

Sept. 11, 1934.

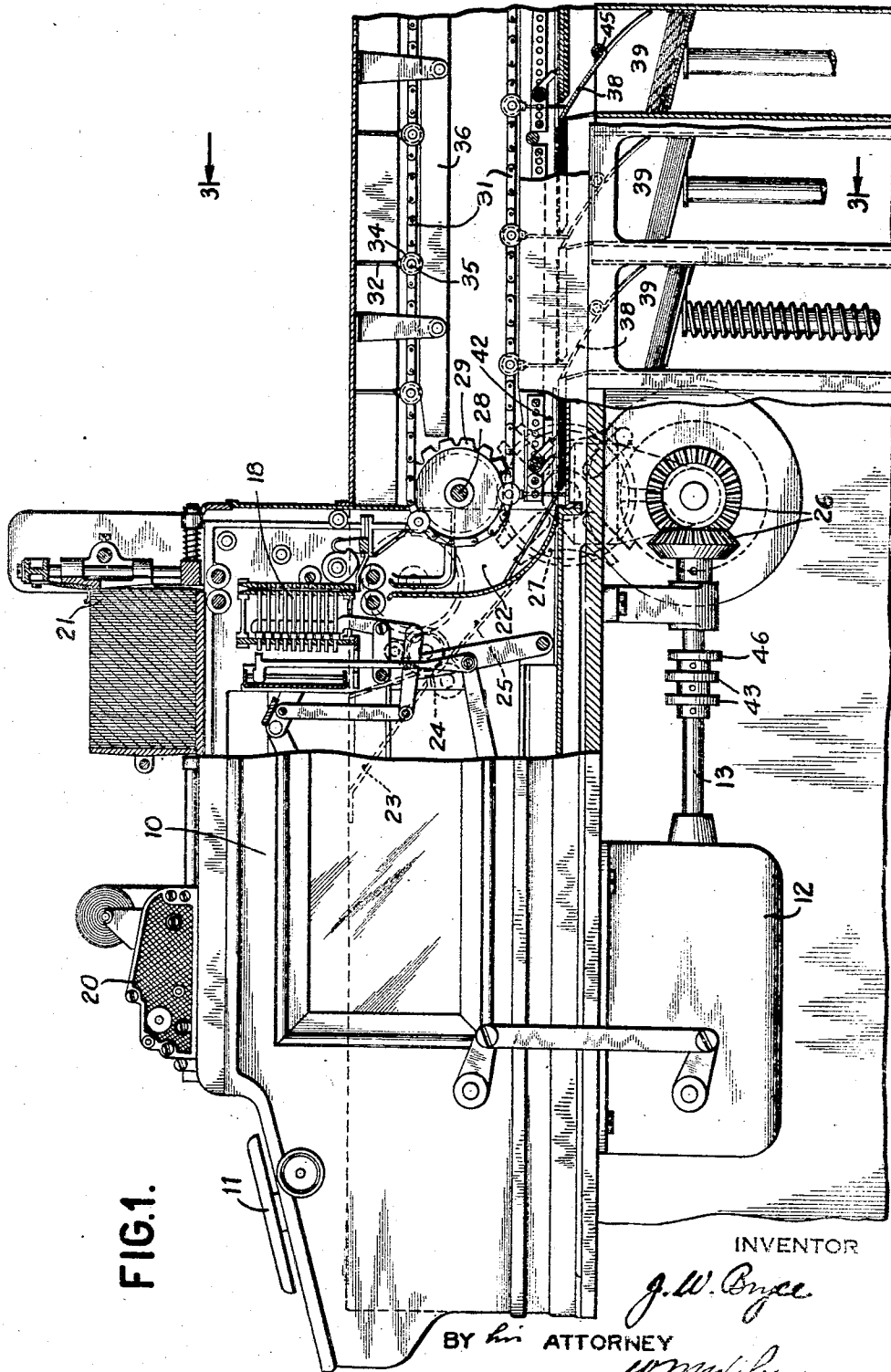
J. W. BRYCE

1,973,246

ADDING AND SORTING MACHINE

Filed Jan. 19, 1931

7 Sheets-Sheet 1



Sept. 11, 1934.

J. W. BRYCE

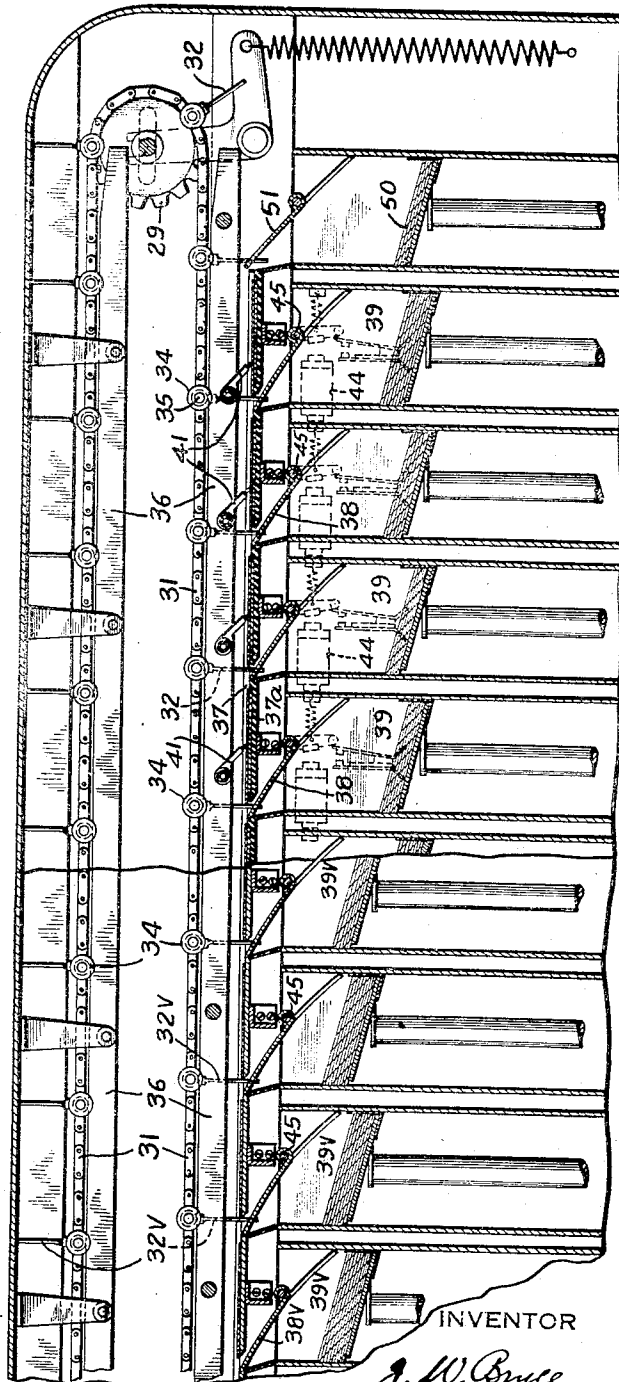
1,973,246

ADDING AND SORTING MACHINE

Filed Jan. 19, 1931

7 Sheets-Sheet 2

FIG. 2.



INVENTOR
J. W. Bryce
BY his ATTORNEY
W. W. Wilson

Sept. 11, 1934.

J. W. BRYCE

1,973,246

ADDING AND SORTING MACHINE

Filed Jan. 19, 1931

7 Sheets-Sheet 3

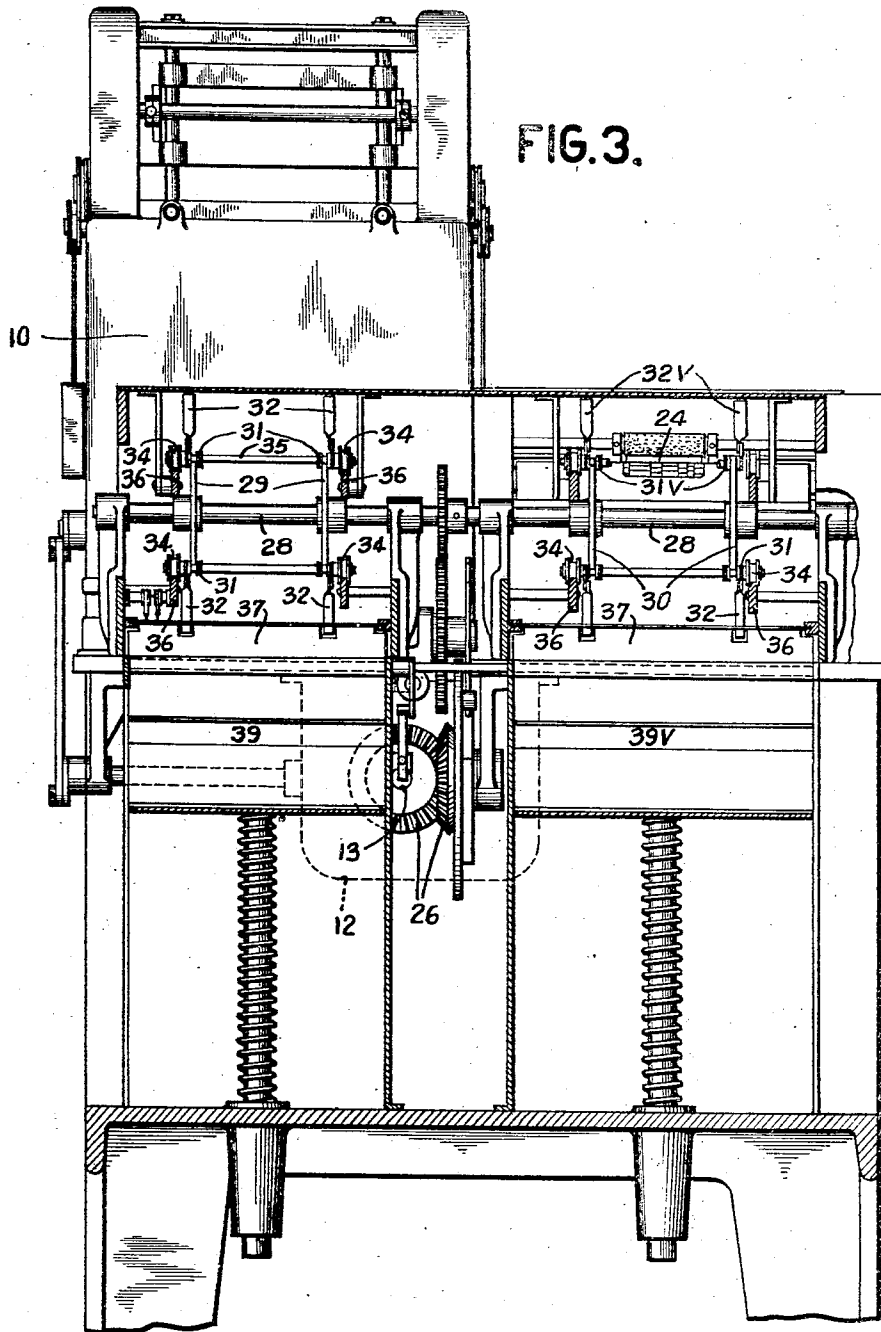


FIG. 3.

INVENTOR

J. W. Bryce

BY *his* ATTORNEY

W. W. Wilson

Sept. 11, 1934.

J. W. BRYCE

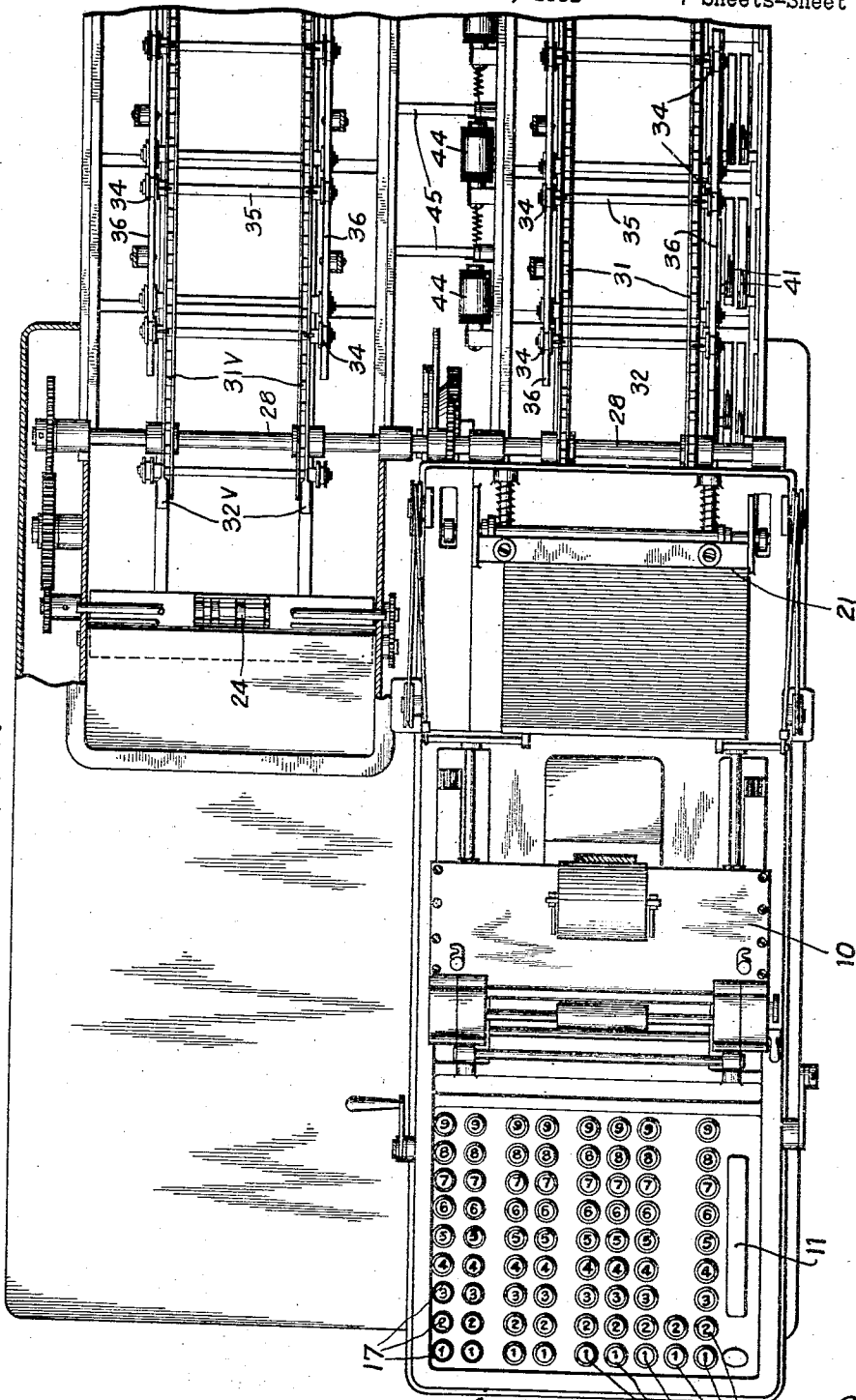
1,973,246

ADDING AND SORTING MACHINE

Filed Jan. 19, 1931

7 Sheets-Sheet 4

FIG. 4.



BY his ATTORNEY

J. W. Bryce
W. M. Wilson

Sept. 11, 1934.

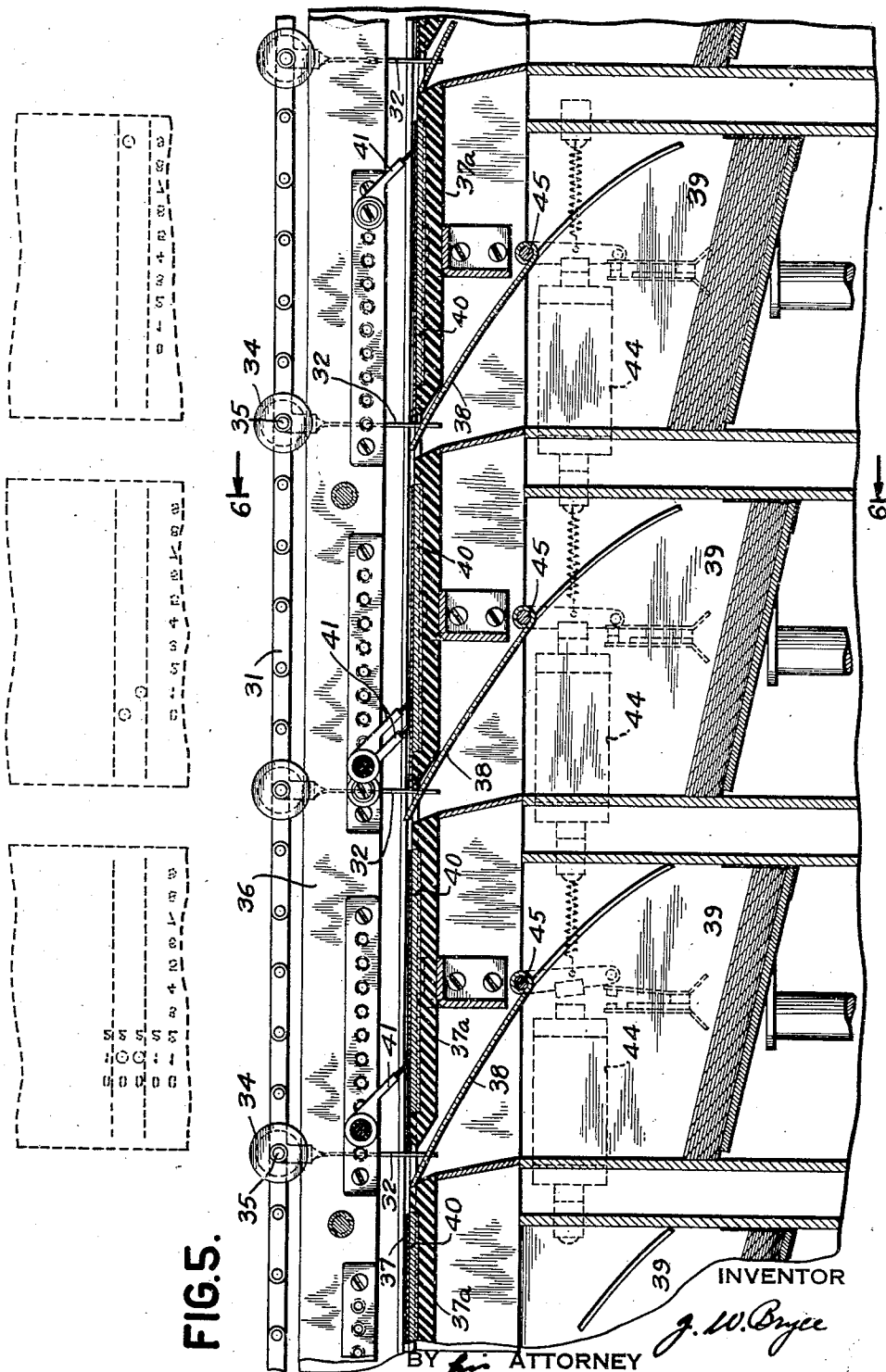
J. W. BRYCE

1,973,246

ADDING AND SORTING MACHINE

Filed Jan. 19, 1931

7 Sheets-Sheet 5



Sept. 11, 1934.

J. W. BRYCE

1,973,246

ADDING AND SORTING MACHINE

Filed Jan. 19, 1931

7 Sheets-Sheet 6

FIG. 6.

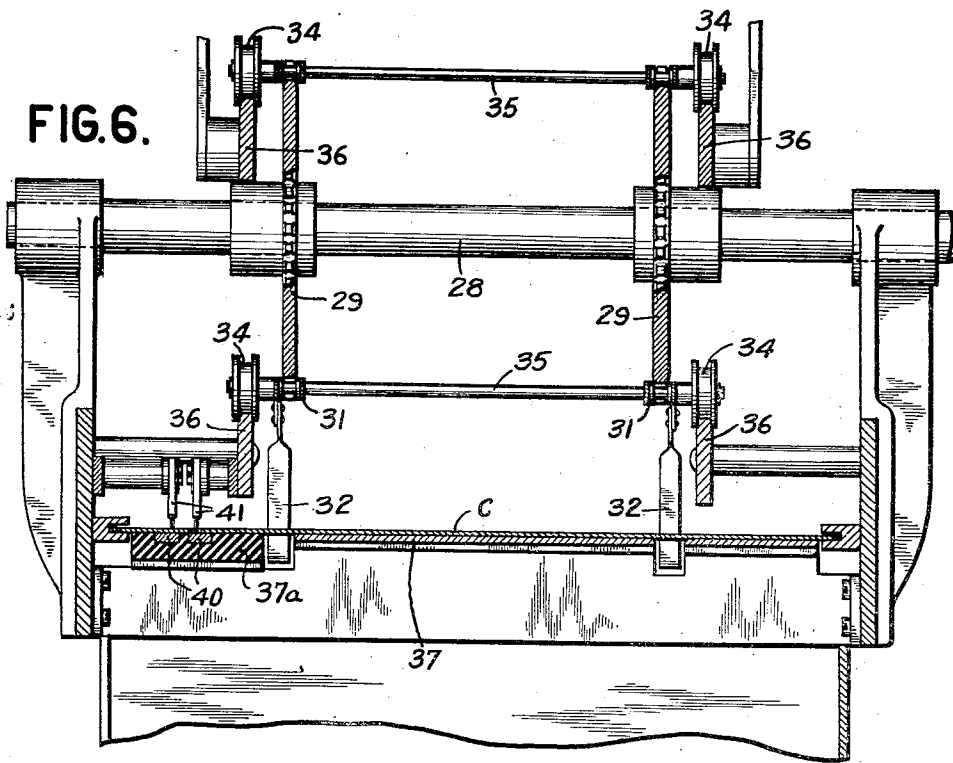
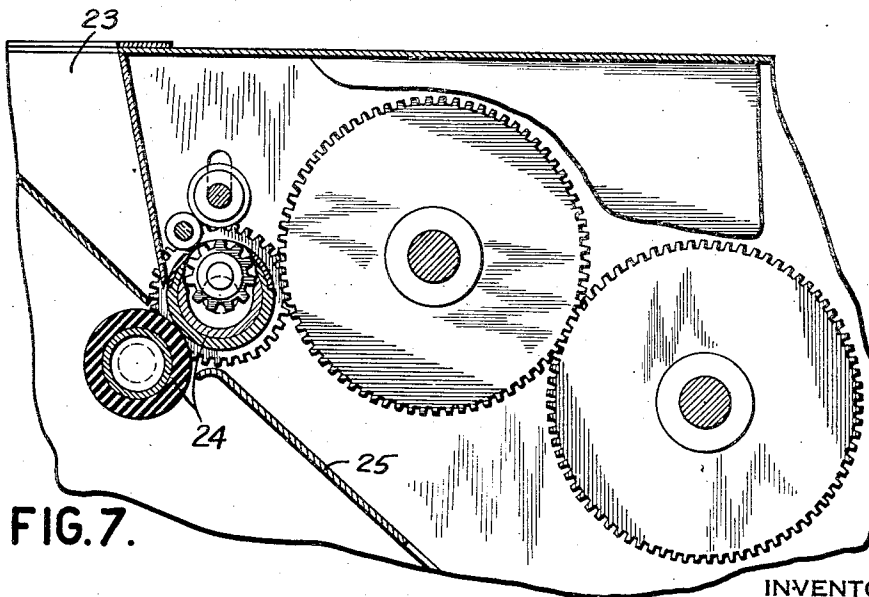


FIG. 7.



INVENTOR

J. W. Bryce

BY *his* ATTORNEY

W. M. Wilson

Sept. 11, 1934.

J. W. BRYCE

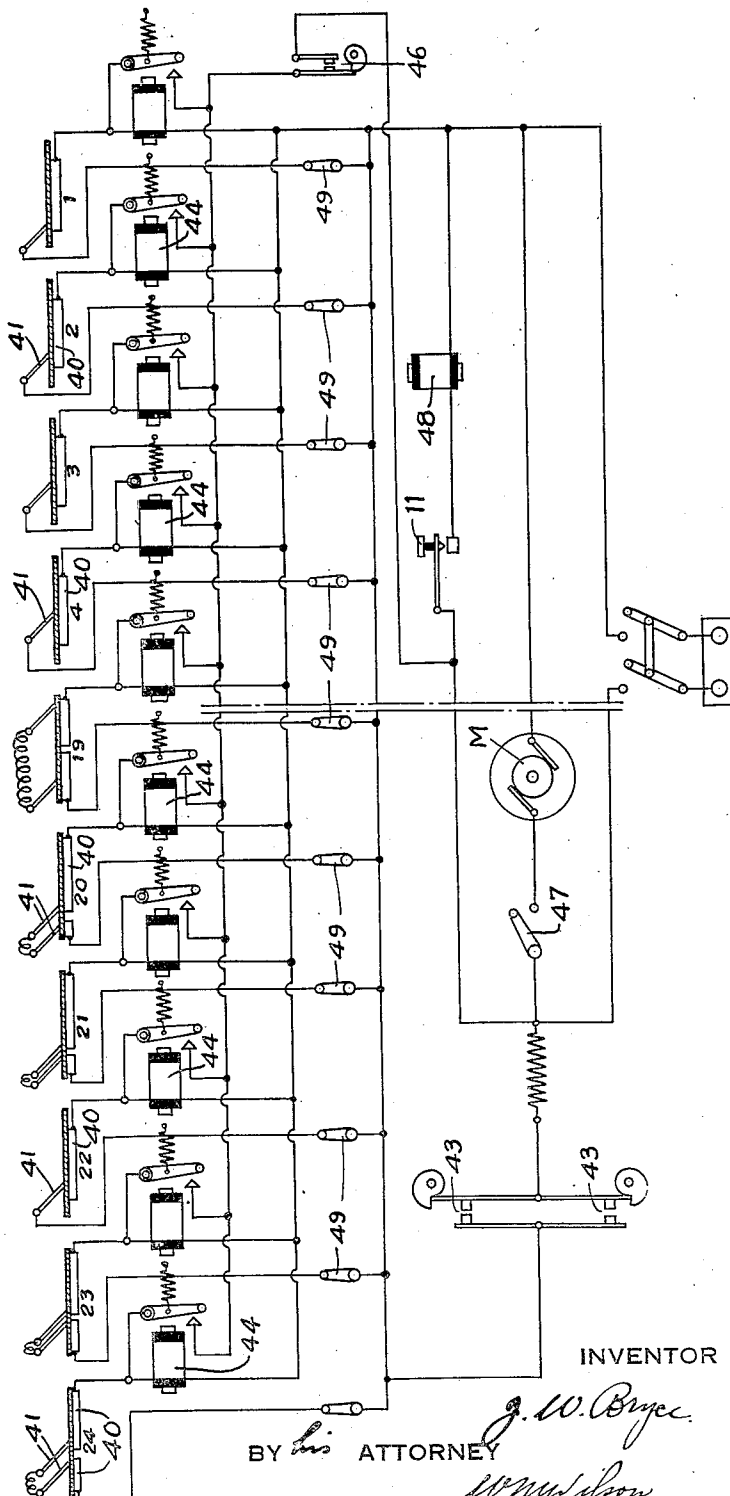
1,973,246

ADDING AND SORTING MACHINE

Filed Jan. 19, 1931

7 Sheets-Sheet 7

FIG. 8.



UNITED STATES PATENT OFFICE

1,973,246

ADDING AND SORTING MACHINE

James W. Bryce, Bloomfield, N. J., assignor, by
mesne assignments, to International Business
Machines Corporation, New York, N. Y., a cor-
poration of New York

Application January 19, 1931, Serial No. 509,644

8 Claims. (Cl. 235—58)

In commercial transactions, for example in banks, it is the present practice to add up various vouchers such as checks and to also sort these vouchers into different classifications. For ex-
5 ample a number of checks come into a bank drawn on miscellaneous banks. These checks are usually hand sorted to different individual bank classifications and then the amounts of the various vouchers are totaled up on adding
10 machines. The present practice involves the hand sorting of the vouchers and the subsequent adding up of the vouchers on adding machines. Where sorting of the checks into classifications is first effected by hand the order of the checks
15 is lost by the sorting operation and it is difficult to verify results should an error occur. In some cases to obviate such difficulties resort has been had to first tallying up and proving each deposit by adding up the various voucher items on an
20 adding machine and then preserving this total, afterwards the checks of one deposit are hand sorted into different bank classifications and then another adding operation is made of each of the vouchers in each individual classification.

25 The above previous practice is both tedious and time consuming and in banks in particular, it is desirable that a distribution of the checks into sorted classifications, the proving up of the amounts of the checks, and the proving up of
30 deposits be made as expeditiously as possible.

The present invention has for its object the provision of a new machine which will materially expedite clearing of vouchers. In brief, the machine is intended to speed up the proving and
35 sorting operations and provide a series of cross checks or proved results which will enable errors to be rapidly located. To this general end a new plan of procedure is adopted. The machine comprises an adding machine of conventional type
40 adapted to list and total up items. Associated with the adding machine are additional classification keys. As each voucher or check is entered on the adding machine these classification keys and the usual number keys, are depressed.
45 The operation of these classifying keys, upon the subsequent operation of the adding machine for entering an item is adapted to control the distribution of the vouchers into compartments of a voucher sorter. The vouchers are fed manually
50 one at a time into the machine as the operation of listing progresses. The adding machine in addition to printing and adding a list and totaling the amounts entered therein is adapted to control and bring into operation a perforating
55 attachment and this perforating attachment, for each voucher entered, perforates a card with data giving the amount of the voucher and additional classifying data. The cards thus perforated by the perforating attachment are sorted
60 into compartments under the control of the classification entries upon the cards and these compartments correspond to corresponding voucher compartments. The machine is provided with means to correlate the voucher sort with the
65 card sort. After the vouchers have been sorted by the machine and the cards have been sorted by the machine, the cards in any one card pocket will correspond in number and amount to the vouchers in the corresponding voucher pocket. It is then possible to remove the cards from any
70 card pocket or from a series of card pockets and pass these cards through a tabulating machine of well known construction, which tabulating machine can run up a list of each of these groups
75 of cards. This list will be a detailed list of the cards in a particular pocket and of all of the vouchers in the corresponding voucher pocket or compartment and the list of entries will be in the order of receipt of the cards and vouchers
80 in their respective pockets. Totals may also be obtained on the tabulating machine of the cards in each pocket and of the corresponding vouchers in the voucher pocket as well as a grand total and this grand total can be used for cross-checking
85 with the printed total shown by the adding machine which made the initial entries.

It has been explained before that the adding machine is provided in addition to the usual number keys with classification keys. For convenience in subsequent accounting operations the
90 adding machine may be provided with more than one set of these classification keys. In the present embodiment two sets have been shown, but it will be understood that more than two can be provided. By providing additional sets of
95 classification keys more than one set of classification perforations may be provided on the cards. One set may correspond to the card boxes and voucher pockets or boxes and may represent banks, clearing house members or the like. The
100 other set may represent individual depositors' accounts or the like and do not control the sorting of the cards and of the vouchers into the respective pockets. These additional or extra classification perforations on the cards permit sub-
105 sequent sorting operations to be effected by the usual card controlled sorting machines and after such sorting operations on the cards are made it is possible to again run the cards through
110 tabulating machines and make up other accounts,

lists or totals as desired according to this new classification. Such list or total could be for example a depositor's statement giving debits or credits to an individual depositor.

5 Further and other objects of the present invention will be hereinafter set forth in the accompanying specification and claims and shown in the drawings, which by way of illustration show what I now consider to be preferred embodiments
10 of my invention.

In the drawings:

Figure 1 is a side elevational view of the adding machine end of the machine showing the perforating apparatus and a view of the sorter
15 card pockets adjacent the adding machine;

Fig. 2 shows sectional views of the voucher and card sorting sections. The section at the right hand end showing a number of the card pockets or compartments and at the left are
20 shown a number of voucher pockets or compartments which are in back of the card compartment;

Fig. 3 is a sectional view taken substantially on line 3—3 of Fig. 1;

25 Fig. 4 is a top plan view of the adding machine end of the machine and a top plan view of some of the card and voucher pockets;

Fig. 5 is an enlarged sectional view of the card pockets;

30 Fig. 6 is a detail cross-sectional view taken substantially on line 6—6 of Fig. 5;

Fig. 7 is a detail part sectional view of the endorsing section for endorsing the vouchers as they are manually placed in the machine; and

35 Fig. 8 is a circuit diagram.

In more detail 10 designates a conventional adding machine which may be of any desired type. The machine herein illustrated is that shown in United States patent to Goss and Bryce, No. 1,190,752. In place of having a manually adding operating machine which is shown in the aforementioned Goss and Bryce patent, a motor driven machine may be provided of customary and well known type. Such motor driven
45 machine may have a motor bar 11. 12 generally designates the motor housing which contains the customary one revolution clutch mechanism. 13 is a drive shaft extending from within the motor housing 12 for driving the card and voucher sorting sections of the machine. As shown in Fig. 4, the adding machine comprises the usual amount keys 15, classification keys 16 and an additional set of classification keys 17.

The adding machine has as is shown in the Goss and Bryce patent, a perforating section generally designated 18. This perforating section is controlled from the item keys 15 and the classification keys 16 and 17. The perforating attachment here shown is adapted to perforate
60 so-called Hollerith type cards.

In the operation of the machine, amounts are entered on the adding machine in the usual way and the proper and corresponding classification keys are depressed. Taking a particular transaction for example, keys 16 can be depressed to represent a clearing house number and keys 17 can be depressed to indicate an account number or the like. 20 conventionally designates a listing and totaling attachment and this listing and
70 totaling attachment has the usual paper roll on which is tallied up a list of amounts and a list of classification numbers as entered into the machine and a total of a given group of amounts. It will be understood that as the entry on each voucher
75 is entered on the adding machine 10 a card is

80 withdrawn from a card magazine 21 and passed into the perforating attachment 18 and there suitably perforated with perforations corresponding to the amounts and classification and is thereafter discharged into the chute generally designated 22 in Fig. 1. Just before the operator depresses the motor bar 11, which is the last operation upon the adding machine, the operator of the adding machine manually presents the voucher or check to a chute 23, Fig. 7, which chute leads
85 to an endorsing mechanism conventionally designated 24. Upon the operation of the machine the endorsing rolls rotate and endorse the check or voucher and deliver it downwardly upon a plate 25. At the end of the adding machine operation a voucher or check will be resting upon tray 25 and a corresponding card will be perforated and disposed in chute 22. Upon the next operation the voucher and corresponding card will be carried along into the voucher sorting and card sorting section of the machine by means which will now be described.

Referring to Fig. 1, the shaft 13 through suitable gearing 26 is adapted to turn Geneva device 27. This Geneva device in turn drives sprocket shaft 28. 28 has mounted upon it a pair of sprocket wheels 29 (see Fig. 3), and another pair of sprockets 30. Sprockets 29 serve to drive a pair of belts or chains 31 which have mounted at intervals thereon fingers or pusher arms 32.
105 These pusher arms 32 upon the intermittent advance of the chain pick up the card from the card receptacle 22 (see Fig. 1) and carry it along past sensing stations and sorting pockets or stations such as 39 into which sorting stations the card is delivered. At the opposite side of the machine there is provided the voucher transporting and sorting mechanism which is of identical construction, viz. there are chains 31v provided cooperating with the sprockets 30. These chains
115 have similar fingers 32v associated therewith which push the voucher along a track over the voucher pockets 39v. No sensing stations are however, provided at this section of the machine because sensing is effected on the cards and not on the vouchers. It will be understood that there is one voucher compartment corresponding to and disposed directly behind each card pocket.

In order to support the belt or chain 21 the chain can be provided with guide pulleys 34
125 mounted on cross shafts 35 and cooperating with supporting rails 36, (see Fig. 3). By the pushing action of the fingers 32, the cards are carried along a track 37 (Fig. 5) which track is provided with slots at intervals therealong to permit shutters or deflectors 38 to be lifted up above the plane of the card to divert it into a pocket 39. The voucher section is provided with a similar construction. Control of the action of the shutters 38 is effected in the following manner. Disposed
135 in the track are contact blocks 40. These are mounted in insulating material as shown. In Fig. 6, 37 is the track and 37a comprises an insulated portion of the track which receives the contact blocks 40. The card proper is shown at C. It will be understood that the track 37 is slotted longitudinally to permit the fingers 32 to extend down below the level of the card. The deflectors 38 and 38v are likewise notched to permit fingers 32 and 32v to pass by. As the card is fed along,
145 sensing brushes 41 traverse the card and cooperate with the classification perforations therein. For certain stations two sensing brushes are provided and for other stations one sensing brush is provided.

Previously it has been explained that after an operation of the adding machine that a card is in the chute 22 ready to be intercepted by the fingers of the chain. On the next operation of the adding machine this card is advanced to the first sensing station. The corresponding voucher is also advanced in the voucher sorter. The card then remains at this first sensing station. It will be assumed that the first card is resting at the first sensing station shown in Fig. 1 at 42. It will also be assumed that this first card is perforated to correspond with the brushes at the sensing station numbered 24. Upon the next operation of the adding machine an operating cycle ensues. Certain cam contacts 43 (see Fig. 8) close a circuit permitting current to flow through one contact block below the card and thence through one perforation of the card, through one brush, thence through the other brush, back to the contact block and down to a magnet 44. Energization of this magnet attracts its armature and rocks its deflector 38 to a position to intercept the card and divert it into the pocket corresponding to this particular classification. As the operating cycle ensues, the card is advanced and is deflected and dropped into the appropriate pocket 39. The deflector 38 is provided with a shaft 45 which shaft extends transversely across into the voucher section of the machine (see Fig. 4). In the voucher section of the machine there is a corresponding deflector 38v secured to the shaft 45 and this deflector 38v operates in an identically similar manner to divert the voucher into the corresponding voucher pocket 39v for example. At the end of each operating cycle the circuit through each sorting magnet 44 is broken and the deflectors are returned to their normal position under spring action. The sorting machine is provided with the usual stick circuit relay points which are of conventional form and the circuit to these stick circuit relay points is interrupted at the proper time in the circuit by cam contacts 46 (see Fig. 8). The circuit need not be further described since it is substantially similar to that shown in Bryce Patent No. 1,651,180. It may be mentioned, however, that in the circuit diagram, Fig. 8, M is the driving motor, 47 is a motor switch, 11 represents the motor bar of the adding machine and 43 represents the magnet operating the one revolution clutch which is disposed within the housing 12. Individual switches such as 49 are also provided for cutting out the magnet circuit for any desired pocket.

It is not believed that a detailed description is necessary of the operation of sorting at single brush stations because here the circuit merely passes through one contact block through a single brush and thence through the sorting magnet. It will also be understood that if a particular card does not have perforations which match the brushes at say the first sensing station, this card will proceed on down the sorting track step by step until it encounters brushes at the sensing station where it does agree with the controlling perforations. When this occurs the card will be diverted into its corresponding card pocket and the corresponding voucher at the opposite side of the machine will be diverted into the corresponding and correlated voucher pocket.

At the extreme right hand end of the machine (see Fig. 2), reject boxes are provided, one for the cards marked 50, the other for the vouchers which is of identical construction and directly behind box 50. Box 50 is provided with a fixed deflector 51 and the voucher reject box has a similar fixed deflector. These reject boxes are adapted to respectively receive any cards which have not been diverted into previous boxes or any vouchers which have not been diverted into previous voucher compartments and also will receive any cards which lack perforations and the vouchers corresponding thereto or any cards which have been passed because of the opening of switches 49 and the vouchers which correspond to such cards.

It will be understood that in the operation of the machine there is a coordinated action of the voucher sorting machine, the adding machine and the card sorting section of the machine. The operation of the motor bar of adding machine brings into action the voucher delivering mechanism and the card delivery and transporting mechanism. Each card will be sensed and delivered into its appropriate sorting pocket. As each card is delivered into its appropriate pocket the voucher which corresponds to the card will be delivered into the corresponding correlated voucher pocket or compartment.

What I claim is:

1. In an accounting apparatus, manually controlled entry means setting up sorting classifications for controlling the sorting of two distinct sets of records into separate but correlated groups, and a dual sorting means cooperating with the manually controlled means for effecting a correlated but separate sorting of both records.
2. In an adding machine, means for making classification entries, a dual sorting apparatus with provisions for making a correlated sorting of two distinct sets of records, and means for controlling the sorting effected by said apparatus in accordance with the classification of the entries which are made.
3. In an accounting machine, a record perforating means and a sorting apparatus cooperating therewith for effecting the sorting of two distinct sets of records, one sorting being controlled in accordance with perforations in the records which are produced by the perforating means, and the other sorting being controlled by the first mentioned sorting.
4. An apparatus of the class described comprising means for making a printed record of a series of items and the classification of the items recorded, means effective during the making of the printed record for making a series of separate individual records provided with classification entries, means for sorting the aforesaid separate records into groups as determined by the classification entries thereon, and additional sorting means cooperating with and controlled by the aforesaid sorting means for providing a correlated sort of a separate and distinct set of records.
5. An apparatus of the class described comprising, a recording machine with item entry keys and classification keys, a listing mechanism for listing in a sequential manner voucher data entered into the recording machine under control of the aforesaid keys, a perforating apparatus also controlled by the recording machine for making individual perforated records of voucher data pertaining to each voucher, a sorting machine receiving the perforated records from the perforating apparatus and also having provision for receiving the original voucher records, and means for sorting the perforated records into classifications corresponding to the classifying data on such records, and means for sorting the vouchers in accordance with the same data.

- 6. An accounting and voucher distributing apparatus comprising, a recording machine, a card perforating means for the recording machine, a card sorting device receiving cards from the card
- 5 perforating means and having sorting compartments, a voucher sorting apparatus having compartments, and means for correlating the sorting of vouchers in the voucher sorter so that the vouchers in each voucher sorter compartment will
- 10 correspond with the cards in each card sorter compartment.
- 7. An accounting apparatus with a recording machine for listing data from vouchers in sequential order, a voucher sorting apparatus cooperatively acting with the operation of the recording
- 15 machine and adapted to receive and transport vouchers after data therefrom is entered in the recording machine, a perforating apparatus controlled by the recording machine for making on a
- 20 card a record corresponding to a related voucher, and a card sorting apparatus receiving cards from

the perforating apparatus and cooperatively acting with the action of the recording machine, and means for correlating the sorting of the cards into groups corresponding with the sorting of the vouchers into groups.

8. An accounting machine comprising, a recording machine provided with a perforating attachment for making individual perforated card records corresponding to vouchers whose data is printed by the recording machine, a card sorting machine receiving cards from the perforating attachment of the recording machine and acting cooperatively with the action of the recording machine for sorting the cards into groups, a voucher sorting device for sorting the vouchers whose data is entered into the recording machine also into groups, and means for correlating the voucher sort with the card sort so that the vouchers in each voucher group will correspond with the cards in each card group.

JAMES W. BRYCE.

25

30

35

40

45

50

55

60

65

70

75

80

85

90

95

100

105

110

115

120

125

130

135

140

145

150