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Patented Mar. 11, 1919.

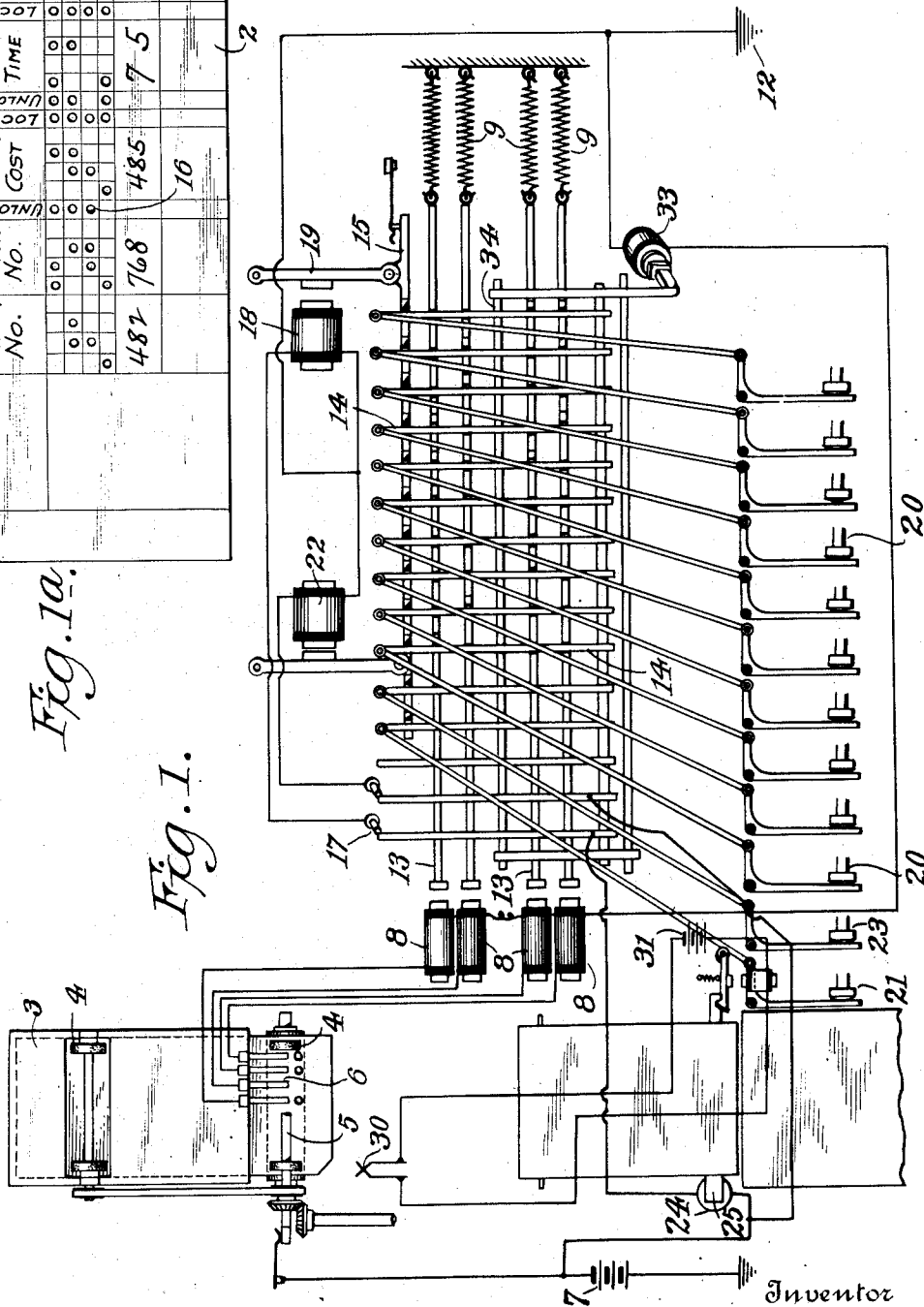
3 SHEETS—SHEET 1.

1,296,727.

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Fig. 1a.

Fig. 1.



Inventor

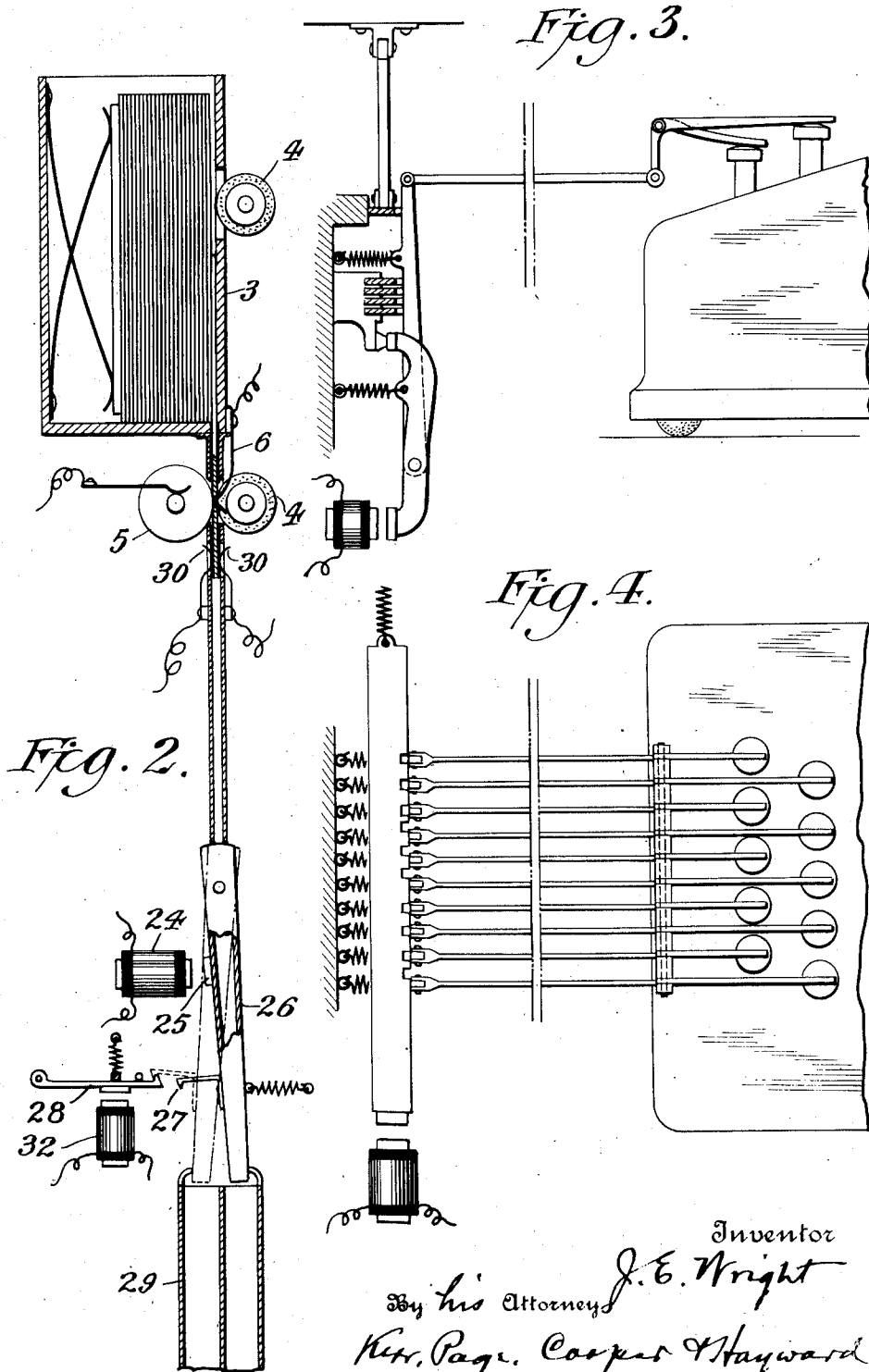
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J. E. WRIGHT.
 TABULATING DEVICE.
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3 SHEETS—SHEET 2.



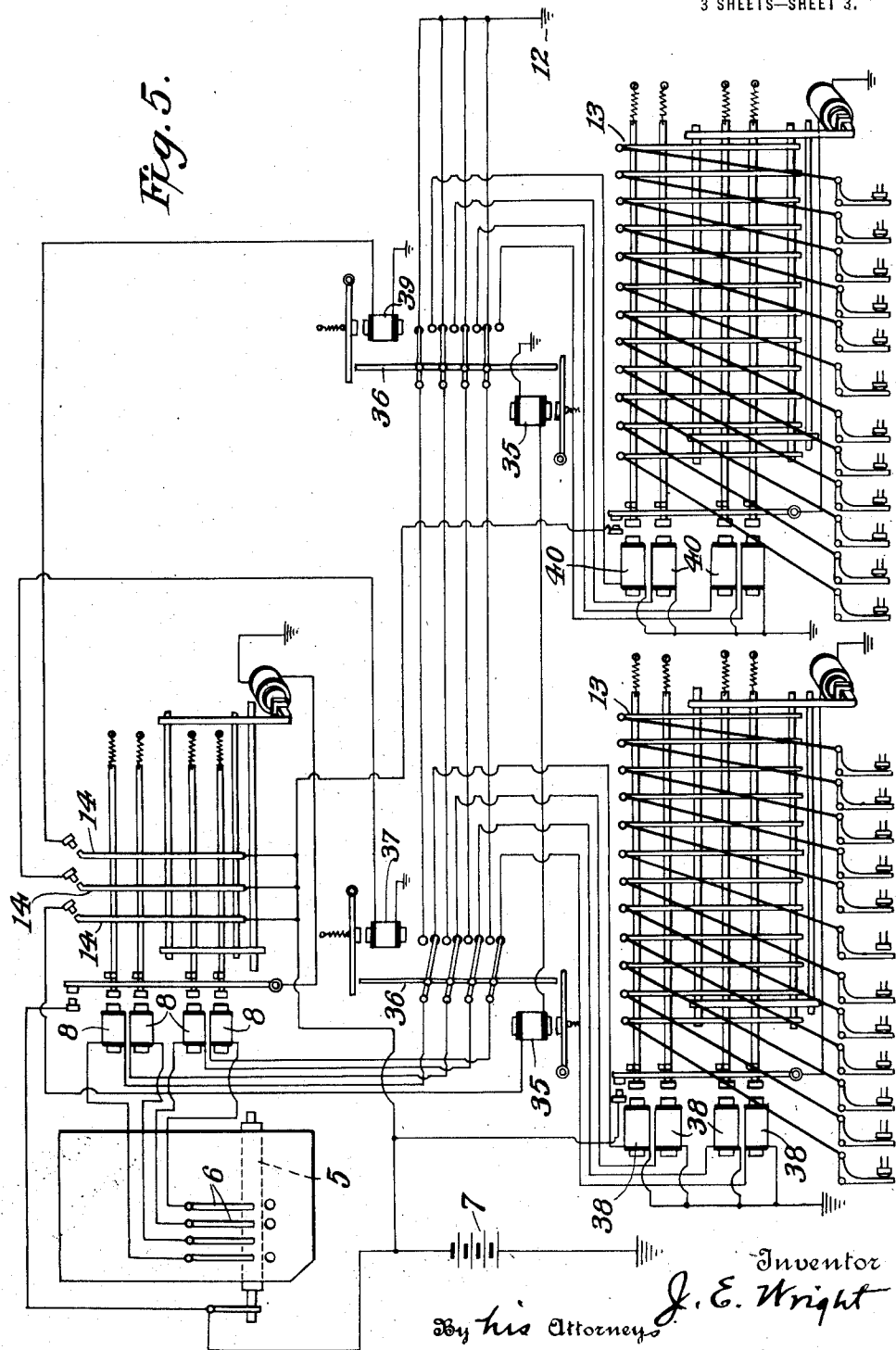
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3 SHEETS—SHEET 3.

Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN E. WRIGHT, OF NEW YORK, N. Y.

TABULATING DEVICE.

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Specification of Letters Patent.

Patented Mar. 11, 1919.

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To all whom it may concern:

Be it known that I, JOHN E. WRIGHT, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Tabulating Devices, of which the following is a full, clear, and exact description.

In many commercial systems at the present time, it is customary to mark cards as by means of appropriately punched holes therein to indicate certain data. The number and variety of these systems is legion, but for purposes of the present case a single example may be selected by way of illustration. Let us assume, for example, a manufacturing industry in which cards are punched at certain points to indicate the order or job number: at another point to indicate different workmen; at a third point to indicate the elapsed time that a workman has been on that particular piece of work, and at still another point to show his wages earned or the labor cost. Other things may be recorded, but this will serve the present purpose.

Assume now that a large number of these cards accumulates and it is desired to sort them and tabulate one or more of all the items of a given kind which they bear. Devices are in use for sorting out all cards bearing a certain date, a certain job number or designating a certain workman, and assuming still for mere purpose of illustration, that all the cards relating to a certain job number have been segregated, it may be desired to tabulate or compute the total time devoted to the job, or the total labor cost of the same, or both. This invention provides a simple, effective and very economical device for such purpose.

I may best explain the nature of the improvement since it resides in apparatus, by a more or less detailed description of the mechanism or its mode of operation, for which purpose I now refer to the accompanying drawings:

Figure 1 is a diagrammatic illustration of a simple embodiment of the invention.

Fig. 1^a is a view of one form of card used in the system.

Fig. 2 is a view partly in section and partly in diagram of the card sorting portion of the apparatus.

Fig. 3 is a diagrammatic view of that part of the device which tabulates the items.

Fig. 4 is another or plan view of the same, and

Fig. 5 is a diagrammatic view of a more highly developed mechanism for carrying out the invention.

Referring to Fig. 1^a, this shows a card 2 with holes punched therein which by their number and position indicate such data as above referred to and certain other holes which are to produce effects or operations hereinafter to be described. These cards are inserted in a machine of any well known and proper character 3, in which rolls 4 are used that pass the cards over a conducting roll 5, upon which bear flexible contact strips 6, in this case four in number.

As the perforations pass under these contacts the latter touch the metal roll 5 and close circuits from a grounded battery 7 to one or more of four electromagnets 8, and thence to ground at 12.

Each of the said four magnets when energized attracts and shifts one of several permutation bars 13, which have notches in their upper edge and which cooperate with bars 14, of which there may be, effectively, fourteen to correspond to fourteen of the permutations and combinations which the four bars 13 are capable of setting up.

Beyond the necessary presence of the elements above described the novel and distinguishing features of the invention are more a matter of function than construction, for many means are well known and in common use by means of which the desired results may be obtained, and I shall therefore complete the description by a statement of what the device accomplishes and how it operates.

Let it be assumed that the labor cost data of all the cards bearing a certain order or job number are to be computed, then these cards are passed one by one through the device 3. As the contacts 6 pass over perforations the circuit from battery 7 is closed to ground 12 through the corresponding magnets 8, but no effect is produced thereby because normally a notched bar 15 lies in a position to engage with all of the bars or levers 14 and prevent any of them from falling into the aligned notches in the permutation bars 13, but immediately preceding the

perforations indicating labor cost there is a row of perforations 16 which set the permutation bars 13 so as to permit, say, the first bar 14 to drop and close circuit contacts 17.

- 5 This circuit is from battery 7, and through a magnet 18 to ground 12, and the energization of said magnet by its attraction for an armature 19 shifts the locking bar 15 and unlocks the machine so that the bars 14 will
10 work until they are again locked.

- When, therefore, the rows of perforations indicating figures of labor cost pass under contacts 6, the bars or levers 14, which correspond to the digits of such figures are successively dropped or depressed and in any
15 suitable and well known way operate the corresponding keys 20 of an adding or tabulating machine of any well known kind such as the Dalton. By means of proper
20 perforations in a card or otherwise, that permutation may be set after each group of labor cost perforations has done its work to operate that bar 14, which works key 21, and prints the figure, and then a row of
25 perforations in the card operates, say, the second bar 14 from the left that closes the circuit through a magnet 22 that shifts the locking bar 15 back to lock the instrument.

- At any time either by perforations in a card or otherwise that combination may be set that operates a key 23, which will print the total of the figures set up and printed by the adding machine. By this means all of the labor cost items on the cards belonging to a given job may be tabulated, or in the same way all of the elapsed time items may be tabulated.

- Certain accessory details are necessary for practically carrying out the above operations. For example, it will be observed that
40 when no card is passing over the roll 5, the four contacts close their circuits and thus set the combination which locks the machine. Again when an unlocking combination is established by a card, the circuit from battery 7 is closed through a magnet 24 to ground 12 that attracts an armature 25, Fig. 2, that shifts a card delivery chute 26 to the left and throws a hook 27, carried by the pivoted
50 chute, into engagement with a hooked pivoted armature 28. This maintains the chute in locked position to deliver all cards from which data have been tabulated into the receptacle 29 until the descending cards have
55 passed beyond the two contacts 30, whereupon these latter come together and close the circuit of a battery 31 that includes a magnet 32 that releases the latch or hook 28 and permits the pivoted chute to swing
60 back to the right.

Finally after each operation of a key 20, due to the dropping of a bar 14, a slow acting magnet 33, in series with the magnet 8, raises a bar 34 and restores the dropped bar

or bars 14 to normal position and permits the bars 13 to be retracted by springs 9.

As I have stated the specific character of the mechanism which I employ for the above purposes is not of the essence of the invention. I have, however, indicated in
70 Figs. 2, 3 and 4 the preferred nature of the most essential parts. In addition to the description given above, no further detailed explanation is necessary, as the corresponding parts described are marked in all the
75 figures with the same numerals.

For the sake of simplicity I have shown but four contacts and four permutation bars, but five or even more may be used if so desired, and it will be obvious that with such
80 increased number the capabilities of the instrument are very greatly increased. Even with four, however, the usefulness of the device may be extended by such arrangement as shown in Fig. 5. In this figure there
85 are but three levers or bars 14 used with the four permutation bars 13. When the four contacts 6 rest on the metal roll 5, or pass over four perforations, the first of the bars 14 to the left drops and this closes the
90 circuit from battery 7 through the magnets 35 which, when energized, push up the switch bars 36 and close the circuits of the four magnets 8 to ground at 12. This has the same effect as locking the machines and
95 as the switches are held by friction in the position to which they may be moved, this locked condition will persist.

Assume, however, that it is desired to tabulate two items on each card, for example
100 the elapsed time on one machine and the labor cost on another. Then a card will have a row of perforations before the labor cost perforations that sets the combination so as to drop, say, the second lever 14 from
105 the left. This closes the circuit by a magnet 37 that shifts the switch lever 36 to a position in which it connects the four magnets 8 in series with the four magnets 38 of an adding machine shown at the lower left,
110 so that the labor cost item corresponding to the perforations on the card will be tabulated on that machine.

After this has been done the machine is locked by an appropriate row of perforations, and by a row of suitable perforations in the card immediately preceding the next item or elapsed time, the third bar 14 from the left is dropped, the magnet 39 energized and the four magnets 40 of the right
120 hand adding machine thrown in series with the four magnets 8.

The card illustrated in Fig. 1* it will be observed is more particularly designed for use in the machine of Fig. 5, but it will be
125 understood that the mere matter of perforating for one or another machine is a matter of choice. With proper provision

for sufficient permutation and combination, one or a dozen kinds of items on a card may be tabulated on one or a dozen different adding or similar machines. This may be a great convenience in many kinds of business, and involves only devices of the most simple and economical character.

Numerous modifications in and modes of use of the apparatus described are possible which contribute to its value and efficiency, but most of these are well within the limits of the skill of the expert user to devise. I may mention, for example, the following: It is never necessary to print except when locking the apparatus and conversely, hence the same series or row of perforations in the card which results in one operation may be utilized to effect the other. Thus if four holes simultaneously operate to lock the device the same combination set up by them may also operate the printing key. This and many other capabilities of the apparatus will be apparent to those skilled in the art.

The various uses to which the invention may be applied, are sufficiently apparent, I believe, from the above description, and what I now therefore claim as my invention is:

1. An apparatus for tabulating all of the items of a given kind indicated by significant perforations in a series of cards, comprising, in combination, a permutation device containing a series of permutation bars, electrical contacts adapted to pass over the parts of the cards which contain the perforations and to thereby set the permutation bars, an adding or tabulating machine for recording the figures corresponding to the set combinations of said bars and means also controlled by perforations in the cards and the combinations set thereby, for locking or releasing the permutation device whereby the desired perforations or figures corresponding thereto only will be recorded.

2. An apparatus for tabulating or recording all of the items of a given kind indicated by significant perforations in a series of cards, comprising in combination an adding or tabulating machine, a permutation device containing a series of permutation bars operatively connected with and adapted to operate the respective keys of the adding machine according to their adjustment, a series of contacts adapted to pass over the cards and to operate the permutation device by setting up therein the various combinations corresponding to the perforations,

and means for locking and releasing the permutation device by means of special perforations in the cards whereby the figures corresponding to the perforations which immediately follow the unlocking perforations only, will be recorded.

3. The combination with a device for passing perforated cards under a limited number of electrical contacts to complete circuits by such contacts as pass over perforations, of a permutation device adapted to be set to a number of different conditions by such contacts dependent upon the number of permutations and combinations possible with the number of contacts, adding or tabulating machine operated by the permutation device to record figures corresponding to the set conditions, and means for locking or unlocking the permutation device controlled by special perforations in the cards and set conditions of the permutation device established thereby.

4. The combination with a device for passing perforated cards under a series of contacts, of a permutation device adapted to be set to different operative conditions by the contacts according to the number and position of the perforations over which they pass, of a plurality of permutation devices and adding or tabulating machines operated thereby, adapted to be thrown successively into operative relation with the contacts according to the nature of the items which the perforations in the cards represent, and means controlled by the contacts for locking and releasing the several permutation devices for the purpose set forth.

5. The combination with a device for passing perforated cards under a series of contacts, of a permutation device, a series of electro-magnets in circuit with the contacts and adapted to set the permutation device, a plurality of other permutation devices containing similar operating electro-magnets and adding or tabulating machines controlled by their operation, whereby the said other permutation devices are adapted to be thrown successively into series with the magnets of the first or controlling permutation device and means under the control of said first or controlling permutation device for establishing such relations and for locking and releasing the several other permutation devices according to need.

In testimony whereof I hereunto affix my signature.

JOHN E. WRIGHT.