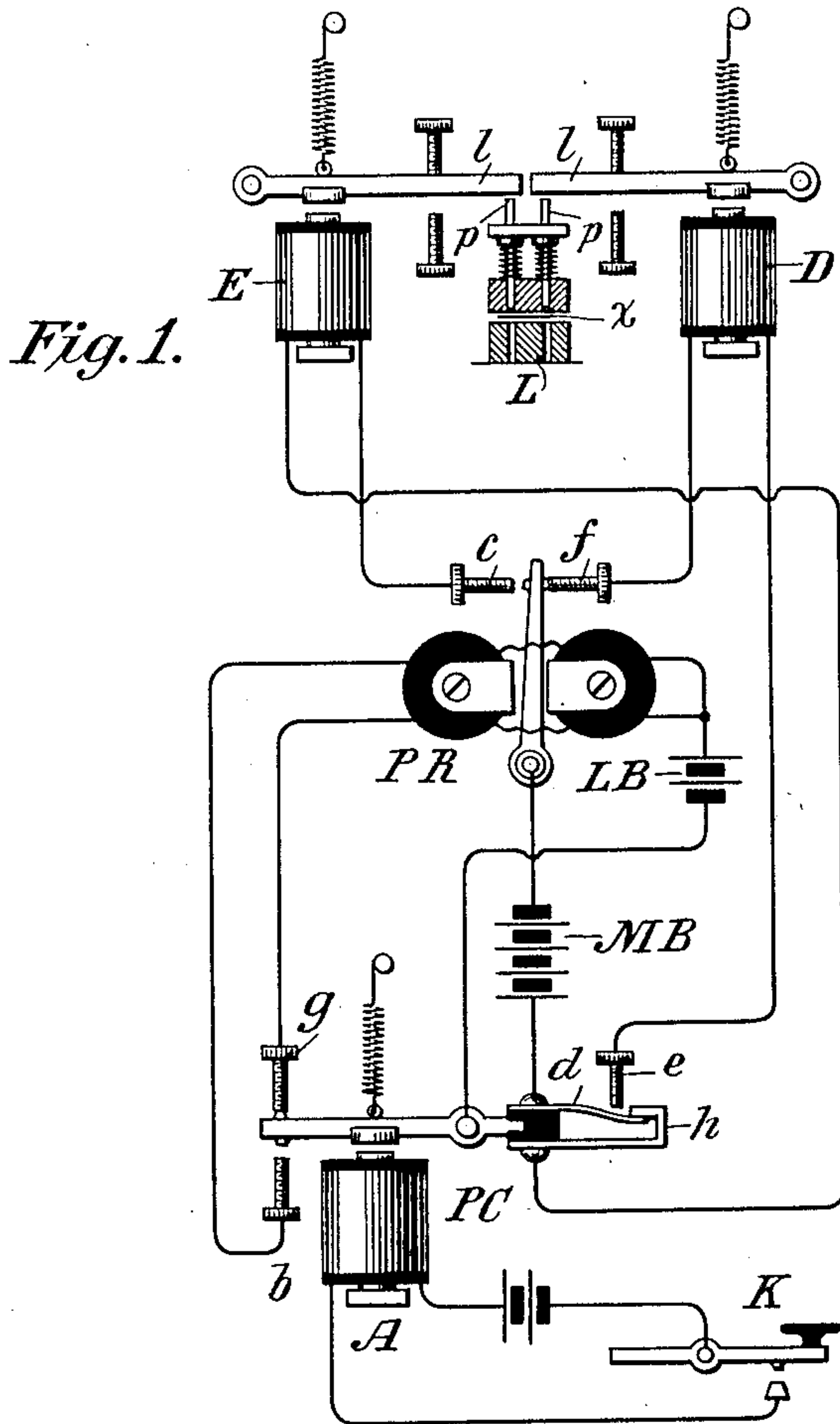


P. B. DELANY.
 PERFORATOR FOR PREPARING TELEGRAPHIC TRANSMITTING TAPES.
 APPLICATION FILED APR. 16, 1902.

906,618.

Patented Dec. 15, 1908.



WITNESSES:
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UNITED STATES PATENT OFFICE.

PATRICK B. DELANY, OF SOUTH ORANGE, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO THE TELEPOST COMPANY OF MAINE, OF AUGUSTA, MAINE.

PERFORATOR FOR PREPARING TELEGRAPHIC TRANSMITTING-TAPES.

No. 906,618.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed April 16, 1902. Serial No. 103,095.

To all whom it may concern:

Be it known that I, PATRICK B. DELANY, a citizen of the United States, residing at South Orange, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Perforators for Preparing Telegraphic Transmitting-Tapes, of which the following is a specification.

In an application for patent filed by me August 12, 1901, Serial No. 72,339, I have shown an electric magnetic perforator in which the perforator magnets are controlled by a Morse key in the circuit of which is a magnet operating a pole changer that controls a differentially wound polarized relay, which, in turn, controls the local circuits and battery of a second polarized relay whose armature lever controls the main circuits in which the two punch magnets are included.

The purpose of the present invention is to dispense with the first named polarized relay and actuate a polarized relay that controls the punch magnet circuits directly from the pole changer that is actuated on the manipulation of the Morse key.

A second feature of the invention relates to the drawing of the strip that is being punched. Heretofore the drawing devices have been constructed and arranged to act in either of two ways: first, the strip is advanced after each perforation by the action of devices positively intermittently actuated after the punching of each perforation. This system involves the stopping and starting of the drawing devices, or their intermittent positive control by some action set up corresponding with the actuation of the punches, to advance the tape step by step and has disadvantages that are well understood. The other system is one in which the tape is continuously drawn forward; and this has the objection that the punches cannot be actuated with such rapidity as to avoid elongation of the aperture or formation of a bur or turned edge at one side thereof by reason of the draft exerted upon the tape while the punch is still engaged with it.

In the present invention, the tape drawing devices are continuously actuated and are continuously in engagement with the tape. They are, however, so arranged and constructed that the resistance of the tape, when engaged by the punch, causes it to re-

main stationary, or to cease to travel until the punch has risen or passed out of engagement with it. To accomplish this result, I preferably employ drawing rolls between which the tape passes, one, at least, of which is continuously driven, and one of which is capable of adjustment as regards the pressure and consequent friction exerted upon the tape so that the drawing power of the rolls is not sufficient to move the tape when its resistance is increased by the entrance of the punch; but, when the punch leaves the tape it is drawn steadily and uniformly forward until again engaged by a punch.

A modification of the organization of tape drawing devices is one in which there is a yielding cushion roll interposed between the punch and drawing rolls and serving to deflect the tape from a straight line between the bed of the punch and the bite of the rolls, and which, when the tape is engaged by a punch, yields and permits that part of the tape engaged by the punch to pause until the punch has passed out of engagement with it.

In the accompanying drawings: Figure 1 is a diagrammatic view illustrating a complete organization. Fig. 2, a detail view indicating an arrangement in which the pressure of the drawing rolls may be adjusted so that they will slip upon the tape when its resistance is increased by the entrance of a punch: and Fig. 3, a detail view showing an elastic yielding cushion over which the deflected tape passes located between the punches and the bite of the drawing roll.

Referring to Fig. 1, K represents a Morse key; A, a magnet included with the local battery in the circuit of the key; PC a pole changer actuated by the magnet A; PR a differentially wound polarized relay; LB the local battery of the relay; MB the main battery; and D, E, the punch magnets. L indicates the die block with which the punch magnets coöperate and x is the tape.

With the several instrumentalities in the position shown in Fig. 1, the main current circuit for the punch magnet E is open at the stop c of the polarized relay and consequently that magnet is deenergized, notwithstanding, the circuit from it is completed through the hook contact h and spring contact e , of the pole changer, to one pole of the battery MB. The armature of

the relay being against its stop *f*, the circuit of the punch magnet *D* is closed at that point, but the same circuit being open at the pole changer contact *e*, the magnet is not energized. When the key *K* is depressed against its contact, the magnet *A* is energized and the armature lever of the pole changer is attracted towards its limiting contact *b*; but, before the contact is completed at that point, the spring tongue contact *d* has passed into action with the top *e* and been pressed out of engagement with the insulated hook contact *h*, the effect of which has been to complete the circuit of the punch magnet *D* from one pole of the main battery *MB* through the armature lever of the polarized relay, its contact stop *f*, winding of punch magnet *D* and through pole changer contacts *e*, *d*, to the other pole of the battery. The punch magnet *D* is, therefore, actuated and its corresponding punch *p* operated. When, however, the armature lever of the pole changer reaches its contact *b*, the circuit of the local battery *LB* is completed through one winding of the differentially wound polarized relay with the effect that its armature lever is caused to pass to the contact stop *c*, thus opening the circuit of the punch magnet *D* at the contact *f*. When the key is raised, the armature lever of the pole changer rises toward its contact stop *g* and the spring tongue *d* passes out of engagement with *e* and into engagement with *h* with the effect that a circuit is now completed from the pole of the battery *MB* through the relay armature and its stop *c*, winding of punch magnet *E* and contacts *h*, *d*, to the opposite pole of the battery and the punch magnet *E* is energized. When, however, the pole changer armature lever reaches its contact stop *g*, the circuit of the local battery *LB* is completed through the other winding of the differentially wound relay and its armature lever is transferred from *c* to *f*, thus opening the circuit of the punch magnet *E* and the parts are in normal position shown in the drawings. The duration of the energization of the magnets *DE* may be regulated by adjustment of the local contacts *g*, *b*, of the pole changer, as well as by adjustment of the relay stops *f*, *c*. Experience has demonstrated that this organization is one of great simplicity and effectiveness and eliminates largely personal key characteristics of the operator from the punched record of the tape.

Notwithstanding the high speed of operation of the punches, experience has shown that the desired clean cut and perfectly symmetrical perforation in the tape is modified and impaired by the draft of the paper against the side of the punch. To remedy this, and yet retain all the advantages of continuously acting tape drawing devices, I provide the following organization as

shown in detail in Fig. 2. The tape *X* passes between a lower roll *R* and an upper roll *R'*. The roll *R* is driven continuously at proper speed by any suitable motor, as, for instance, an electric motor driving a belt *R*² passing over a pulley *R*³ on the shaft of the roll, and the paper strip is pressed and drawn frictionally between the two rolls. The upper roll *R'* is mounted upon a spring or other arm *S* and is pressed constantly toward the roll *R*. The pressure, however, may be varied by the adjustment of the tension spring *s* by means of a screw thumb bolt *s'*. In this way, I have found, by experience, that the friction upon the tape interposed between the rolls may be so regulated that the tape will be drawn forward with precision when disengaged from a punch, but will pause when engaged by a punch by reason of the slip of the roll due to the added resistance to the traverse of the tape. By such an organization which has been put into practical use by me, I am enabled to punch in the tape perfectly symmetrical perforations with clean cut flat edges. A similar result may be effected by such an arrangement as that shown in Fig. 3 where the lower and upper rolls *R*, *R'*, are so set as, at all times, to firmly frictionally grasp the tape. Here the tape *x* is deflected upwardly over the roll *r* supported in the end of a spring or other arm and thence downwardly between the drawing rolls. The upward tendency of the roll *r* may be adjusted by means of a spring *r'* and a screw thumb bolt *r*². When the resistance of the tape is increased by the entrance of the punch into it, the roll *R* will yield sufficiently to permit that part of the tape engaged by the punch to remain momentarily at rest.

For many reasons, as already stated, I very much prefer an organization having the mode of operation of that disclosed in Fig. 2.

I claim as my invention:

1. In an electro magnetic telegraph tape perforator, the combination of a key, the pole changer magnet controlled thereby, a differentially wound polarized relay, the pole changer armature lever and its limiting contact stops, the local circuit of the windings of the relay controlled at said stops, the punch magnets, the main battery, the punch magnet circuits controlled at the stops of the polarized relay and contacts of the pole changer also controlling the circuits of the punch magnets, the operation being substantially as described.

2. In an electro magnetic telegraph tape perforator, the combination of a key, its local circuit, a pole changer magnet included in the local circuit, the armature lever of the pole changer and its contacts, a polarized relay and its local reversing circuits con-

5 trolled by one set of contacts of the pole
changer armature lever, the main battery,
the punch magnets, the punch magnet cir-
cuits controlled at the contact stops of the
polarized relay and another set of pole
changer contacts also controlling the circuit
of the punch magnets.

10 3. In a telegraph perforator, the combina-
tion with a punch of continuously operating
frictionally acting tape drawing devices ar-
ranged to draw the tape past the punches,
and means for adjusting their frictional grip
upon the tape so that they will slip and the
traverse of the tape be arrested when en-
15 gaged by a punch.

20 4. In a telegraph tape perforator, the com-
bination with a punch of frictional acting
continuously operating tape drawing de-
vices arranged to draw the tape past the
punches and so adjusted that when the re-
sistance of the tape is increased by the en-

trance therinto of the punch, the drawing
device slip and permit a pause in the move-
ment of the tape whereby distortion of the
punched perforation is prevented. 25

5. In a telegraph tape perforator, the com-
bination with a punch of continuously op-
erating tape drawing devices constantly en-
gaging the tape and arranged to draw it
past the punches, the drawing devices com- 30
prising in their organization means where-
by, when the resistance of the tape is in-
creased by the entrance of the punch into it,
that part of the tape engaged by the punch
is permitted to pause while the punch is en- 35
gaged with it.

In testimony whereof I, have hereunto
subscribed my name.

PATRICK B. DELANY.

Witnesses:

EDWARD C. DAVIDSON,
KATHARINE MACMAHON.