No. 669,350. Patented Mar. 5, 1901.

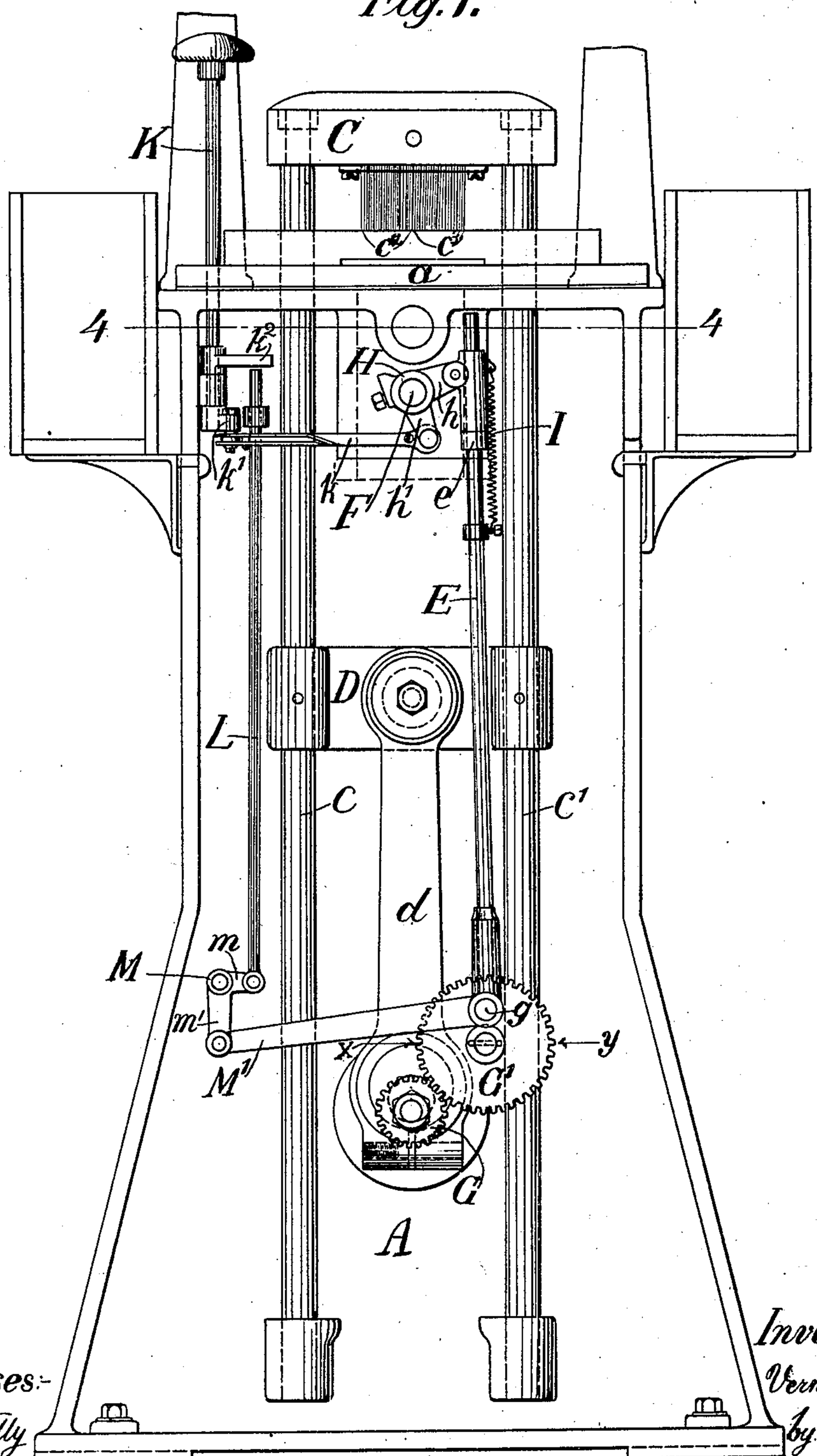
V. ROYLE.

PIANO MACHINE FOR PUNCHING JACQUARD CARDS.

(Application filed Aug. 20, 1896.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



Witnesses:-
John N. Tilly
George Barry Jr

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Fig. 2.

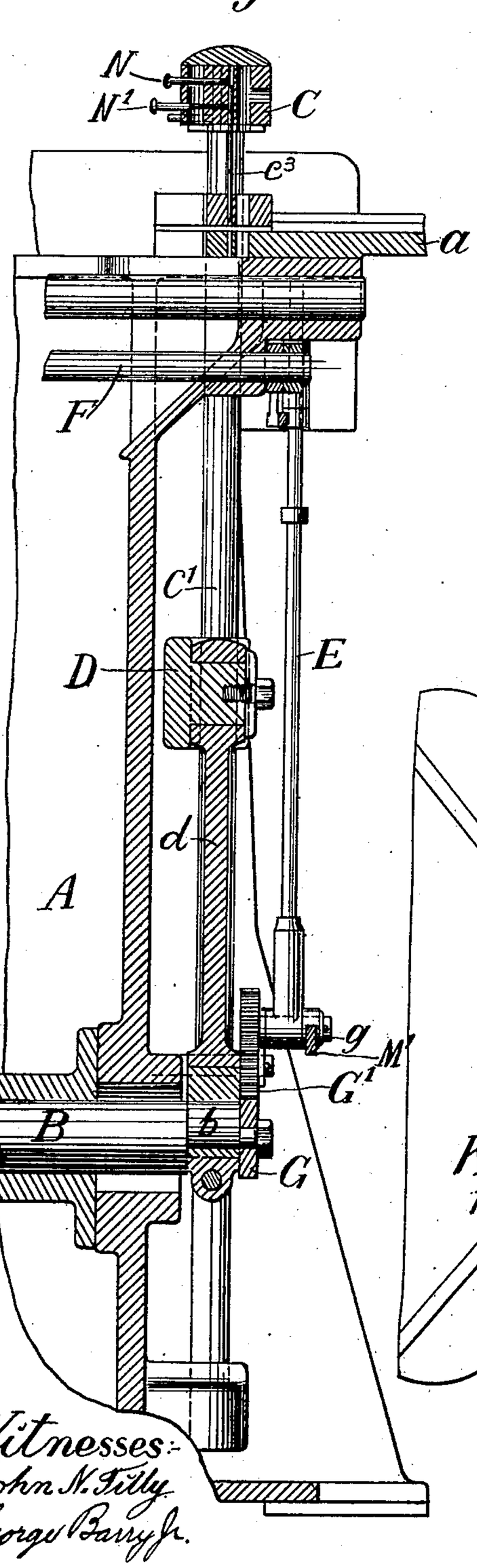


Fig. 3.

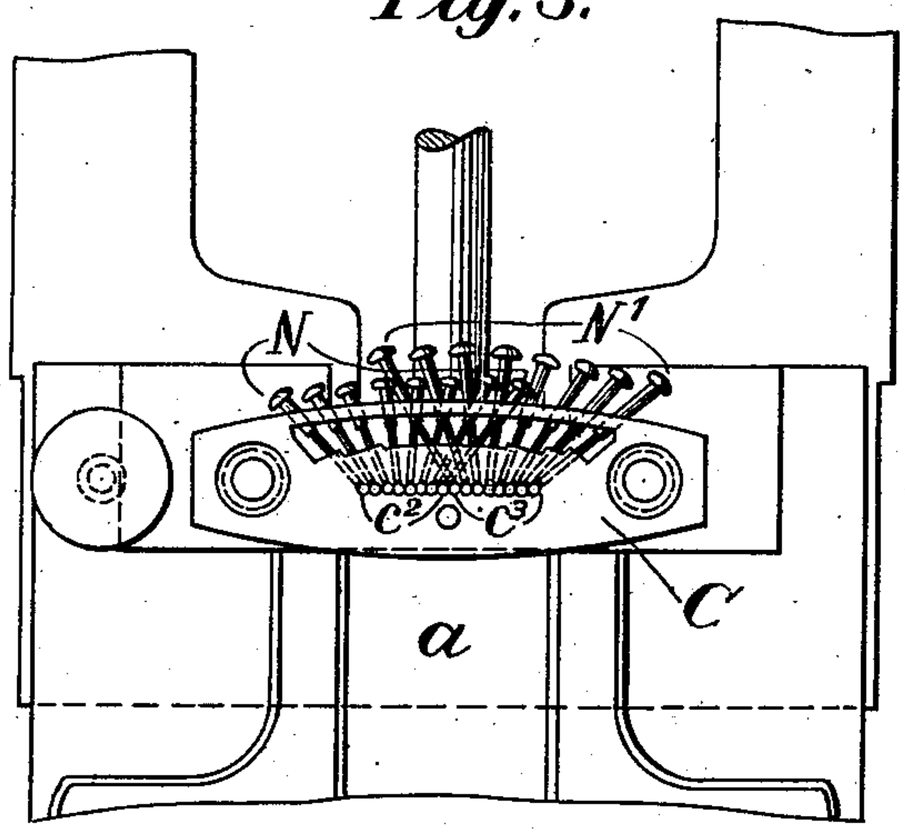
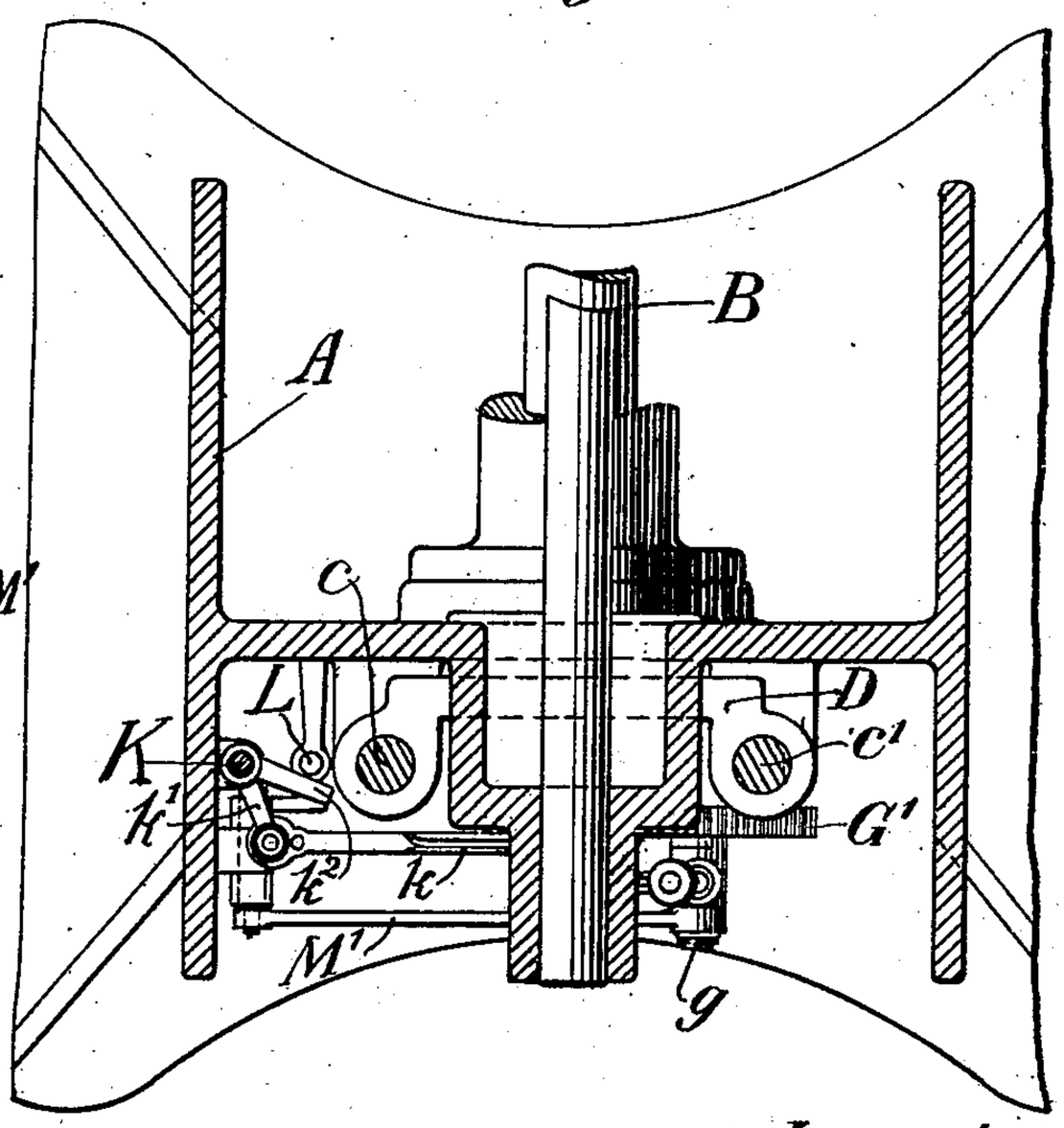


Fig. 4



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UNITED STATES PATENT OFFICE.

VERNON ROYLE, OF PATERSON, NEW JERSEY.

PIANO-MACHINE FOR PUNCHING JACQUARD-CARDS.

SPECIFICATION forming part of Letters Patent No. 669,350, dated March 5, 1901.

Application filed August 20, 1896. Serial No. 603,342. (No model.)

To all whom it may concern:

Be it known that I, VERNON ROYLE, of Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Piano-Machines for Punching Jacquard-Cards, of which the following is a specification.

My invention relates to an improvement in piano-machines for punching jacquard-cards, in which provision is made for punching the holes of each successive series at several operations, the feed taking place at predetermined intervals of groups of punching operations.

My present invention further contemplates the locking of the feed-escapement during certain of the punching operations to prevent the misplacement of a card when for any cause it is required to reset it with relation to the punches.

In the accompanying drawings, Figure 1 is a front elevation of so much of a machine as is necessary to illustrate the invention. Fig. 2 is a vertical central section of the same from front to rear. Fig. 3 is a top plan view, and Fig. 4 is a horizontal section through the plane of line 4 4 of Fig. 1.

A represents the pedestal of the machine, and *a* the table or bed-plate on which the cards are fed to be punched.

The machine which illustrates my present invention is of the same general type as that shown, described, and claimed in my Patent No. 644,871, dated March 6, 1900. It is a power-machine as distinguished from a machine which is operated by hand, the driving-shaft being represented in the present drawings by B. The punch-carrying head is denoted by C and is fixed to a pair of vertically-reciprocating rods *c c'*, which rods are connected below the table *a* by a cross-head D, the latter being connected by a pitman *d* with an eccentric *b* on the drive-shaft B for imparting to the punch-carrying head its reciprocating movement toward and away from the bed-plate *a*.

In punching jacquard-cards where the number of holes in each transverse series is more than ten or twelve there is difficulty experienced by the operator in pressing in at one operation the required number of punch-operating keys to make the necessary number of holes. In the form illustrated in the accompanying drawings I have provided for punching as many as sixteen holes in each series by two successive operations of eight holes, and while this number is sufficient for the present demands it is to be understood that the number of operations might be made greater than two without departing from the principle involved in arranging for the two operations.

The punch-carrying head is moved toward and away from its work during each revolution of the drive-shaft B, and in order to prevent the feed from taking place until after the necessary number of operations of the punches have taken place to complete a series of holes—in the present instance two operations—I have arranged to have the rod E, which rocks the escapement-shaft F, work idly during one revolution of the drive-shaft B and perform its work of feeding the card during each alternate revolution of the drive-shaft. This is accomplished by fixing a gear-wheel G on the drive-shaft B in position to intermesh with a gear-wheel G', to the face of which the escapement-operating rod E is attached by a wrist-pin *g*, the relation of the two wheels G and G' to each other being such that the wheel G will complete two revolutions to one of the wheel G'. As shown in Fig. 1, the wheel G' is at the middle of its movement from the point *x* to the point *y*, which movement corresponds to one complete revolution of the drive-shaft and lifts the arm *h* of the angle-lever H on the escapement-shaft F and rocks the shaft in the direction to feed the card one step. The movement of the wheel G' from *y* to *x*, corresponding to the next succeeding complete revolution of the drive-shaft, will not affect the escapement-shaft F, since the rod E is permitted to slide downwardly in the socket in the end of the arm *h* of the angle-lever, while the shaft F remains at the limit of its rocking movement in that direction. This idle movement of the rod E is against the tension of a spring I, which connects the rod with the arm *h* of the angle-lever and tends to hold the arm in engagement with a shoulder *e* on the rod, while permitting the lever H to be rocked in a direction to operate the escapement by pressure upon the other arm *h'* of the angle-lever

when the rod E is at rest. The arm h' is connected by a rod k with an arm k', extending laterally from the hand spindle or shaft K. To prevent the release of the escapement by hand excepting when the wheel G′ is at the beginning of its several half-revolutions or when the wrist-pin g is opposite the point x, I provide a stop-rod L, arranged in the present instance to work vertically and operated by one arm, m, of an angle-lever M, the other arm, m', of which is connected by a rod M′ with the wrist-pin g on the wheel G′. The upper end of the rod L is in position to lift in front of a finger k^2 on the spindle K when the wheel G′ is at the beginning of its movement to carry the wrist-pin g from y to x, but drops out of the path of said finger when the wheel G′ is at the beginning of its movement from x to y.

The punch-head C has the punches seated therein in groups of eight, the group c^2 being longer and having their operating-keys N arranged in a plane above the operating-keys N′ of the group of punches c^3. In the present arrangement one or more of the groups of keys N being first pressed in to lock the respective punches constituting one-half of the full line or series at the moment the wheel G′ is in position with its wrist-pin opposite the point y and the shaft B set in motion the card will be punched throughout one-half the length of one of its transverse lines. As no feed will take place during this revolution of the drive-shaft the second group of keys N′ may be pressed in to complete the punching of the said transverse line of the card during a second revolution of the drive-shaft and while the wheel G′ is moving from x to y, at the finish of which the feed will take place and the next succeeding transverse line may be punched. If from any cause the operator should fail to set the second group of keys N′ in time to cause them to lock the punches during the second revolution of the shaft and it should be necessary to stop the drive-shaft and release the escapement by hand to retract the card one or more steps, this can only be done when the parts are in position to punch the second half of any given transverse line, so that there will be no liability of mistake in setting the card for receiving an operation from a set of punches not intended.

The construction of the punches and keys and the manner of effecting the feed and of starting and stopping the drive-shaft may be, so far as the punches and keys are concerned, of any well-known or approved form, and, so far as the feed and means for starting and stopping the drive-shaft are concerned, of the form shown and described at length in my patent hereinabove referred to, or of such other form as may be found expedient, my present invention being directed, broadly, to means for effecting a plurality of punching operations intermediate of successive steps of feed whatever be the specific mechanism employed.

What I claim as my invention is—

1. In combination the punches, their operating-keys arranged in different groups, a drive-shaft, means for operating the punches at each revolution of the drive-shaft and means for actuating a feed mechanism to feed a card to be operated upon at intervals of a plurality of revolutions of the drive-shaft, substantially as set forth.

2. The combination with the punching and feed-actuating mechanisms and means for operating one of said mechanisms at intervals of several operations of the other of said mechanisms, of a hand device for releasing the feed-actuating mechanism and a stop for preventing the operation of the said hand device during certain of the punching operations, substantially as set forth.

VERNON ROYLE.

Witnesses:
GEO. R. FOWLER,
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