

Sheet 1, 3 Sheets.

A. Bain.

Perforating Paper for Telegraphic Signals.

N^o 43,618.

Patented Jul. 19, 1864.

Fig. 1.

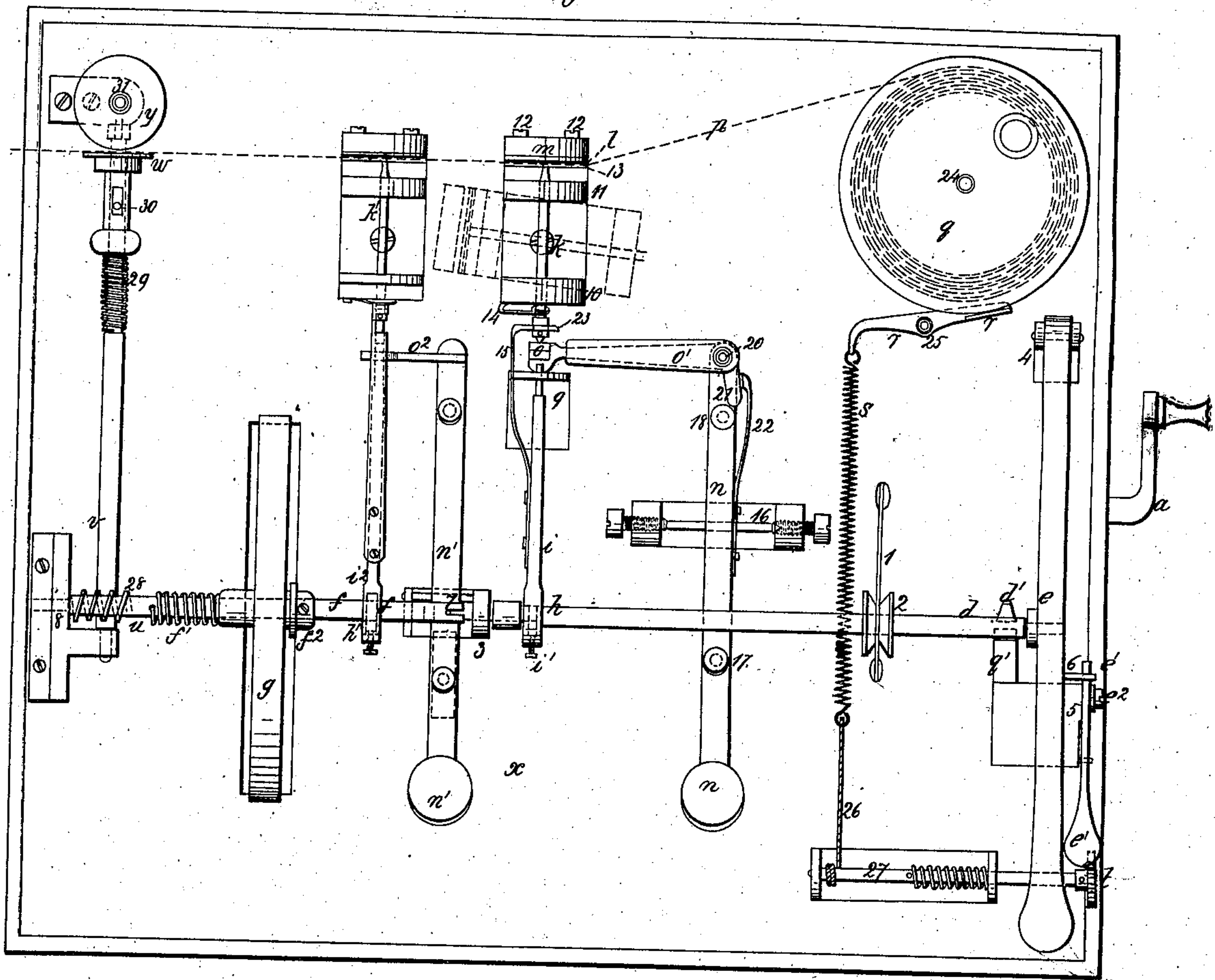
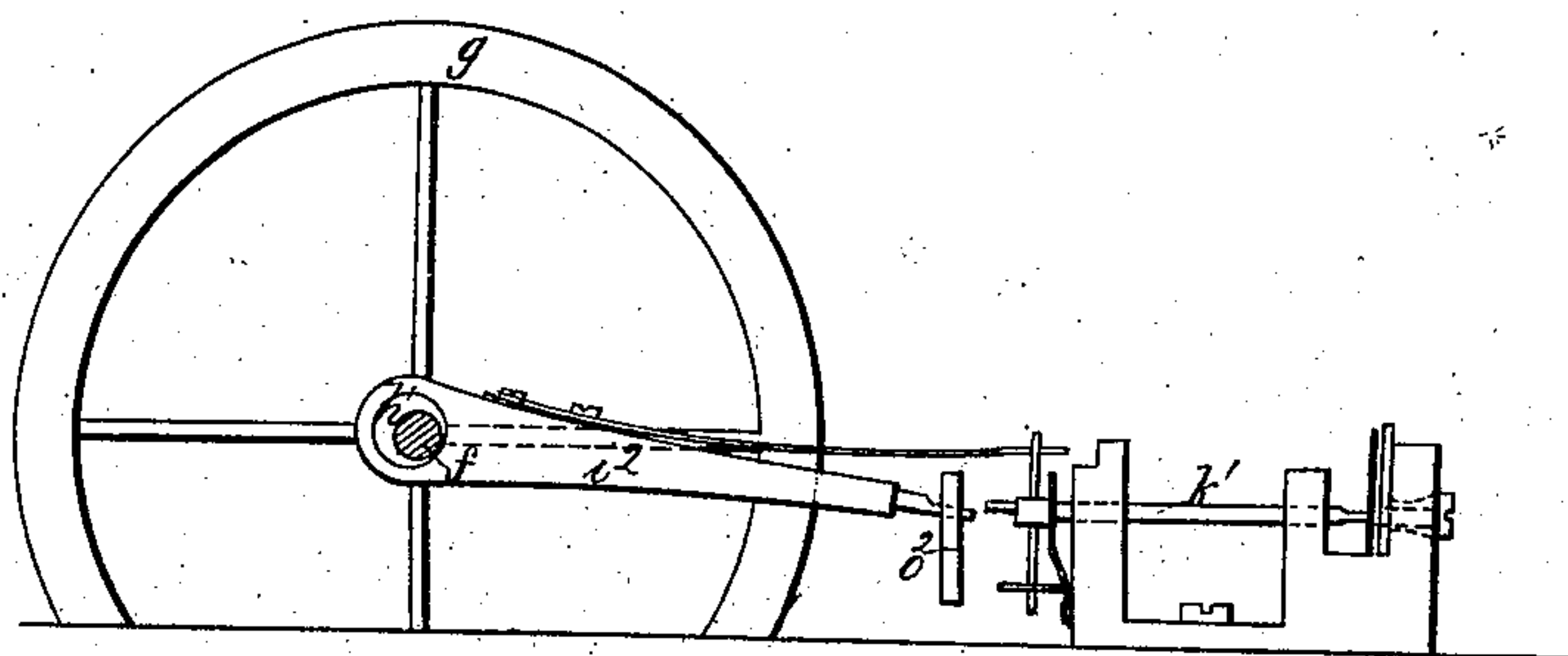


Fig. 7.

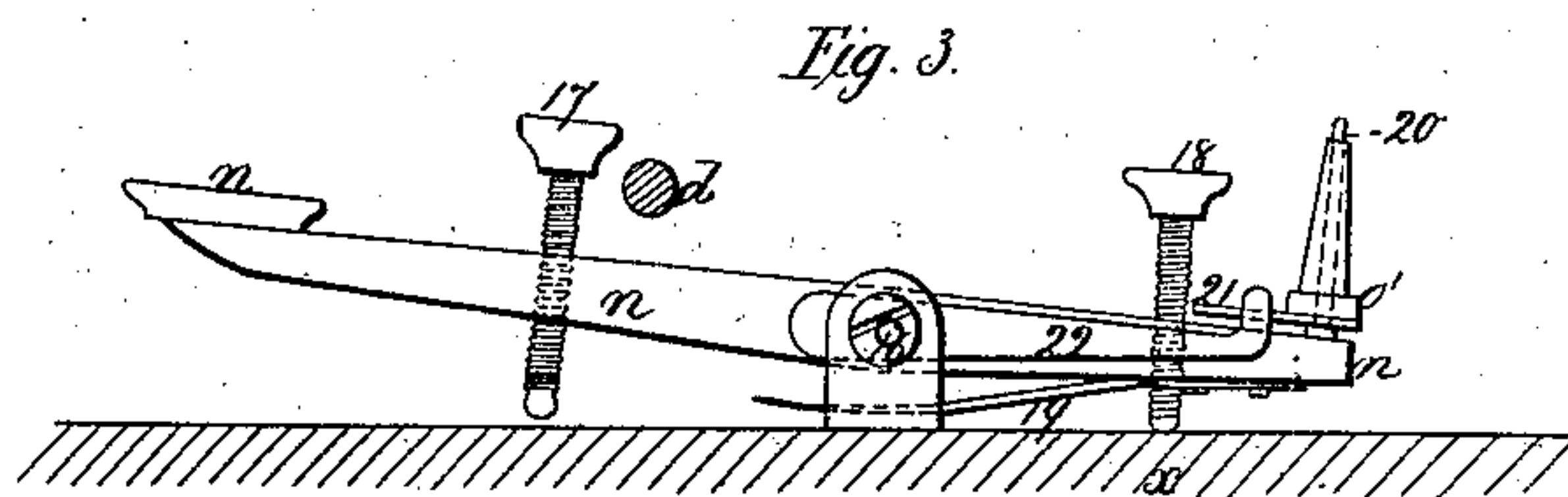
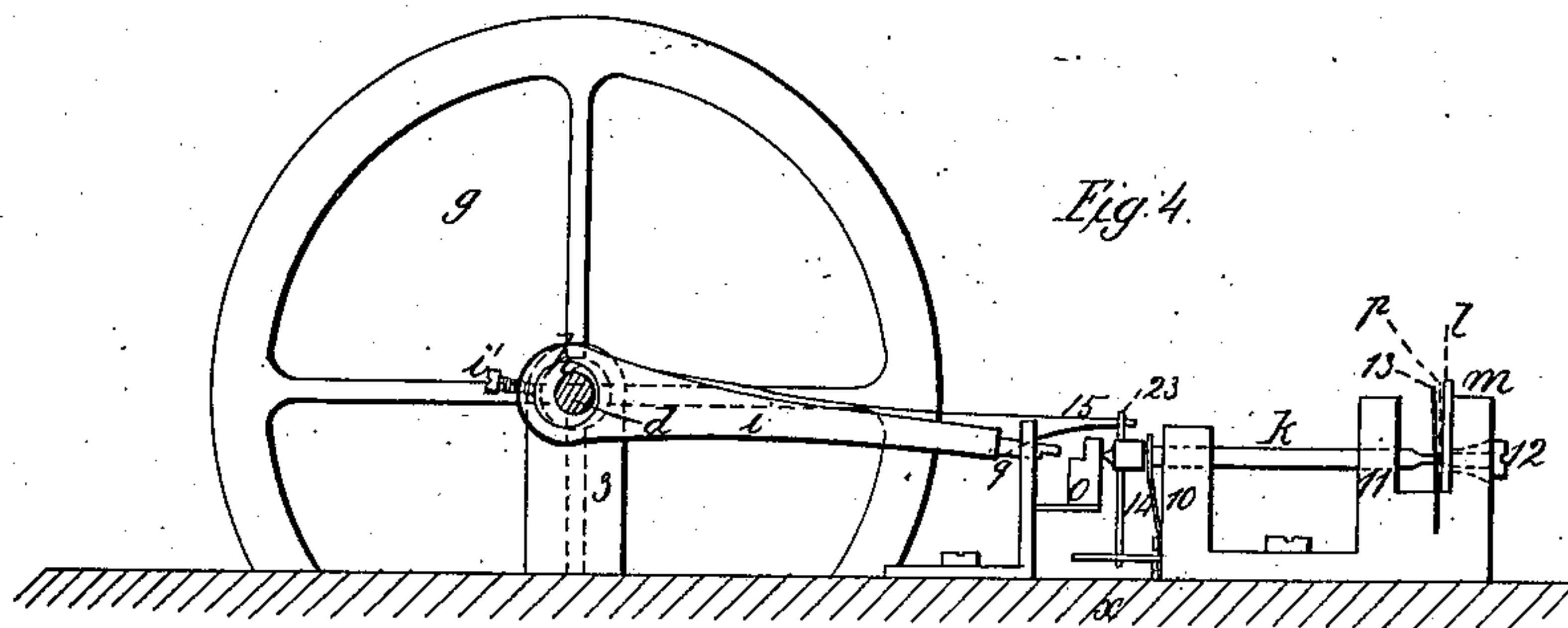
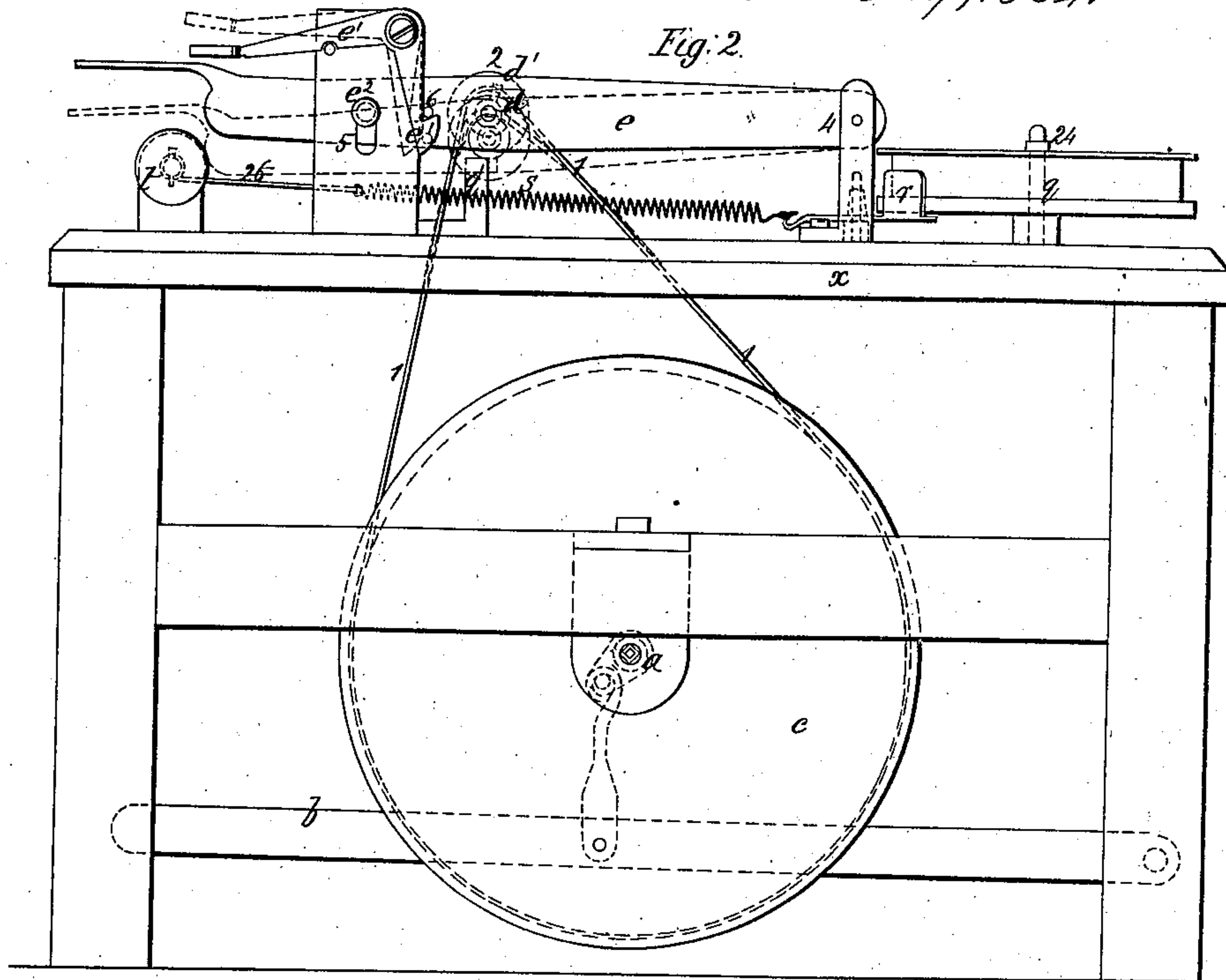


Witnesses;
 Lemuel W. Serrell
 Chas. H. Smith

Inventor;
 Alex. Bain

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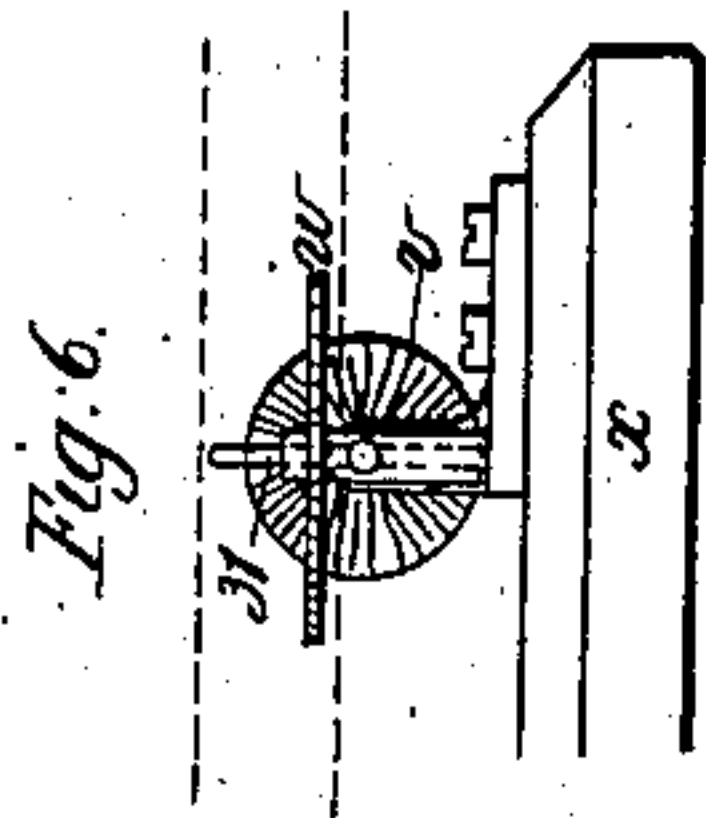
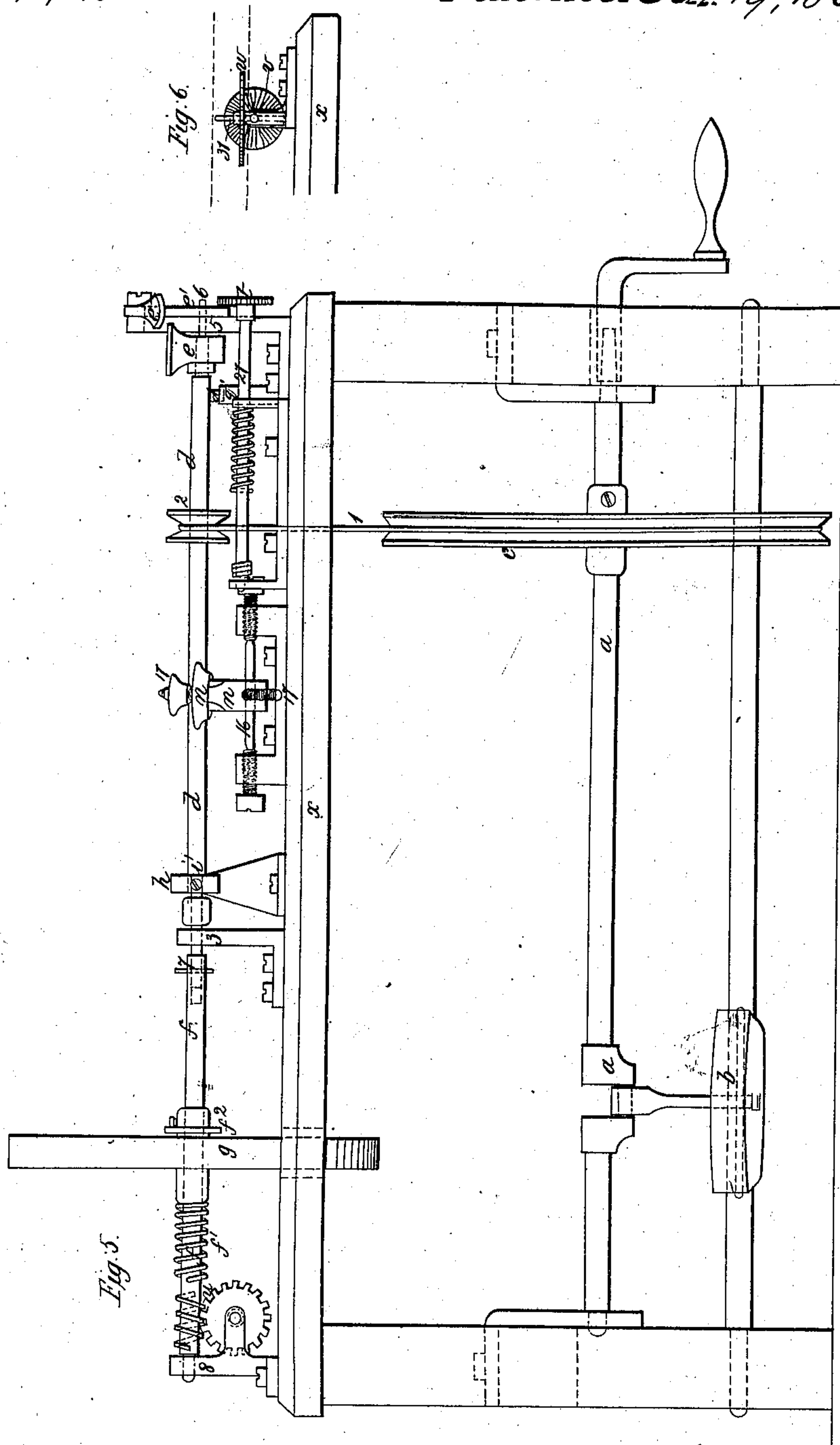
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Witnesses:

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Inventor,

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UNITED STATES PATENT OFFICE.

ALEXANDER BAIN, OF NEW YORK, N. Y., ASSIGNOR TO WM. H. ALLEN, OF
SAME PLACE.

IMPROVEMENT IN MACHINES FOR PUNCHING PAPER FOR TELEGRAPHIC PURPOSES.

Specification forming part of Letters Patent No. 43,618, dated July 19, 1864.

To all whom it may concern:

Be it known that I, ALEXANDER BAIN, of the city and State of New York, have invented, made, and applied to use a certain new and useful improvement in means for perforating strips of paper or other material to be employed in the transmission of telegraphic messages, &c.; and I do hereby declare the following to be a full, clear, and exact description of the said invention, reference being had to the annexed drawings, making part of this specification, wherein—

Figure 1 is a plan of my improvement. Fig. 2 is a side elevation of the same. Fig. 3 is a side view of the finger-key. Fig. 4 is a similar view of the punching apparatus. Fig. 5 is a front elevation, and Fig. 6 is a detached elevation, of the disks that draw the strips of paper or other material along.

Similar marks of reference indicate the same parts in all the figures.

In Letters Patent granted to me on the 17th day of April, A. D. 1849, a mode is shown of transmitting telegraphic signals by electric pulsations by means of a metallic comb and roller in the telegraphic circuit, between which a perforated strip of paper was drawn along, the paper breaking the circuit and the perforation allowing a metallic contact for completing such circuit, thereby causing the transmission of pulsations of greater or less extent with interruptions to such pulsations of a longer or shorter period, according to the signs representing letters and words punched or perforated in the strip of paper.

The nature of my present invention consists of an improved mechanism for perforating strips of paper or other material in such a manner as to form short or long openings, and with a greater or less distance between those perforations, said perforated strips of material being especially adapted to the transmission of telegraphic pulsations; but my apparatus may be employed in punching strips of material for other purposes.

In the drawings, *a* is a shaft driven by competent power applied in any desired manner. I have, however, shown a foot-treadle, *b*, for this purpose.

c is a wheel from which a band, 1, extends to the pulley 2 on the shaft *d*, which shaft *d* is sustained at one end by the bearing 3, and

at the other end by a bush in the lever *e*, that is on the fulcrum 4 at one end and guided near the other end by the standard 5.

6 is a pin or stud on this lever *e*, that is taken by a bent lever-latch, *e'*, on the standard 5. When the lever *e* is raised so as to strain the band 1 the latch *e'*, taking under the pin or stud 6 in the lever *e*, sustains the shaft *d* in its working position for driving the other parts of the machine; but when the bent lever *e'* is raised so as to unlatch the pin or stud 6 the lever *e* descends, as represented in red lines in Fig. 2, the extent of motion being determined by a screw and slot, *e''*. This lowers that end of the shaft *d* and allows of the wheel *c* and shaft *a* to continue their rotation without moving the other parts of the machine, and the band 1, being thus loose, is not sustained or injured. By this arrangement the shaft *a* may extend along beneath several machines and be revolved by manual, steam, or any other power, and each operator throws his machine in or out of gear at pleasure.

The shaft *d* is connected by a coupling or sleeve 7 to the shaft *f*, sustained at the other end in the bearing 8; and *g* is a fly-wheel on this shaft, to equalize the movement of the parts.

h is a small eccentric on *d*, taking the rod *i*; and *i'* is a small screw passing through the large end of the rod *i*, and the point entering a small groove around the periphery of the eccentric to retain the rod in position. The end of the rod *i* slides through a support, 9, on the bed *x* of the machine.

k is a punch sliding in supports 10 and 11 on *x*, and the cutting end of this punch *k* is of a size and shape corresponding to the smallest perforation required in the paper; and *l* is a steel-plate die corresponding therewith, which plate is attached by screws 12 to the block *m*, the holes in which block *m*, passing the screws 12, are slightly larger than the screws, so as to allow of an accurate adjustment of the die *l* by entering the point of the punch *k* into such die previous to screwing up the screws 12, as the punch *k* must work without the possibility of sticking in the die, and at the same time make a clean perforation in the strip of paper or other material *p* (see red line) that is passed between the die *l* and a small metal guide-plate, 13. A hole larger than the punch is made in this guide-plate, to pass said punch freely. A spring,

12, tends to keep the punch *k* away from the die *l*, and an arm, 15, connected to the eccentric-rod *i*, and taking behind a pin, 23, through the end of *k*, insures the drawing back of the punch under all circumstances, and prevents it remaining in the die, in consequence of any fibers of papers that may wedge therein.

The eccentric-rod *i* can vibrate without acting upon the punch *k*, because the end of said rod *i* is not long enough to reach such punch. When, therefore, it is desired to cause the punch to perforate the strip of material an interposer is so brought between the eccentric-rod and the punch by means of a finger-key that the punch is made operative, and when the interposer is depressed or otherwise removed from between the parts the punch again ceases to operate. Hence, if the interposer be introduced and immediately withdrawn, a small perforation will be produced; and if it remain between the parts while the punch makes several strokes, the perforation will be elongated by the series of perforations cutting into each other, and the strip of material being drawn along by a regular feed motion, it is in the power of the operator to produce or allow of any desired distance between the perforations or groups of perforations, so as to produce the desired characters for telegraphic transmission by the association of dots, lines, or dashes and spaces.

The interposer aforesaid may be actuated by any suitable mechanism. I have, however, represented the same as fitted to a finger-key, so that the same may be worked similarly to a telegraphic instrument.

n is a finger-key on the axis 16, with the regulating screws 17 and 18 and spring 19 of any usual character.

20 is a stud at the end of the key, receiving the arm *o'*; and 22 is a spring on the side of *n*, taking a projection, 21, from *o'*.

o is the interposer upon a spring (see dotted lines) that is attached on the under side of *o'*. If the finger-key is depressed when the rod *i* is projected toward the punch, the spring carrying the interposer will bend until the rod *i* draws back, when the interposer, springing between the rod and punch, causes the next stroke of the eccentric-rod to effect the punching of the strip of material, the interposer *o* and arm *o'* vibrating on the stud 20 as the eccentric rod and punch reciprocate. The interposer *o* is formed with a rise or flange (see Fig. 4) that remains in contact with the punch *k* by the action of the spring 22.

I have represented a variation in the mode by which the vibrating eccentric-rod *i*² can be applied to move the punch. In this the eccentric-rod *i*² is sustained by and vibrates through an arm, *o*², on the finger-key *n'*, so that when said key is not depressed the eccentric-rod vibrates below the end of the punch, as seen in Fig. 7, and does not act on the same; but when the key is depressed the end of the eccentric-rod is brought on line with the punch *k'* and causes the vibration thereof, the same

as the punch *k*. The parts receiving the said punch and the die at the end thereof are to be of the character heretofore set forth. It will be seen that either of these keys can be employed, as most convenient. The parts of this modification of the punch and key not otherwise mentioned correspond with those heretofore described with the other key.

If desired to sharpen the punch, it may be done by grinding the end off flat, and for convenience the punch and its stock may be turned into the position shown by dotted lines in Fig. 1, so that said punch may be withdrawn without taking anything apart.

The strip of material *p* is on a reel, *q*, sustained by a stud, 24; and *r* is a friction-clamp applied to said reel to regulate the tension upon the paper as drawn off. This clamp *r* is on a fulcrum, 25, on *x*; and *s* is a spring from the end of the clamp *r* to the cord 26, that can be wound on the rod 27 by the button *t* to increase the friction of the clamp *r* and the consequent tension on the paper. This tension on the paper causes the die to cut the perforations much better.

The strip of paper is drawn along by the following means: A worm, 28, on the shaft *f* gives motion to a wheel, *u*, on a shaft, *v*, sustained in suitable bearings, and carrying a disk, *w*, on a sleeve, rotated by a pin and slot, 30, and kept toward a horizontal wheel, *y*, by a spring, 29. The face of this disk *w*, is roughened, and the wheel *y* comes in contact therewith above its center, so that the paper, passing between the wheel *y* and disk *w*, will be drawn along gradually and according to the distance between the center of the disk *w* and the point of contact of *y* therewith, so the motion of the perforated material will be faster or slower; and to prevent the paper being worked out from between the disks by their motion the point of contact of *w* and *y* should not be exactly over the center of the disk, but very slightly toward the descending side of the disk *w*, so that the tendency is to carry the edge of the paper toward the shaft *v* and prevent its escaping.

It may be necessary to stop the revolution of the shaft *d* immediately upon moving the lever-latch *e'*, to effect which I make use of a tooth, *d'*, that comes in contact, when the shaft *d* is lowered, with the stud *q'*, but revolves clear of said stud when the shaft *d* is raised by the lever *e*.

To prevent the fly-wheel *g* being injured or injuring the parts by its momentum, I allow the hub thereof to be loose on the shaft *f*, and use a spring, *f'*, to press the said hub against the fixed collar *f*² on said shaft, thereby driving the fly-wheel by friction, which allows the said fly-wheel to move after the shafts *d* and *f* have been stopped.

What I claim, and desire to secure by Letters Patent, is—

1. The arrangement of the shaft *d*, lever *e*, and latch *e'*, to cause the band 1 from the mo-

tive power to be operative or inoperative, as set forth.

2. A reciprocating rod actuated by an eccentric or its equivalent, in combination with a punch and mechanism, substantially as specified, for causing the eccentric-rod to be operative or inoperative on the punch, substantially as set forth.

3. The combination of a finger-key, a punch, and reciprocating mechanism, substantially as specified, whereby the punch is made to operate by depressing the key, substantially as set forth.

4. The spring-clamp *r* applied to the paper-reel, for the purposes and as specified.

5. The disk *w* and wheel *y*, applied, as specified,

for drawing along the strip of paper or similar material, as set forth.

6. The tooth *d'* and stop *q'* applied to the shaft *d*, for the purposes and as specified.

7. Withdrawing the punch by a positive movement derived from the reciprocating mechanism through the agency of the arm 15 and pin 23, or their equivalents, for the purposes and substantially as specified.

In witness whereof I have hereunto set my signature this 11th day of February, A. D. 1864.

ALEXR. BAIN.

Witnesses:

LEMUEL W. SERRELL,
CHAS. H. SMITH.