

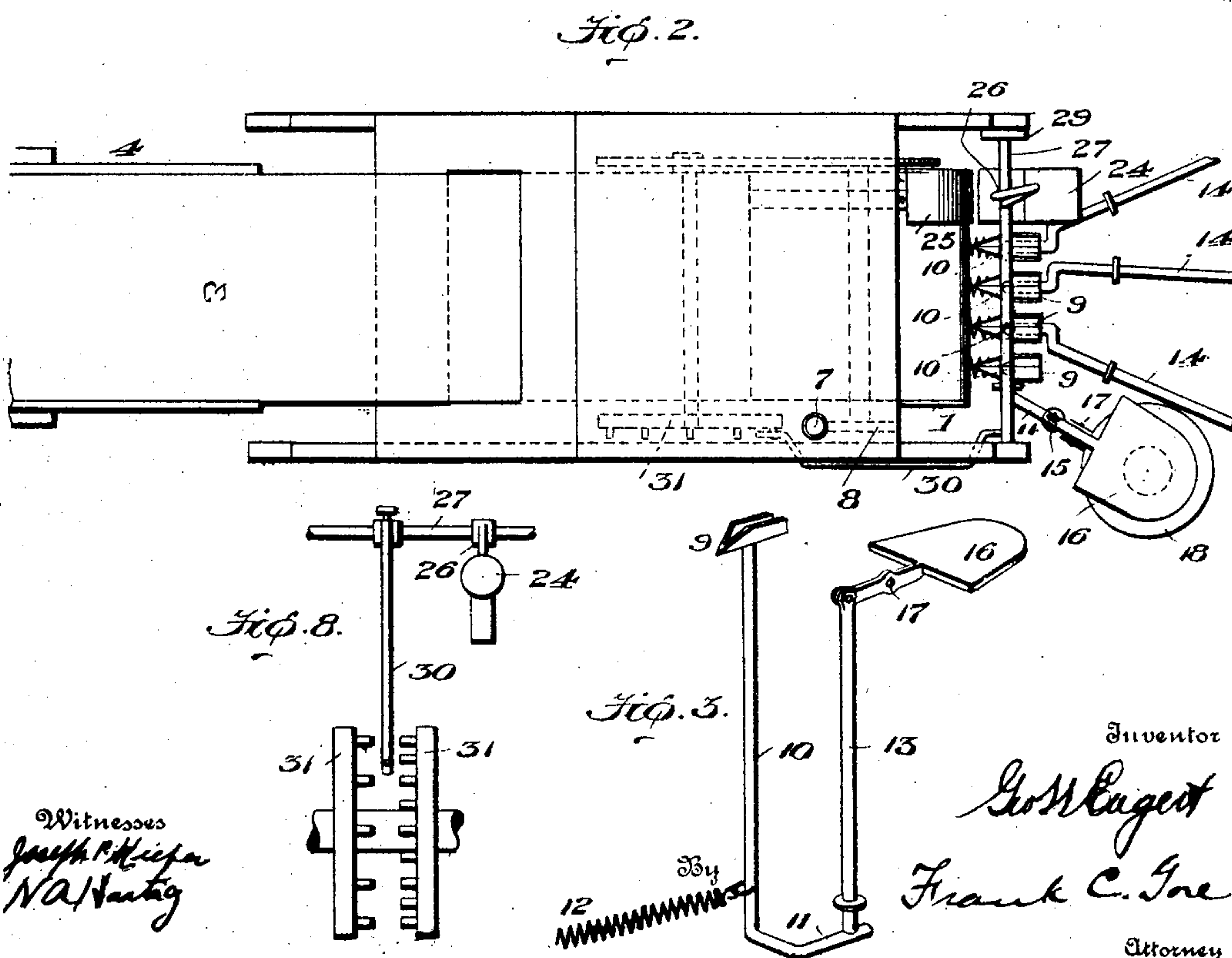
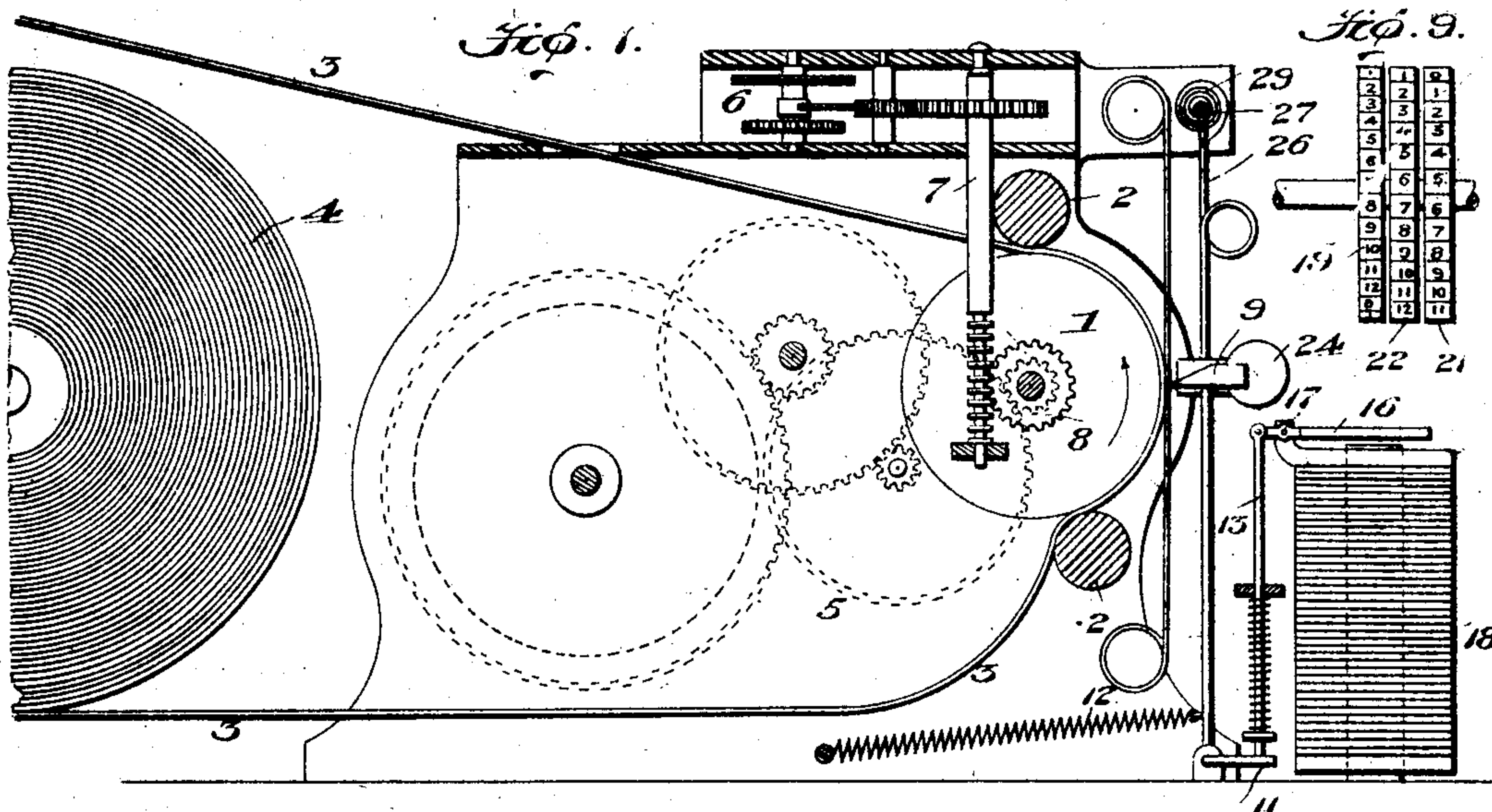
No. 797,051.

PATENTED AUG. 15, 1905.

G. N. ENGERT.  
RECORDER.

APPLICATION FILED OCT. 24, 1904.

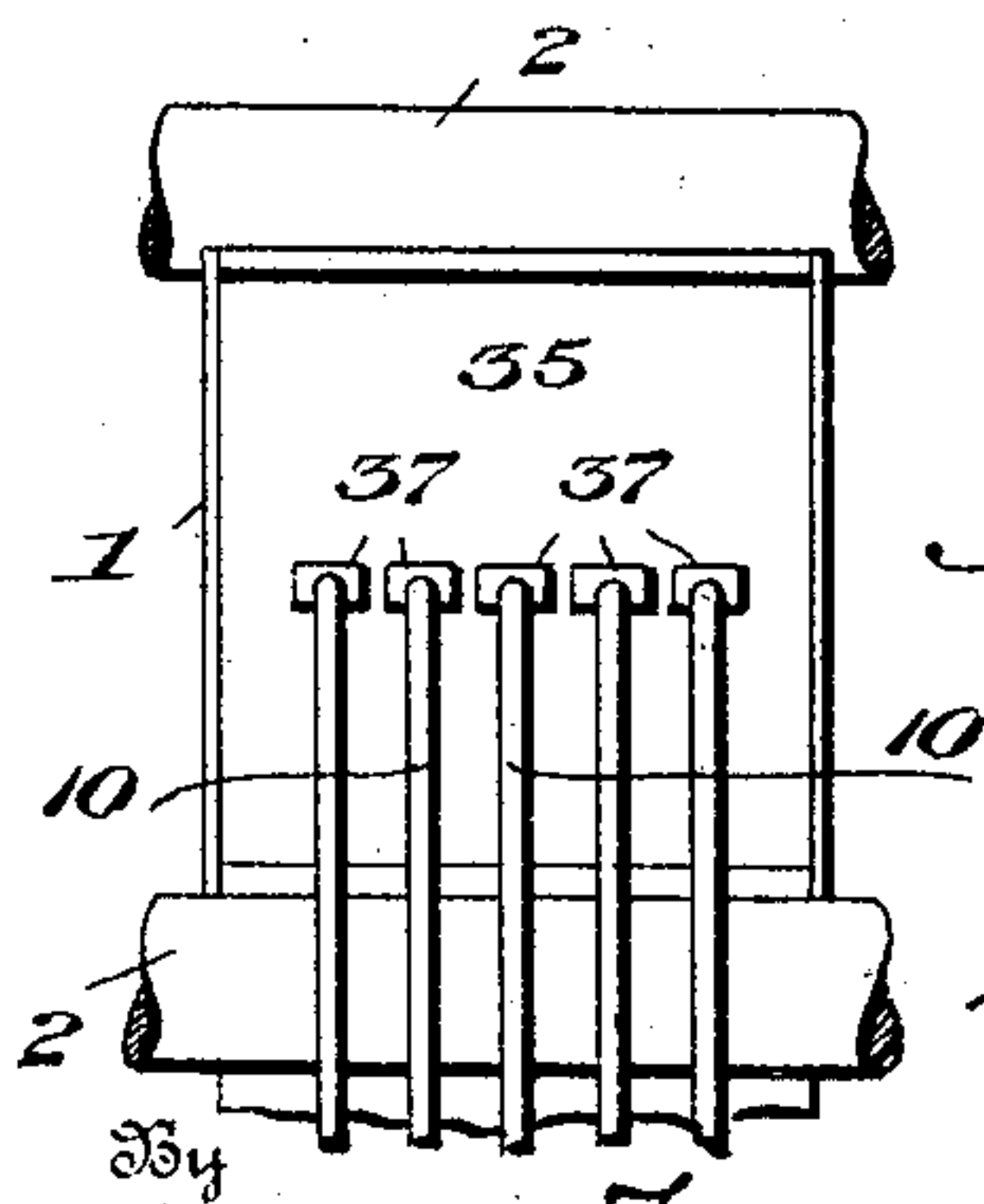
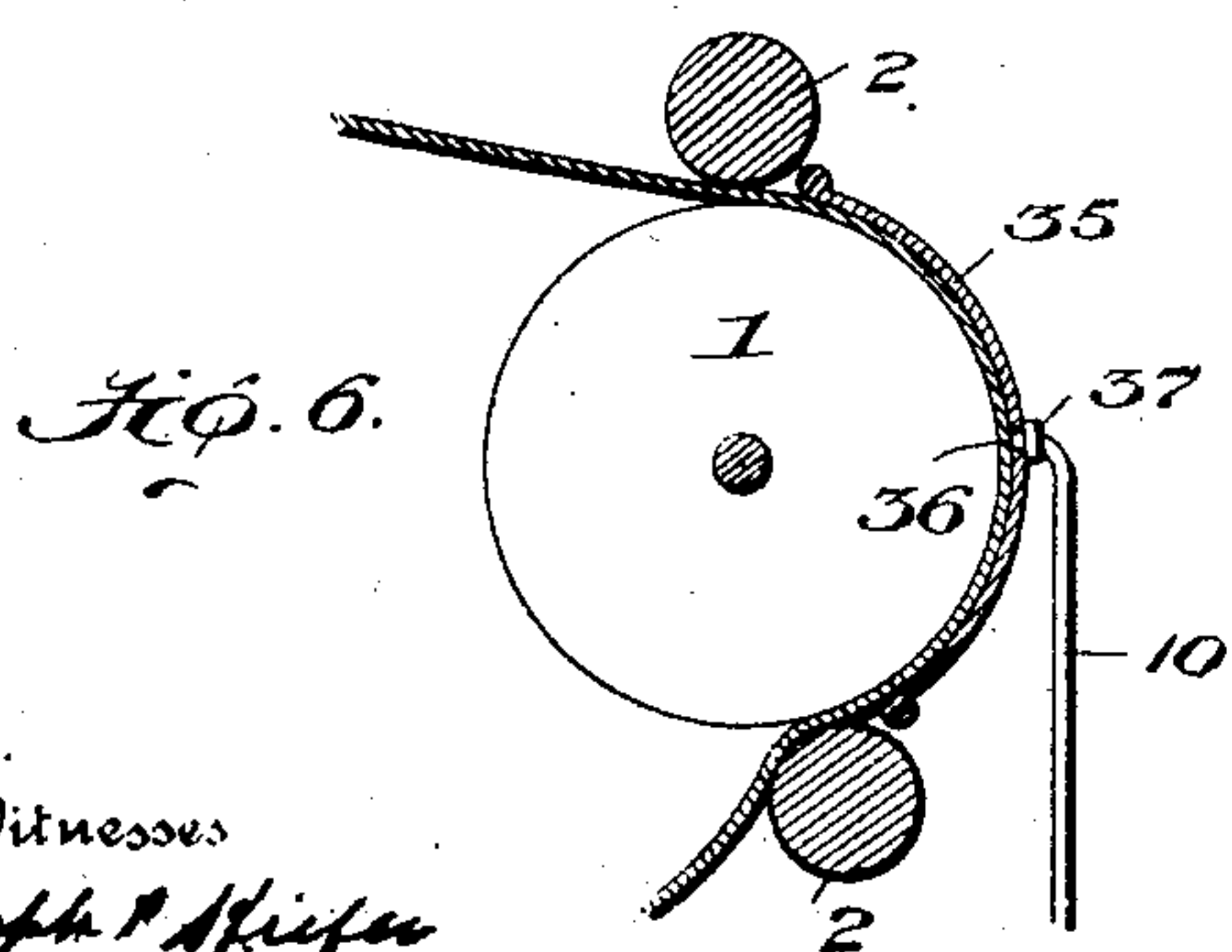
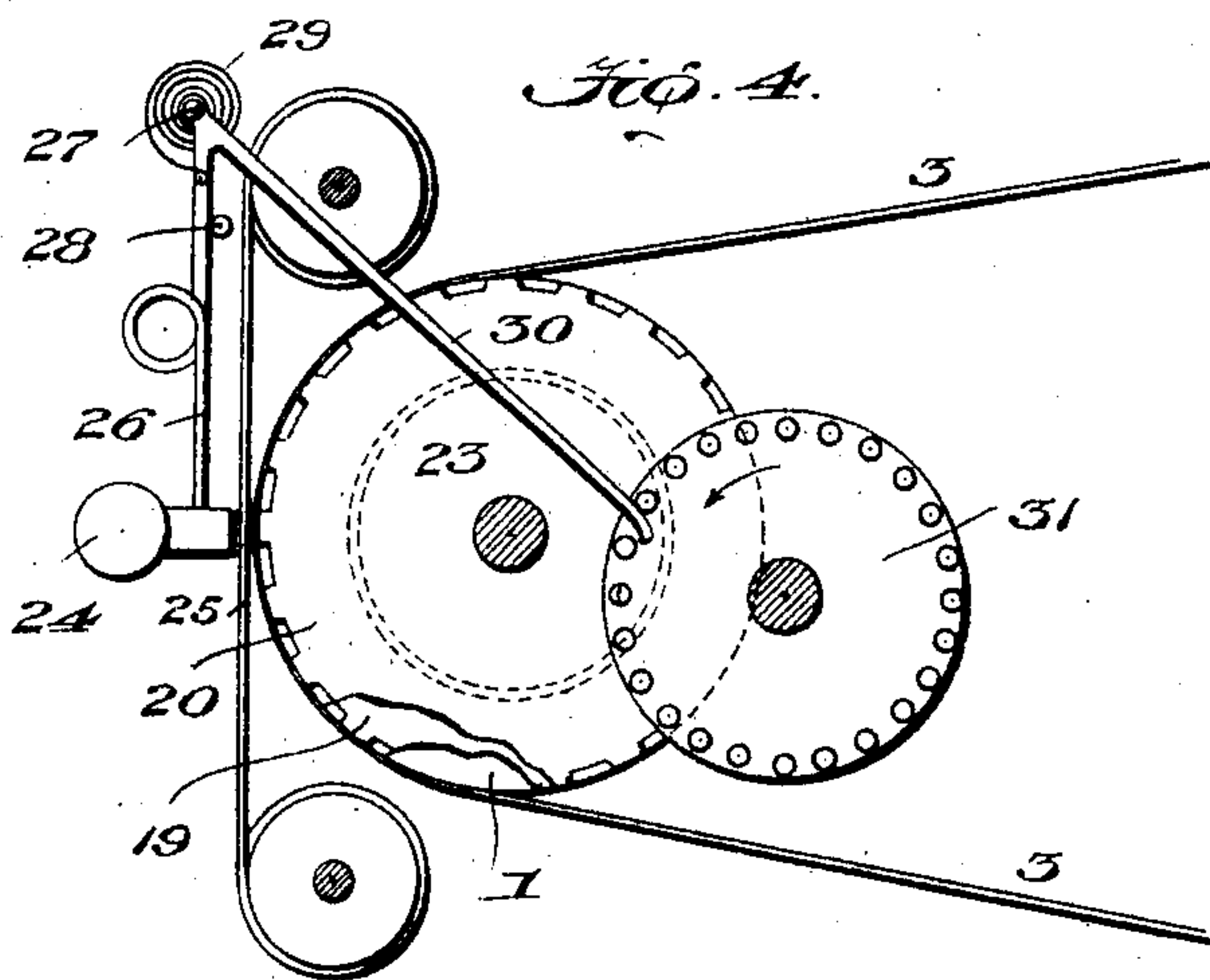
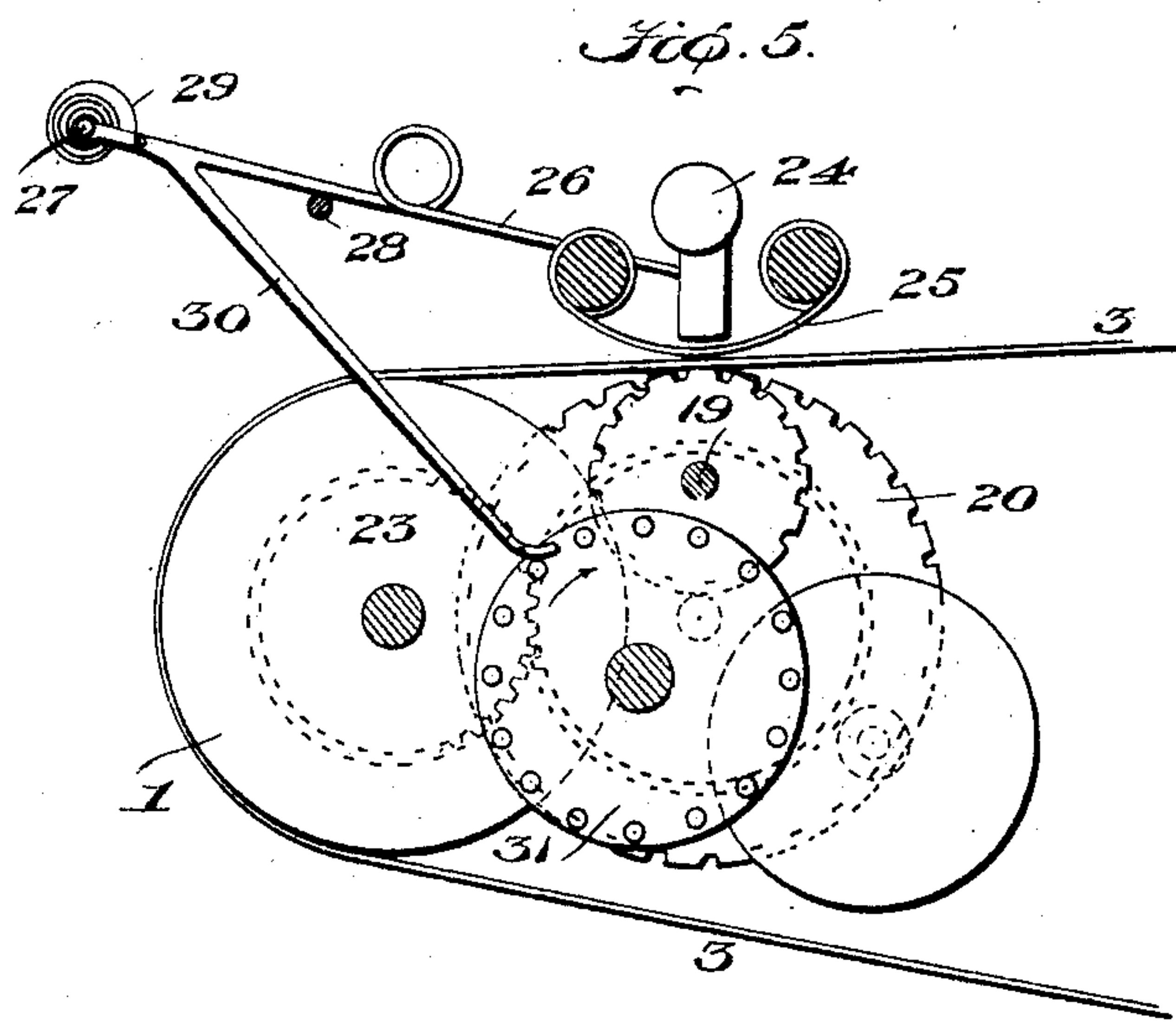
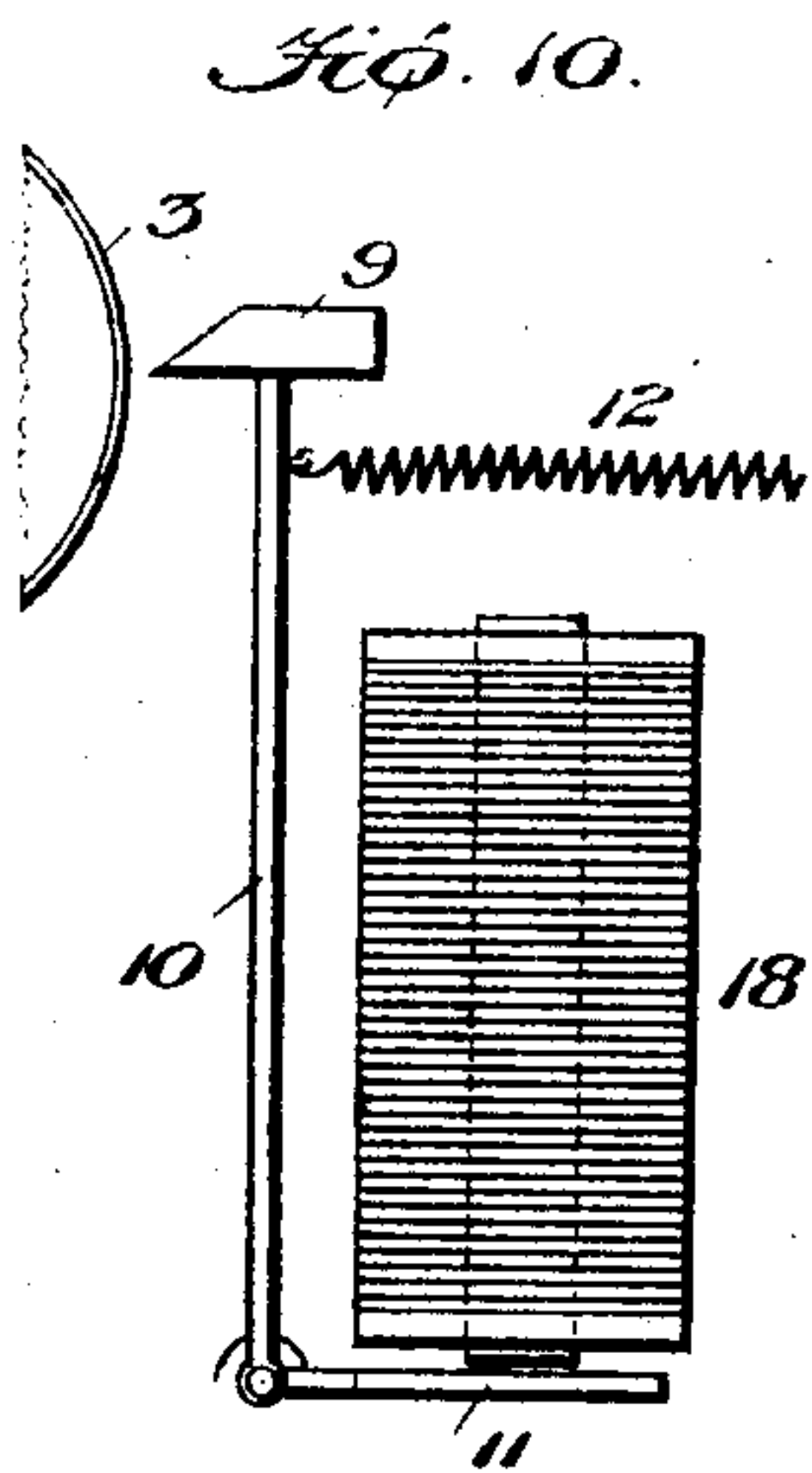
2 SHEETS—SHEET 1.



G. N. ENGERT.  
RECORDER.

APPLICATION FILED OCT. 24, 1904.

2 SHEETS—SHEET 2.



Witnesses  
Joseph P. Hefner  
W. A. Hartig

Inventor  
G. N. Engert  
By  
Frank C. Gore  
Attorney



# UNITED STATES PATENT OFFICE.

GEORGE N. ENGERT, OF WASHINGTON, INDIANA.

## RECORDER.

No. 797,051.

Specification of Letters Patent.

Patented Aug. 15, 1905.

Application filed October 24, 1904. Serial No. 229,830.

*To all whom it may concern:*

Be it known that I, GEORGE N. ENGERT, a citizen of the United States, residing at Washington, county of Daviess, and State of Indiana, have invented certain new and useful Improvements in Recorders, of which the following is a specification.

This invention relates to recorders of that general type employing a continuously-moving paper ribbon, combined with indicating mechanism acting on the ribbon.

My object is the provision of a recorder of the class set forth having improved electrically-operated indicating or marking mechanism and novel devices for stamping the time on the ribbon to disclose the periods when the indicating mechanism operates.

The present invention is designed more particularly for use at telephone-exchanges to make a permanent record of the period elapsing between the time a subscriber calls and is answered by the exchange operator and also the time elapsing between his time of "ringing off" and the discontinuance of the connection, so that the manager may be constantly apprised of the quality of service of any given operator; but the invention is intended for use in any situation to which such a device is adapted and its use is not necessarily restricted to telephone-exchanges.

The invention is set forth in detail hereinafter and the novel features recited in the appended claims.

In the accompanying drawings, Figure 1 is a side view, partly in section; Fig. 2, a plan; Fig. 3, a detail of one of the pen-actuating devices; Fig. 4, a view showing the time-printing mechanism; Fig. 5, a view showing a modified arrangement of time-printing mechanism; Fig. 6, a view of a modification using a photographic or sensitized film; Fig. 7, an end view of Fig. 6; Fig. 8, a detail of a modified device for operating the hammer of the time-printing mechanism; Fig. 9, a detail of a modified arrangement of printing-wheels where two wheels are used to indicate the minutes; Fig. 10, a modification of the pen-actuating device.

The feed-drum 1 has pressing thereagainst the paper-holding rollers 2, which hold the paper ribbon 3, running freely from the roll 4, firmly against the drum 1. Drum 1 is driven at a regular predetermined rate al-

ways in one direction by clockwork 5 and is controlled by an escapement 6, the escapement-wheel being secured on worm-shaft 7, meshing with worm-wheel 8 on the drum.

As many independent styluses or marking-pens 9 may be employed as found desirable, one being used for each independent record it is desired to make on the tape or ribbon 3, and in using the recorder at telephone-exchanges the pen or stylus used to indicate when the telephonic service is discontinued or broken after the calling subscriber has hung up his receiver will be supplied with a different-colored ink. The recording-pens 9 are carried by independent levers 10, each having a short arm 11. The levers 10 are actuated by independent springs 12 to cause the pens to bear on the ribbon or tape 3 when the levers are released; but said levers are held normally retracted by rods or slides 13 bearing either directly on the arms 11 or co-acting therewith through the agency of rock-shafts 14. The rods 13 are pressed against the arms 11 by coil-springs 15 of greater strength than the springs 12. Connected to the respective rods 13 are armatures 16, pivoted at 17 and controlled by independent electromagnets 18. The rods 13, related to those magnets which are immediately adjacent the levers 10, may coact directly with the arms 11. With those farther removed the rock-shafts 14 must necessarily be employed. According to the use to which the invention is to be put will the various electromagnets 18 be embraced in circuit connections. In telephone-exchanges the magnets will be wired, so that the proper one will be energized as soon as a subscriber calls and its recording-pen continue to mark the tape until the call is answered, and after the subscriber has hung up his receiver the proper magnet will be energized and its pen will record the duration of time until the operator cuts out the line. In each instance the recording-pen makes a continuous line on the tape until the electromagnet governing it is deenergized by cessation of the current. In the modification of Fig. 10 the pen is normally retracted by a spring 12' and directly actuated by the magnet 18.

The invention as described thus far is complete, and the inspector, manager, or other person wishing to learn the duration of a



given mark on the tape need only know the rate of feed of the tape through the recorder to tell the time which elapsed.

It will be obvious that the recording mechanism could be so arranged that the pens would make a continuous line on the tape, except when the electromagnets were energized, and would then be withdrawn, so that the breaks in the line would indicate the duration of time of energization of the electromagnets.

It is desirable to use a time-stamp operating in conjunction with the paper tape to indicate thereon the exact time which elapses in any instance, and the following mechanism carries out this object. Referring first to Figs. 4 and 5, the numerals 19 and 20 represent printing-wheels having raised numeral-type on their periphery, the former running in regular series from "1" to "12" and then repeated to represent the hours, and the latter from "1" to "60" to represent the minutes, or the hours may run from "1" to "24" to distinguish a. m. from p. m., or, as shown in Fig. 9, two wheels 21 and 22 may be employed to represent the minutes, wheel 21 representing units of minutes and wheel 22 tens of minutes. In any instance the printing-wheels are suitably connected by gearing 23 to the clockwork, so that at stated intervals a type is presented under tape or ribbon 3 in proper position for printing. The numeral 24 represents a hammer positioned to deliver a blow on a suitable inked ribbon 25 and thence on the tape 3, whereby the imprint of the type is made on the tape 3. The hammer is carried by a spring-arm 26, pivoted at 27 and held against a stop 28 by a spiral spring 29 in a position slightly removed from ribbon 25. Connected to the spring-arm 26 is a trip-lever 30, positioned for engagement by and subsequent release from the pins on a trip-wheel 31, which is suitably geared to rotate so that it will coact with the lever 30 at the proper time. As shown in Fig. 8, two of these trip-wheels 31 may be employed and the trip-lever 30 made movable, so that it can be shifted for engagement by either trip-wheel, said wheels being so geared that the hammer will be actuated at more frequent intervals by one than by the other. At the proper time the nearest pin on trip-wheel 31 engages lever 30 and retracts spring-arm 26 against the action of spring 29, and thereafter the lever 30 is released and spring-arm 26 flies back against stop 28; but the inertia of the spring-arm 26 causes it to bend when arrested by the stops 28 and the hammer 24 delivers its blow on the ribbon 25, causing the impression of the type on the printing wheel or wheels to be made on the tape 3, after which the hammer flies back to normal position.

As shown in Fig. 5, the printing-wheels may be disposed in offset arrangement relatively to the paper-feeding drum 1 and suitably geared thereto, in which case the paper tape first passes over the drum and then beyond to the printing-wheels. The printing operation is as before outlined; but the time record is slightly in advance of the line or break made by the pen, though this makes no difference in the calculation, as the intervening space on the tape is always taken into consideration.

In Figs. 6 and 7 I have shown another adaptation of the invention where a photographic film, sensitized paper, or similar strip is used in place of the paper tape 3 and suitably protected from extraneous light by the case 35 of the machine, in which are slits 36, taking the place of the recording-pens, said slits being controlled by shutters 37, operated by the electromagnets. The shutters could be arranged to normally remain open or closed to cause breaks to be made in the exposure of the film to the light or cause exposures when the electromagnets are operated.

In operation when a given electromagnet is energized on some act being performed the recording-pen or the shutter, whichever is used, is operated and the record made on the constantly-moving tape, and the time-stamping mechanism indicates at regular periods the time of passage of the tape, thus disclosing the time at which the record is made and the duration of this record. On deenergization of the electromagnet the recording operation ceases, but the tape continues its movement.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a recorder, means for feeding a tape, recording means cooperating with the tape by which a record can be made on the tape, and a time-stamp comprising a rotary printing device bearing printing characters representing the hours and minutes over which the tape moves, a time movement for turning the rotary printing device, inking means, a spring-actuated hammer adapted to deliver a blow on the tape, means for arresting the hammer to hold it normally away from the tape, means permitting the hammer to move by its inertia beyond its normal point of rest when released in order to deliver the blow on the tape, and means for automatically operating said hammer at predetermined times to print time characters at regular intervals on the tape.

2. In a recorder, means for feeding a tape, recording means cooperating with the tape by which a record can be made on the tape, and a time-stamp comprising a rotary printing device bearing printing characters rep-

representing the hours and minutes over which the tape moves, a time movement for turning the rotary printing device, inking means, a hammer having a spring stem or handle, a stop for engaging the spring-stem to arrest the hammer and hold it normally away from the tape, an independent spring cooperating with the hammer to hold it against its stop, and means automatically operated by the

time movement at predetermined times for operating said hammer to print time characters at regular intervals on the tape.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

GEORGE N. ENGERT

Witnesses:

JOSEPH P. KIEFER,  
N. A. HARTIG.