W. K. CALDWELL.

MACHINE FOR REPEATING PATTERN CARDS.

APPLICATION FILED OCT. 11, 1916.

1,254,470.

Patented Jan. 22, 1918.

3 SHEETS—SHEET 1.

Fig. 1.

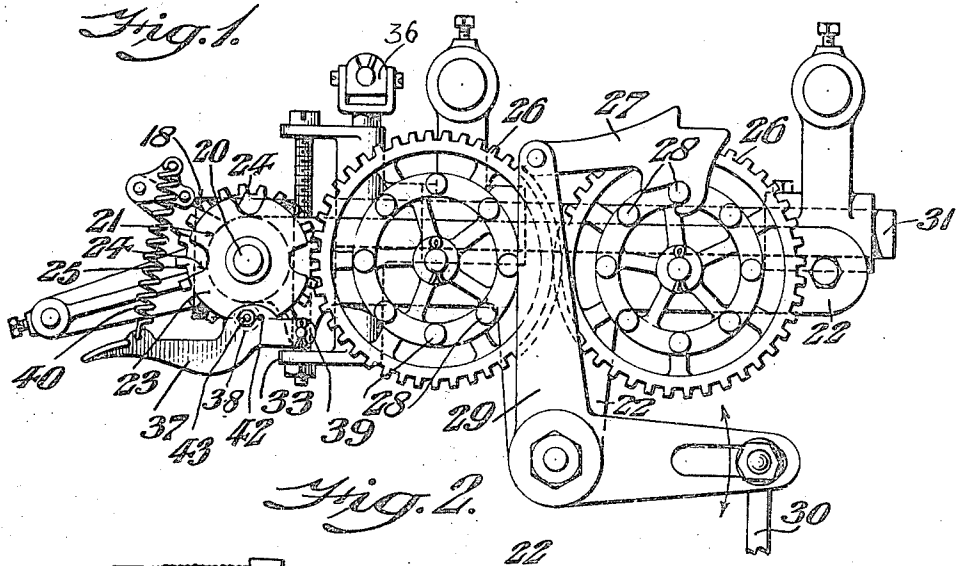


Fig. 2.

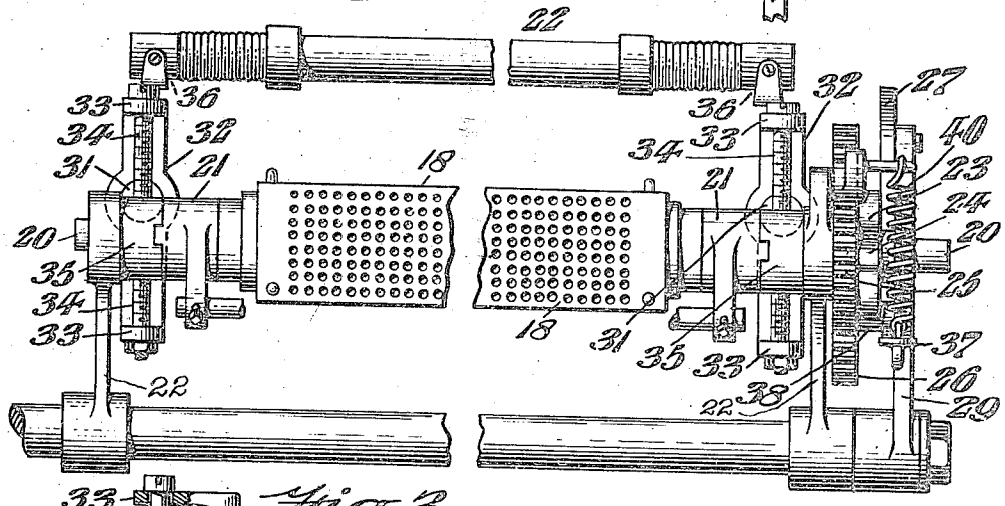


Fig. 3.

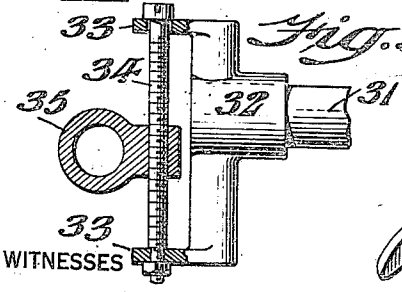
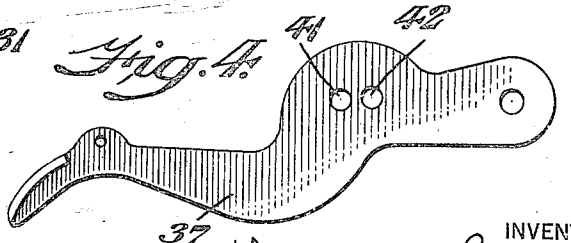


Fig. 4.



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3 SHEETS—SHEET 2.

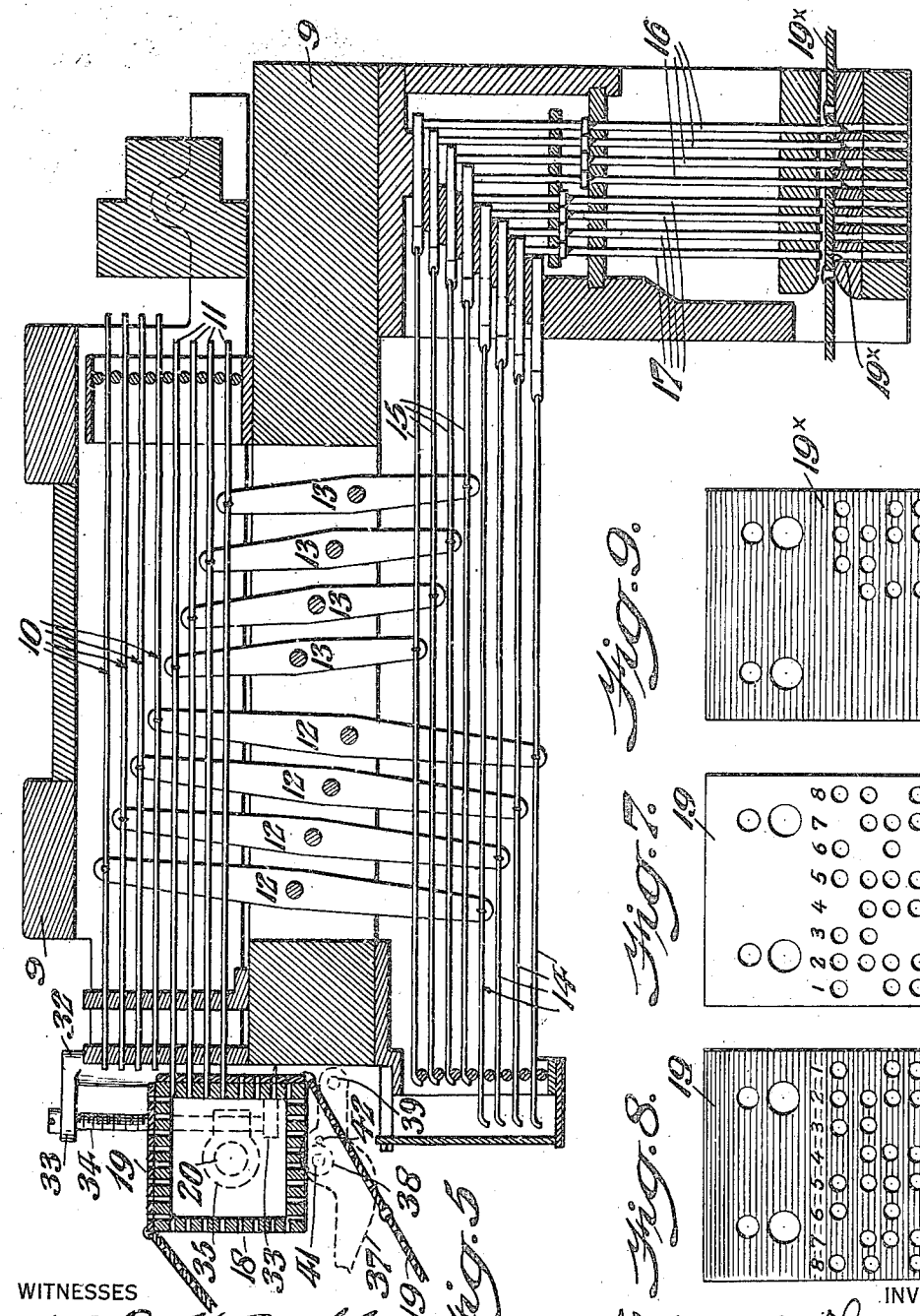


Fig. 5.

Fig. 9.

Fig. 7.

Fig. 8.

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3 SHEETS—SHEET 3.

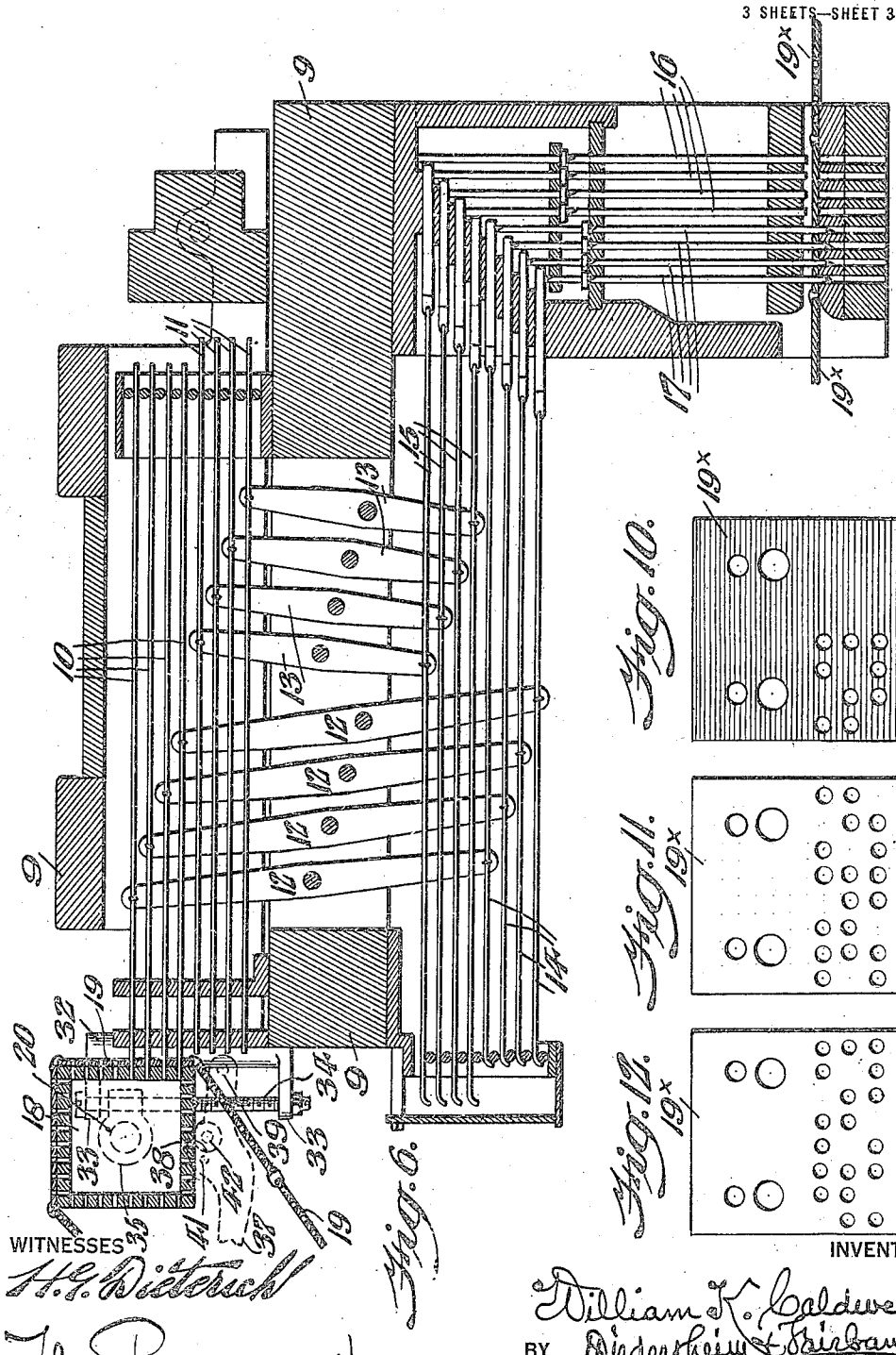


Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

WITNESSES

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MACHINE FOR REPEATING PATTERN-CARDS.

1,254,470. Specification of Letters Patent. Patented Jan. 22, 1918.

Application filed October 11, 1916. Serial No. 124,969.

To all whom it may concern:

Be it known that I, WILLIAM K. CALDWELL, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Machine for Repeating Pattern-Cards, of which the following is a specification.

My invention relates to machines for "repeating" pattern cards, particularly of the character employed in Jacquard looms,—that is for producing precise or reverse duplicates of any set or chain of pattern cards, every one of which is itself a correct reproduction or facsimile of a design from which it is copied by being punched in a punching machine by an operative skilled in so doing.

My invention has reference to machines for repeating pattern cards of the type disclosed in United States Letters Patent, No. 304,864, granted to Royle and Royle, September 9th, 1884, and to that machine as improved by Vernon Royle and patented to him by Patent No. 556,775, dated March 24th, 1896,—and also has reference to a machine of the same general character patented to Robert Johnston in and by Patent No. 764,129, granted July 5th, 1904.

In the art of making jacquard cards, particularly for the weaving of Wilton and of Brussels carpets, the foregoing machines, which are respectively known as the "Royle" and the "Johnston" machines, are to-day the card repeating machines most generally used by the trade.

These machines are of different types: The Royle machine is adapted only to repeat or precisely duplicate the design or pattern of the original pattern card upon which the machine operates; and the Johnston machine is adapted only to produce a card which is a reverse of the original pattern card, that is to say, a card in which the original design or pattern is punched and appears in reverse.

Each of these two types of machines performs an equally effective service through mechanism more or less the same, but neither one of them can make the complemental card or duplicate facsimile of the design of the original pattern card which the other makes.

The object of my invention which is applicable as an improvement upon or adjunct to both of the foregoing types, is to make it possible with the "Royle" machine to produce cards which are the reverse and not duplicates of the original pattern card used, and with the "Johnston" machine to make it possible to produce an exact duplicate card or a facsimile of the original pattern card.

These objects I accomplish by a special mechanism which is applicable to either type of machine and operative in connection with the elements which in their assemblage constitute both machines.

Broadly expressed, I attain these objects by so raising and lowering the pattern cylinder with reference to the grouped assemblage of selecting needles that, in the operation of the machine, only a given portion,—for instance, either the lower or the upper portion of the original pattern card is exposed to the operation of either the upper or the lower portion of the group or assemblage of selecting needles.

In other words, when the cylinder is raised to its uppermost position, as in Figure 6, the lower half of an original pattern card is exposed to the upper half of the group of selecting needles, while when the cylinder is lowered to its lowermost position, as in Fig. 5, the upper half of an original pattern card is exposed to the lower half of the group of selecting needles.

Of course, with pattern cards of varying character of perforations, the lifting or lowering of the pattern cylinder need not be to the entire extent of one-half of its operating face, but for the purpose of the explanation of this invention, I am confining myself to a description of its use in an operation which requires such lifting and lowering of the cylinder as to expose precisely one-half of its front or acting face and one-half of the pattern card thereupon, to one-half of the entire assemblage of selecting needles considered as divided into two halves by an imaginary central or median horizontal plane of division.

Regarding, however, the construction represented which deals only with the use of one-half portion, whether it be the top portion or the bottom portion longitudinally of the original pattern card, and considering that card as centrally and longitudinally divided into an upper portion and a lower portion,—in the operation of my machine whether it be applied to the Royle or to the Johnston construction, it is to be understood that the chain of original pattern cards in either application has to be twice passed through the machine, that is to be twice brought into contact with the selecting

needles, either first with the upper half of the group and then with the lower half, or first with the lower half and then with the upper half, so as to have been ultimately in contact with them all.

In other words, the reproduced or complemental card is not made as the result of one operation of the entire assemblage of selecting needles with reference to a given original pattern card such as that shown in Figs. 7 and 8, so as to be when completed such a type of card as, for instance, is represented in Fig. 11,—but is made as the result of two operations of stamping of the complemental card, one upon one side of a median line across the face of the card, and the other upon the other side of said line, which operations result in the passage of the chain of original pattern cards twice through the machine.

This distinction must be borne in mind for the clear comprehension of my invention, because it is not applicable to the making from a given design of original pattern card of the precise duplicate of that design in a complemental card by a single operation of the needles, punches and other working mechanism with reference to a single original pattern card,—but only by a double operation, so to speak.

For the purpose of illustrating my invention, I have shown in the accompanying drawing as applied to the needles, levers, key rods and punches as arranged in the machine of the Johnston patent, and as applied to the pattern cylinder mechanism as generally organized in the Royle machine, a certain type and embodiment of it which is at present preferred by me, because in practice it has given satisfactory and reliable results.

It is to be understood, however, that the various instrumentalities in which my invention is shown as embodied can be variously arranged and organized, and that my invention is not therefore limited to the precise arrangement and organization of the instrumentalities which are typified in the construction shown in the accompanying drawings and herein described.

In the drawings, Fig. 1 represents in side elevation so much of a repeating machine embodying my invention as relates to the pattern cylinder, the means for occasioning its rotation, and the means for adjusting it vertically up or down when presenting a given face and a given original pattern card with reference to the selecting needles,—the view designating the cylinder in its lower position or that shown in Fig. 5.

Fig. 2 represents in front elevation, the mechanism shown in Fig. 1.

Fig. 3 represents a fragmentary side elevation of one of the supporting brackets which carries one of the cylinder-adjusting bolts, a pair of which serves to effect the up and down adjustment of the boxings of which a pair carry the journals of the cylinder shaft.

Fig. 4 represents in side elevation the yielding dog of the notched disk removed from the machine.

Fig. 5 represents a vertical, longitudinal section of the machine, typically illustrating the usual groups of selecting needles, levers, key rods, and punches, which are common to the machines both of the "Royle" patent and the "Johnston" patent hereinbefore referred to. The view illustrates the pattern cylinder in its lower position.

Fig. 6 represents a view similar to that of Fig. 5, representing, however, the pattern cylinder in its upper position.

Fig. 7 represents in front elevation a fragmentary portion of one end of the front face of a typical original pattern card, the card being represented in vertical instead of in horizontal position as it is when upon the cylinder and in the machine.

Fig. 8 is a similar view of the back or reverse face of the card represented in Fig. 7.

Fig. 9 represents in elevation a fragmentary part of the rear face of the right-hand half of the original pattern card, as it is presented to the selective needles, the apertures or holes of which are repeated on the left-hand half of the card being reproduced, as shown in Fig. 11.

Fig. 10 is a view similar to Fig. 9, except that it is the other side, so to speak, of Fig. 9, or a view of the rear face of the left-hand half of the original pattern card, the apertures or holes of which are repeated on the right-hand half of the card being reproduced, as shown in Fig. 11.

Fig. 11 represents the front face of a finished repeated card, which is made on a Johnston machine, as the result of the completed operation of presenting to the selecting needles first one half and then the other of the back of the original card, as shown in Figs. 9 and 10.

Fig. 12 represents the front face of a finished repeated card, made on a Royle machine, which results from the two operations of presenting the back of original card to selective needles, as shown in Figs. 9 and 10.

Similar numerals of reference indicate corresponding parts.

Referring to the drawings, the repeating and punching mechanisms typically illustrated are those of the machine of the Johnston patent referred to, which itself is a modification of the Royle machine.

Without elaborating the description, the frame-work of the machine is designated 9,— the selecting needles of the upper half of the group 10,— the selecting needles of the lower half of the group 11,— the levers

which are operative with the upper half of the group of needles 10 are designated 12,— and the levers which are operative with the lower half of the group of needles 11, are designated 13.

The group of levers 12 are connected at their lower ends with the lower group of key rods which are designated 14,— and the group of levers 13 are connected at their lower ends with the upper group of key rods which are designated 15.

The outer group of punches which are designated 16 are operated in the usual way through their connection with the upper group of key rods 15,— and the inner group of punches 17 are connected with the lower group of key rods 14.

The housing of the assemblages of needles, key rods, and punches, and the mounting and fulcruming of the levers are all sufficiently illustrated in Figs. 5 and 6, and are of the usual character; and the machine represented is assumed to be operative with original pattern cards formed with, for instance, forty-six holes or perforations considered in one longitudinal series, and with, for instance, eight holes or perforations considered in vertical series, which herein are designed 1, 2, 3, 4, 5, 6, 7 and 8. Of course, the total assemblage of the needles and of their adjuncts, may be numerically greater or less to correspond to larger or smaller original pattern cards.

18 is the pattern cylinder. In the construction shown, a hollow quadrangular, or four-sided, perforated body-member, over which the chain of pattern cards 19 is in a step by step rotation of the cylinder carried forward and around it so as to be presented rear face front, original pattern card after original pattern card, to the selecting needles.

In Figs. 7 and 8, a typical vertical row of the needle apertures is designated, aperture by aperture, from 1 to 8, and a typical disposition of all of these vertical rows as it occurs in both an original pattern card and in a repeated card is illustrated in Figs. 7 to 12, as already explained in connection with the definitions of said figures.

Referring now to Figs. 1, 2, 3 and 4 which particularly illustrate the devices which in machines of this class impart an interrupted rotary movement to the pattern cylinder, it is to be explained that only so much of the devices for occasioning the intermittent rotation of the cylinder is illustrated as is necessary for an understanding of the action, the entire detail of the mechanism being disclosed in Royle Patent, No. 556,775, already referred to.

The pattern cylinder 18 has journals 20 which are rotatable in boxings 21 carried at the front end of a supplemental frame 22 extending forward from the main frame-work 9 of the machine. Near one end of one of these journals of the cylinder is mounted a notched disk 23, the notches of which are designated 24, and which is connected with a spur wheel 25, so that the disk and spur wheel rotate together.

The spur wheel 25 is operated through a train or pair of connected counterpart gear wheels 26, which, as in the Royle machine, are operated and controlled by a swinging or overturnable pawl 27, which operates in connection with a series of pins 28 projecting laterally from the side faces of said gear wheels 26, so as to be adapted in its manipulation through a rocking angle lever 29 to occasion the meshed rotation of the gear wheels in one or the other direction, and the consequent rotation of the spur wheel and notched disk in one or the other direction, depending upon the position of the pawl and the throw of the angle lever.

The angle lever itself is controlled by a rod 30 adapted to move upwardly or downwardly from a direct crank connection with the main driving shaft of the machine, which it is unnecessary to illustrate.

Supported upon the supplemental frame 22, conveniently by carrying studs 31, are a pair of counterpart supporting brackets 32, forwardly extending horizontal top and bottom flanges 33 of which form the supports for cylinder-adjusting bolts 34, which as a counterpart pair are threaded through and support a pair of vertically adjustable boxings 35 through which the journals of the pattern cylinder respectively extend and are mounted.

The desired vertical adjustment of the supporting brackets 32 is conveniently effected through their connection with a transversely disposed carrying bar 36 housed in the frame-work.

37 is a yielding dog to control the position of the pattern cylinder by means of a roller 38 which it carries, and which is adapted to enter within the notches 24 in said notched disk 23.

These notches are so spaced apart as to correspond to the four sides of the pattern cylinder, and by the engagement of the roller of the dog serve to retain the pattern cylinder with its face squarely toward the selecting needles, while it is being moved into engagement with them to determine the work of the punches.

The dog at its inner end is pivoted or fulcrumed at 39 to the frame, and at its outer end is connected with the lower end of a spring 40 the upper end of which is fixedly connected with the frame.

Obviously, when the dog is depressed its roller is freed from the notch of the notched disk with which it is then in engagement, and it is the controlled rotation of the spur wheel 25 that occasions the periodic and

automatic depression of the dog and the expansion of the spring, which latter in the continuing and next advancing rotation of the notched disk recoils to bring the roller into the next notch presented, and hold it there for the next time being.

As the yielding dog 37 has a fixed fulcrum 39, and as its function through its roller 38 is to retain the notched disk 23, and in consequence the pattern cylinder, for the time being in different positions of their common rotary movement,—it will be understood that the practical and effective operation of the dog in performing its function will, in view of its fixed fulcrum, be affected by the fact of whether the cylinder be in its upper or in its lower position. In other words, a fore and aft adjustment of the roller 38 relatively to the dog with which it is connected and from which it extends laterally inward, will be necessary in order to insure the temporary maintenance of the pattern cylinder with each of its faces in turn squarely toward the selecting needles whether the cylinder be in its upper or in its lower position.

This necessary adjustment I conveniently and inexpensively effect by providing the dog with two threaded apertures 41 and 42, one in advance of the other, into either one of which a threaded bolt 43 which forms the axle of the notch roller 38 may be introduced, so that when, for instance, the cylinder is in its upper position, as in Fig. 6, the roller will be connected with the rear threaded aperture 42, while when the cylinder is in its lower position, as in Fig. 5, the roller will be connected with the front aperture 41. This adjustment of the roller, has of course, to be made before the machine is put in motion to effect the rotation of the cylinder in either of its two positions.

Although the supporting brackets 32 and the adjusting bolts 34 are a convenient means for occasioning the raising and lowering of the vertically adjustable boxings 35, it is apparent that the essence of my invention so far as it is concerned with the mechanical raising and lowering of the cylinder and with the accomplishment of the results which flow from such raising and lowering, is not dependent upon the particular means by which the raising and lowering of the cylinder may be effected, and therefore, that other devices being mechanical equivalents of the brackets, bolts and boxings referred to, may be substituted for them.

19× designates the cards of a chain of blank cards which are to be repeated and which in both the Royle and the Johnston machine are caused to travel card by card beneath the group of punches.

I have regarded it as unnecessary to illustrate the means by which the intermittent travel of the chain of these cards is effected, as it is preferably such as is used in both of the machines referred to.

It will now be apparent that I have devised a novel and useful construction of a repeating machine which carries into effect the objects of my invention; and that while in the present instance, I have shown and described a preferred embodiment of machine which in practice has been found to be efficient, it is to be understood that such embodiment is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

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

1. The combination with the main frame of a machine for repeating pattern cards, of a supplemental frame fixed to and extending forwardly from the main frame, a pattern cylinder having journals and also having a notched disk fixed to it, a spur gear on the main frame, a spur gear fixed to said disk and intermeshed with the spur gear on the main frame, carrying studs supported upon the supplemental frame and having brackets, upright cylinder-adjusting threaded bolts journaled in said brackets, threaded boxings receiving said bolts and in which the journals of the pattern cylinder are mounted, and a yielding dog pivoted on the main frame and having means for entering the notches of the cylinder disk and also having apertures whereby the notch-entering means may be fixed at different points in the length of the dog.

2. In a machine for repeating pattern cards, the combination of supporting means, a pattern cylinder having journals and also having a notched disk fixed to it, means for rotating the pattern cylinder, upright cylinder-adjusting threaded bolts mounted in the supporting means, threaded boxes receiving said bolts and in which the journals of the cylinder are mounted, and a yielding dog pivoted on the supporting means and having means for entering the notches of the cylinder disk and also having apertures whereby the notch-entering means may be fixed at different points in the length of the dog.

In testimony whereof, I have hereunto signed my name, this ninth day of October 1916.

WILLIAM K. CALDWELL.

In the presence of—
H. S. FAIRBANKS,
C. D. MCVAY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."