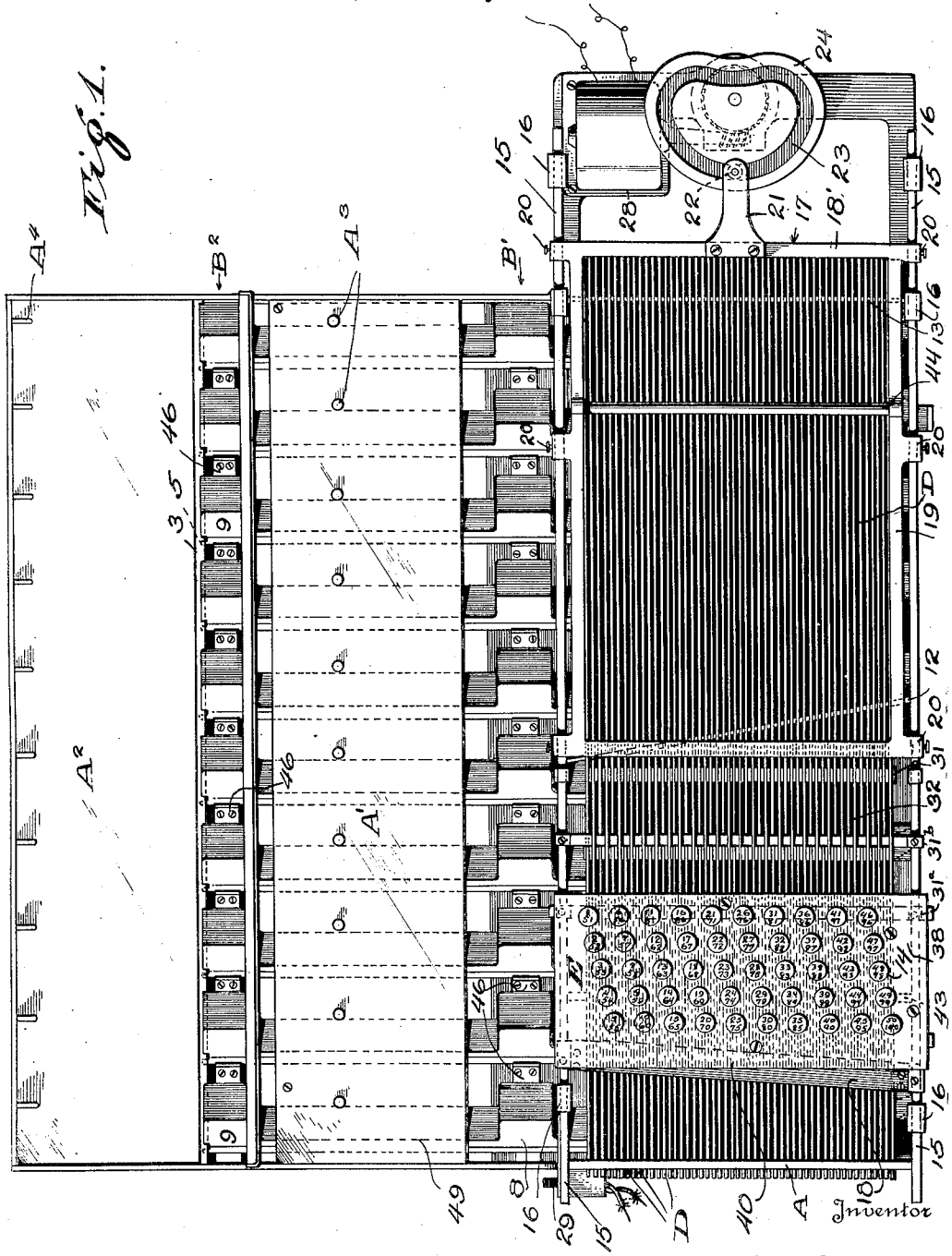
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G. W. COX, JR

SORTING MACHINE

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Fig. 1.



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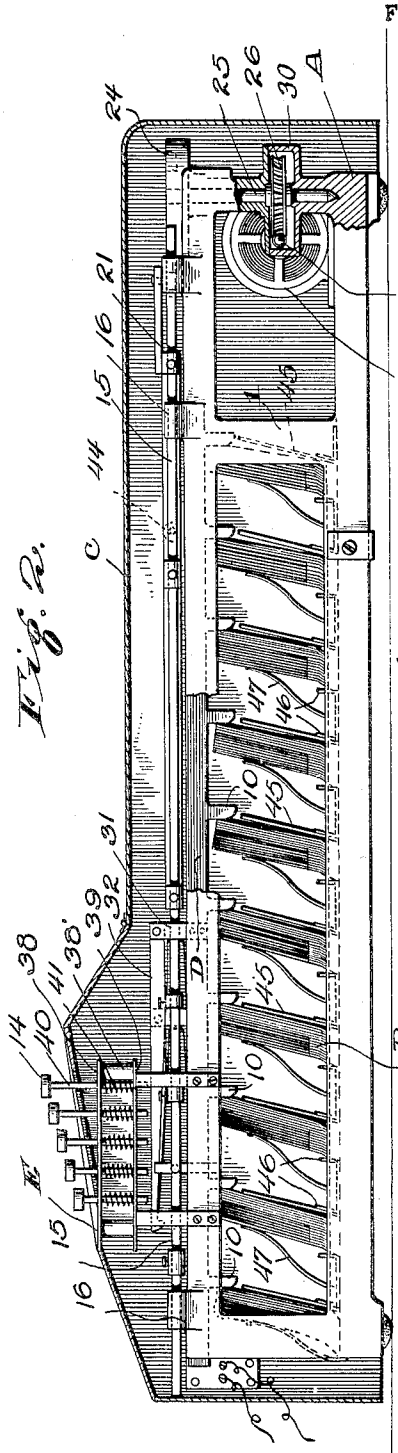


Fig. 2.

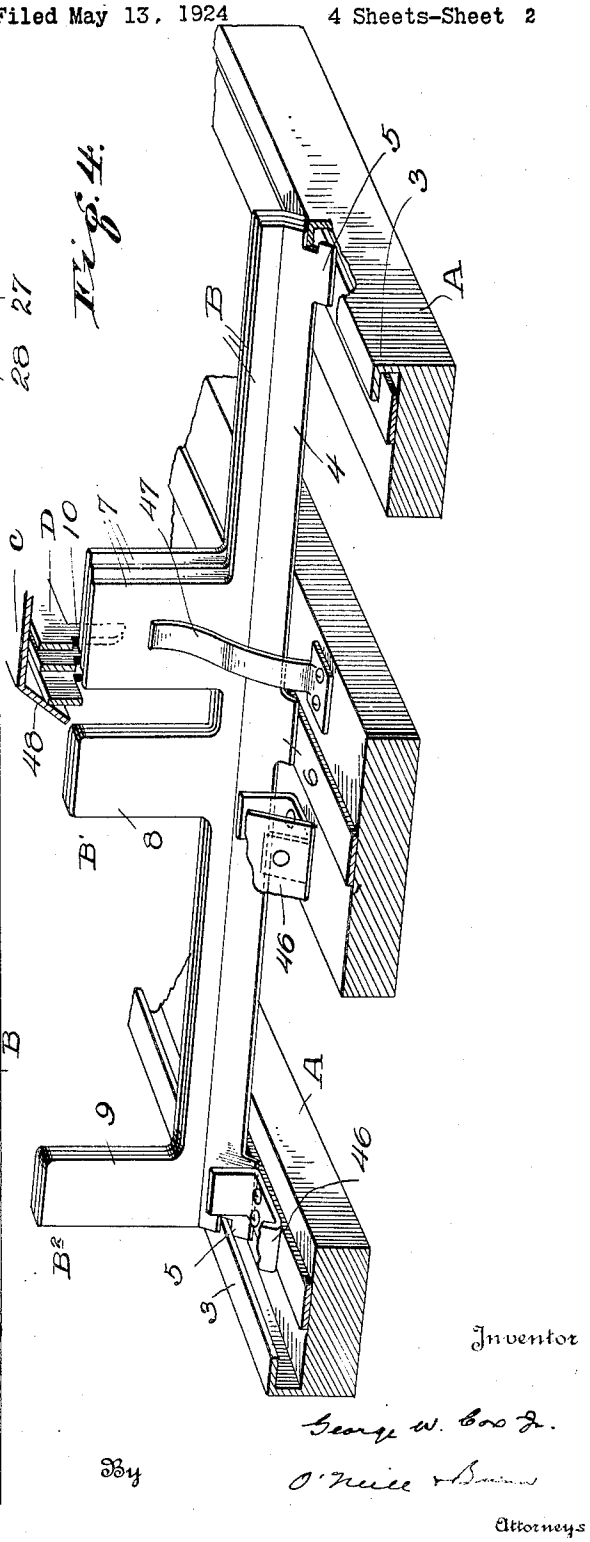


Fig. 4.

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Fig. 3.

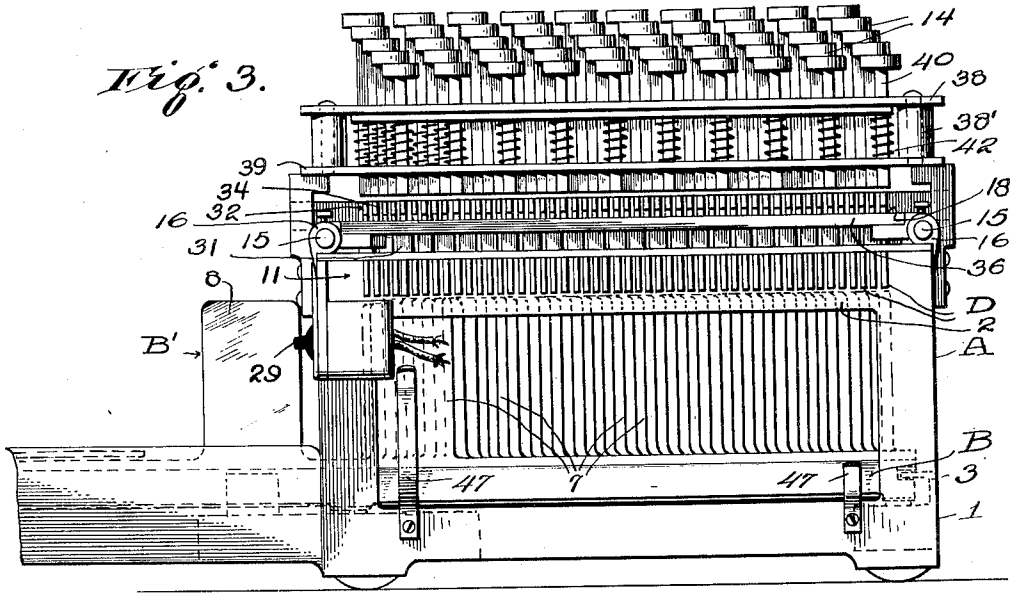


Fig. 14.

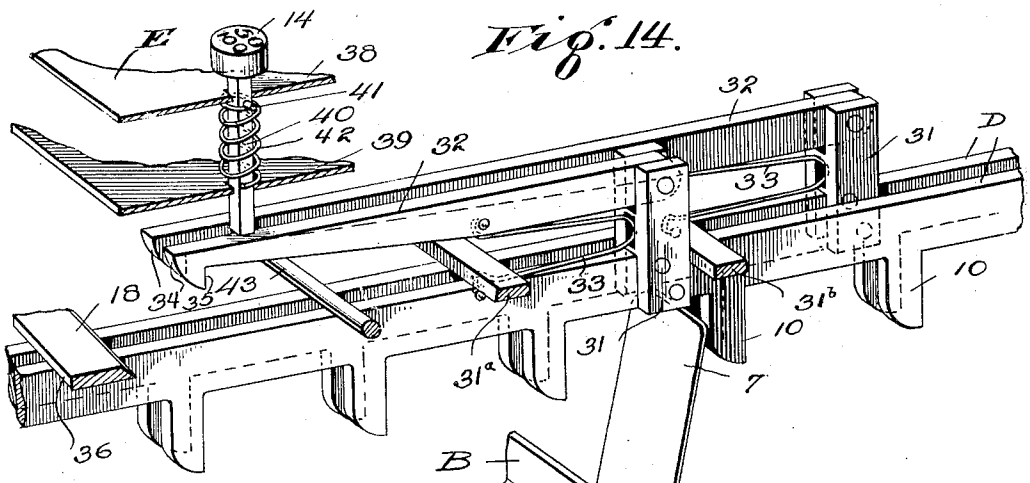
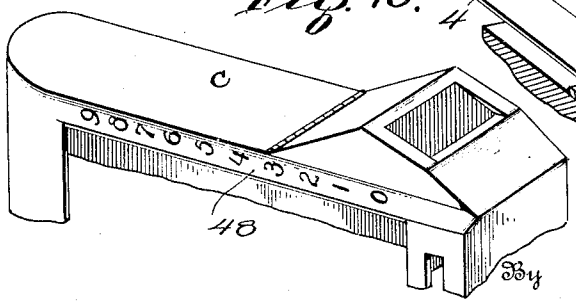
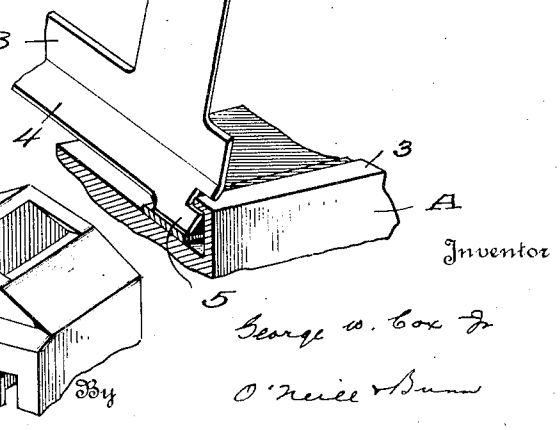


Fig. 13.





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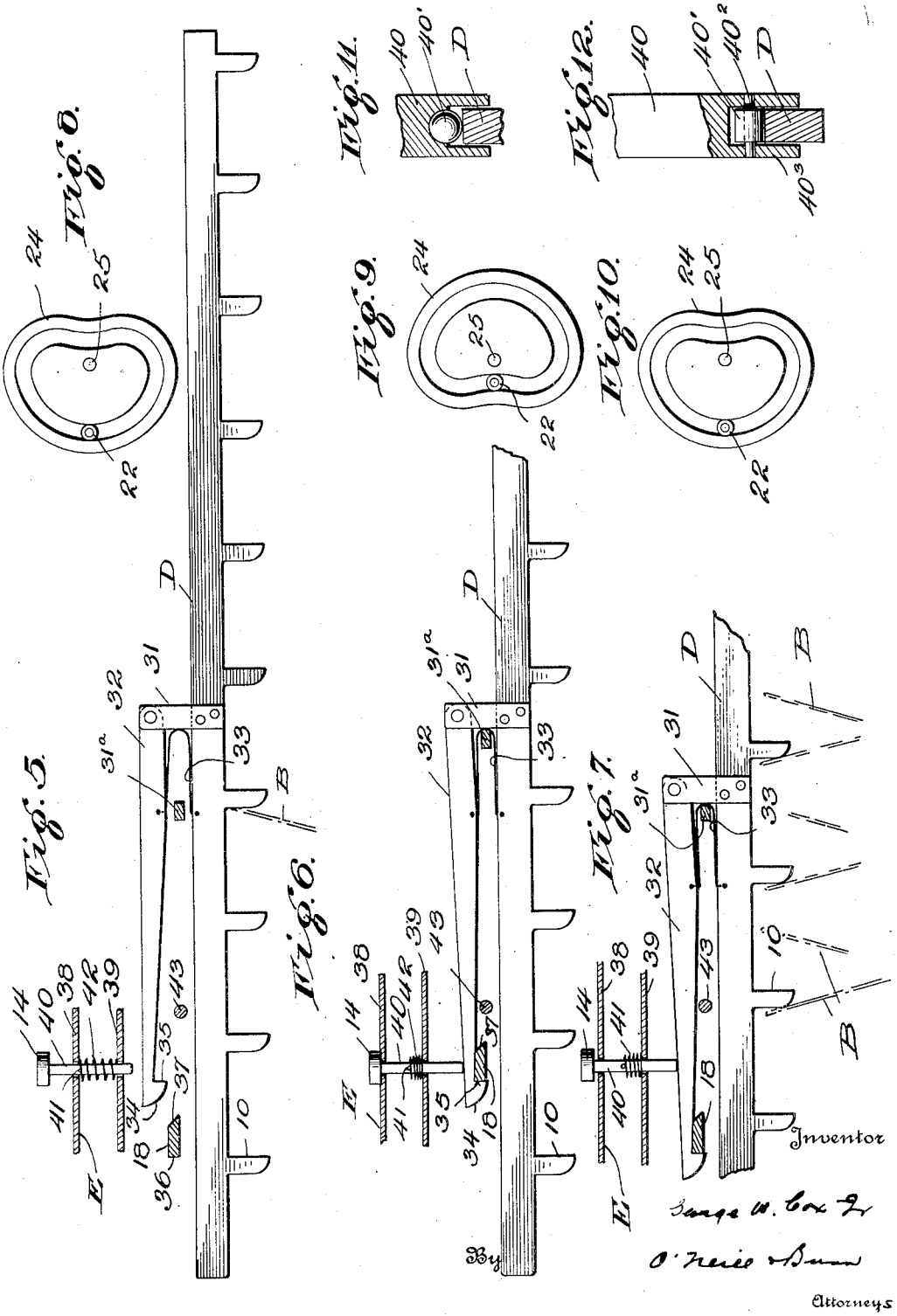
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G. W. COX, JR

SORTING MACHINE

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Patented Apr. 14, 1925. 1,533,698

UNITED STATES PATENT OFFICE.

GEORGE W. COX, JR., OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO NATIONAL ASSORTING COMPANY, OF WASHINGTON, DISTRICT OF COLUMBIA, A CORPORATION OF DELAWARE.

SORTING MACHINE.

Application filed May 13, 1924. Serial No. 713,089.

To all whom it may concern:

Be it known that I, GEORGE W. COX, JR., a citizen of the United States, and resident of Washington, District of Columbia, have invented certain new and useful Improvements in Sorting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to machines for sorting checks, papers, invoices and the like, such as disclosed in my co-pending application Ser. No. 559,020, filed May 6, 1922.

In said application I provide a plurality of vertically-extending, adjacent separator elements, or leaves, all arranged in groups, having described as one embodiment of my invention, five hundred of the leaves arranged in groups of fifty leaves each, and means for selectively and simultaneously separating any two adjacent leaves of the same position in each group. Thereafter two of the articles being sorted may be placed between the separated leaves, one against the rear of the front leaf, and the other against the front of the rear leaf. In another embodiment of the invention the leaves are provided with two parallel rows of upstanding tabs positioned longitudinally of the cover or casing, and, during the sort of miscellaneous papers bearing classifying indicia, the paper being sorted is placed in the proper group of the left-hand or right-hand row of tabs, dependent upon the indicia carried by the paper.

In the copending application heretofore referred to I disclosed 50 actuator bars, each carrying 10 depending arms adapted for contact, upon reciprocation of the actuators, with similarly positioned leaves in each group. Each actuator carries indicia classifying it with respect to the position of the leaves in the groups, and with indicia carried by the articles being sorted, and, upon inspection of the indicia carried by the article, the operator pulls forward the proper actuator and deposits the article in its appropriate position between the separated leaves.

The application referred to disclosed a hand-operated machine, and the primary object of the present invention is the provision of powered means for selectively and simultaneously moving the similarly positioned leaves in each group, and separating each from its adjacent leaf.

Other objects of the invention will be made apparent in the following specification, when read in connection with the drawings forming a part thereof.

Fig. 1 is a top plan view of my machine with the cover removed.

Fig. 2 is a side plan view, partly in section.

Fig. 3 is a front end view of the machine partly broken away.

Fig. 4 is an enlarged perspective view of a portion of three adjacent leaves.

Fig. 5 is a detailed view in elevation of one of the actuator bars.

Fig. 6 is a similar view showing an actuator bar connected to the powered mechanism.

Fig. 7 is a similar view showing an actuator bar in a different position after being moved by the powered mechanism.

Figs. 8, 9 and 10 illustrate the positions of the operating cam, when the actuators are, respectively, in the positions shown in Figs. 5, 6 and 7.

Fig. 11 is a fragmentary sectional detail of a modification of the lower end of the key rod, showing an anti-friction element carried thereby.

Fig. 12 is a similar view of another modification.

Fig. 13 is a fragmentary perspective view, on a reduced scale, of the cover or housing for the machine, and

Fig. 14 is an enlarged, fragmentary perspective view of two actuator bars, and a leaf engaged by one of said bars, and the means for selectively engaging each bar with the associated power mechanism.

Now referring specifically to the drawings:

The machine comprises a support A, preferably in the form of a metallic casting, although it may be of sheet metal or of any material suitable for its purpose, and may be of any suitable configuration which adapts it as a supporting base. As here illustrated, the support A is a casting of rectangular formation, comprising a base portion and angularly disposed vertical rails 1,

and a top rail 2, at the front and rear, and similar rails along its sides.

On each side of the base portion, the support A, is provided an upwardly extending inwardly-turned flange 3, as clearly indicated in Fig. 4, and a plurality of separator elements, or leaves B, are pivotally supported upon said flange 3. The leaves B extend across the support A, the lower portion 4 of each leaf being formed on an angle to the body thereof, and provided adjacent each end, with a depending lug 5 which extends below and projects under the plane of the flange 3, as illustrated in Fig. 4. It will be noted that the projecting extreme end portions of the leaves B are positioned slightly above the flange 3, permitting pivotal movement of the leaves. Each leaf B is provided with a central supporting lug 6, which rests upon a wear strip secured to the floor of the casting A, similar strips also supporting the ends 5 of the leaf, as shown in Fig. 4.

Extending over approximately one-half the length of the leaves B, is a protective housing or cover C, and each leaf is provided, under said cover, with an upstanding projection 7, which projections may be of the same width on each leaf, all of the projections however, being arranged in staggered relation, for a purpose to be hereinafter described.

As in the copending application heretofore referred to, the leaves B are arranged in regularly spaced groups, and there are 500 leaves divided into 10 groups of 50 each. As illustrated in Fig. 4, the leaves extend outwardly from the cover C, and they are here shown as provided with upstanding tabs 8, arranged in a row B′, and similar tabs 9, spaced from the tabs 8, and arranged in a row B^2, both rows being parallel each to each, and to the cover C. The tabs on the separate leaves in each row lie adjacent and, when separated, provide the necessary space to receive the papers or other articles being sorted, which papers are positioned on edge, upon the floors A′ and A^2 shown in Fig. 1, supporting and spacing projections A^3 and A^4, rising from the floors A′ and A^2, and serving to hold the free ends of the sorted papers in proper upright position.

Extending over and transversely of the leaves B, are 50 actuator bars D, as shown in Fig. 1. Each bar D is provided with ten depending lugs 10, one of said lugs extending behind and constantly engaging the upstanding projection 7 of a leaf in each group, and it is to be understood that the lugs on an actuator engage only similarly positioned leaves in each group. The actuators D are suitably spaced, and the forward ends extend through a supporting comb 11 at the front end of the machine, as shown in Fig. 3, and through additional combs 12 and 13, provided along the frame, as shown in Fig. 1. At the front of the machine is provided a key-board carrying a key 14 for each actuator, said key bearing indicia classifying it in accordance with the position of the associated actuator which it controls. It is to be here understood that the indicia on the keys 14 may be of any character desired, it being necessary that they also be classified in accordance with whatever indicia are carried by the articles being sorted.

In my copending application the key is connected directly to the actuator and a forward pull upon the former will reciprocate the latter, and open the space which is proper for the reception of the paper being sorted. In the present invention I provide for the utilization of the following-described powered means to reciprocate the actuators.

Slidably supported above the actuators is a reciprocable carriage, mounted upon two slide rods 15, 15, on each side of the casting A. The rods are held in alignment by, and are slidable through brackets 16, fastened to the side rails 2 of the frame, as clearly shown in Figs. 1 and 2. The carriage frame 17 is rigidly secured upon the rods 15, 15, and comprises end rails 18, 18′, and side rails 19, 19, bracing elements connecting the rails each to each, in actual practice, and serving to prevent distortion of the carriage. The carriage is provided near its corner portions, and along the rails 19, 19, with collars 20, adapted to surround the rods 15, and to be rigidly secured thereto by means of bolts, or screws. The rear rail 18′ of the carriage is provided with a strong bracket 21, which carries a depending anti-friction roller 22 fitted into a track 23 of a horizontally positioned cam 24. The cam 24 is fixed to a shaft 25, upon which is mounted a worm-wheel 26, in mesh with a worm-shaft 27 of an electric motor 28. A switch 29, at the front of the machine is in circuit with said motor 28, whereby the rotation of the cam may be controlled at will, and a casing 30 is provided to cover the wheel 26.

As indicated in Fig. 1, the actuators D lie in close proximity, and in parallelism, and a straddle arm 31 is rigidly mounted upon each actuator and extends thereabove. The upper portion of the arm 31 is also slotted, and the rear end of a finger 32 is pivotally mounted therein, as clearly shown in Fig. 14. It is necessary, for economy of space, that the actuators D lie as close together as possible, and, for this reason, the arm 31 on alternate actuators is in a different plane, as clearly shown in Figs. 1 and 14, the alternate fingers 32 being of different lengths in order that the ends of all of the fingers may be in alignment. In order to retain the finger 32 in its normal position, a very weak leaf spring 33 is positioned between the finger 32 and the actu-

ator D, the spring always tending to hold the finger in the raised position shown in Figs. 14 and 5.

The front end of the finger 32 is downwardly and inwardly curved at 34, terminating in an upwardly extending flat surface 35, adapted for engagement with the flat front edge 36 of the rail 18 of the carriage frame 17, said rail 18 being provided with a beveled rear edge 37, for a purpose to be presently explained.

Normally the fingers 32 lie in a plane such that the surface 35 is immediately above the plane of reciprocation of the rail 18, and, in order to depress any selected finger into engagement with the rail 18, whereby to reciprocate the desired actuator D, I provide a key-board E, here shown as composed of two spaced plates 38 and 39, each plate being provided with 50 perforations which register with the perforations in the other plate. Mounted above the plate 38 are 50 keys 14, fixed to stems 40 which extend through the aligned apertures in the plates 38 and 39. Each stem 40 carries a transversely extending pin 41 below the plate 38, serving to limit the upward movement of the stem, and a spring 42 is coiled around the stem 40, and bears against the pin 41 and the top surface of the plate 39, the spring always tending to raise the stem.

The lower portion of the stem 40 projects through the plate 39 and terminates directly above the upper surface of the front portion of the finger 32, and it is obvious therefore that a pressure upon the key 14 will depress the spring 42 and cause the end of the stem 40 to move the finger downwardly against the slight counter-pressure of the spring 33. This movement of the finger 32 causes it to pass into the path of the constantly reciprocating rail 18 on the carriage 17, as should be clearly understood. Upon a depression of a finger 32, if the rail 18 is at that time in front of the forward end of the finger, as shown in Fig. 5, when the rail 18 moves to the rear the beveled edge 37 will contact the surface 34 of the finger and slide thereunder, and move the latter upwardly against the slight pressure being imposed by the operator upon the key 14. Upon further rearward movement of the rail 18, the surface 35 of the finger will engage the flat surface 36 of the rail 18, whereupon a return forward movement of the rail will pull the finger 32 forwardly, and with it that actuator to which it is attached. It is to be clearly understood that the rail 18 is at all times reciprocating with a stroke of preferably, approximately 2¼ inches. Its limit of forward stroke is indicated in Fig. 5, the finger 32 being out of engagement therewith and its limit of rearward stroke is indicated in Fig. 6, the finger engaging the rail. Figs. 8, 9 and 10 indicate the cam positions with respect to the views of the finger as shown in Figs. 5, 6 and 7.

A stop rod 43 extends under all of the fingers 32, limiting the downward movement thereof, and a friction bar, or a roller 44, is carried by the rails 19, extending transversely over the rear portions of the actuators D, limiting upward tilting movement of the latter as shown in Fig. 1.

Two parallel push rods 31^a and 31^b are secured to the rods 15, and extend transversely between the actuators D and the fingers 32, as clearly indicated in Figs. 1 and 4. It is the duty of these rods to return the actuators to normal position, and the instrumentalities are so positioned, with respect to the action of the cam 24, that, when the return movement of the carriage releases the rail 18 from the surface 35 of the finger 32, the rod 31^a will contact the front of the straddle bar 31 in the front row, and move the actuator D back to normal position. The rod 31^b has the same duty with respect to the bars 31 in the rear row. If all of the straddle bars were in the same line only one push rod would be necessary. As the actuators are returned to normal position, the leaves B are also automatically returned by means of a spring, as will hereinafter be explained.

It is to be noted that the keys 14 are here shown in 5 rows of 10 keys each, and that the keys in each row are arranged in staggered relation with respect to the keys in the adjacent row. This arrangement is of course for the purpose of permitting the use of larger keys than might be used if the keys were arranged in a straight line directly above the actuator.

The leaves B are separated into groups of 50 each, by means of stop plates 45 at the rear of that portion of each group which is beneath the housing C, and by a double-angled plate 46, secured to the base of the casting A, and adapted to limit the movement of the projecting tabs 8 and 9. Also similarly secured to said casting A, is a leaf-spring 47, which bears against the front projection 7 of each group of leaves, tending to return the leaves to normal position. All the leaves are mounted for gravitation to the normal position shown in Figs. 1 and 2, but any leaf may be moved forward, by reciprocation of its associated actuator, to the position shown in Fig. 7. The leaf-spring 47 always tends to hold the leaves in their normal position, pressing one leaf against the leaf adjacent.

The machine is here shown as arranged for the sorting of papers, such as checks, bearing numbers from 1 to 1000, and it will be noted that the cover C is provided on its side with an inclined strip 48, bearing a rear-

wardly extending row of digits from 0 to 9, one digit being immediately adjacent each group of tabs 8. Since each leaf carries a tab 8, and also a tab 9, it is obvious that each tab 8 is classified, by position in a group, with the tab 9 carried by the same leaf but in a spaced row. In the sorting of the checks above referred to, each check upon which the last two digits aggregate 50 or less, is placed in the row B^2, between the tabs 9, and those having terminal digits aggregating 51 to 100, are placed in row B', between the tabs 8.

It being understood that the cam 24 is in operation, the rail 18, is constantly reciprocating under the front end of the fingers 32. Each key 14 bears two numbers, one above the other, the lower number being greater than the upper by 50 points, thus;

1	6	11	16	21	26	31	36	41	46
51	56	61	66	71	76	81	86	91	96
2	7	12	17	22	27	32	37	42	47
52	57	62	67	72	77	82	87	92	97
3	8	13	18	23	28	33	38	43	48
53	58	63	68	73	78	83	88	93	98
4	9	14	19	24	29	34	39	44	49
54	59	64	69	74	79	84	89	94	99
5	10	15	20	25	30	35	40	45	50
55	60	65	70	75	80	85	90	95	100.

The checks to be sorted are of course promiscuously arranged, and assuming that the first check is numbered 162, the operator presses upon the key which bears the number 12/62. This operation, as heretofore explained, engages a finger 32 with the reciprocating rail 18, and causes a forward pull upon the actuator, which is attached, by the straddle bar 31, to the finger which has been depressed. It will be noted that, as shown by the foregoing chart of the key-board, there is a difference of 5 points between the top numbers on a key 14, with respect to the top number on the key immediately adjacent in the same horizontal row, and that the same is also true of the bottom numbers on said keys; also that, on each key, the bottom number is greater than the top number by 50 points.

It is also to be noted that the first key to the left in the second horizontal row bears a top number which is 1 greater than the top number on the first key on the first horizontal row, the top numbers on all the keys in the second row also increasing by 5 on each adjacent key to the right, and the bottom numbers similarly increasing and, in each case, being 50 points greater than the top number on the same key. The same system of numbering the keys prevails with respect to all of the horizontal rows, it being noted that there are 50 keys each bearing two separated sets of classifying indicia, here shown as numbers, but which, in the sort of papers bearing indicia other than numbers, the keys 14 are provided with indicia to correspond with that carried by the papers being sorted. As here shown there are 100 separate classifications carried by the keys, and assuming that there are 50 of the tabs 8 in each group in the row B', and 50 of the tabs 9 in each group in the row B^2, it follows that there are 50 spaces which may be provided for the insertion of checks in each group in each row, or 100 spaces in those groups in the same horizontal plane; in other words the tabs 8 and the tabs 9, are in the same group, since similarly positioned tabs 8 and 9 are carried by the same leaf B, and there are therefore 100 spaces for checks in each group. Since there are 10 groups extending longitudinally of the machine, it is possible, by movement of the leaves B, to provide spaces for the reception of 1000 papers, as will be understood.

In the sort of the check numbered 162, it will be understood that the operator depresses the key 12/62 because this key is the only one which bears the numerals 62 as the last two digits, and it is also to be understood that the first movement of the sort, to wit, reciprocation of the proper actuator D, is always governed by the last two digits on the paper being sorted. In depressing the key bearing the numbers 12/62 therefore, the finger 32 on the actuator immediately under that key was caused to engage the reciprocating rail 18, resulting in a forward pull upon that particular actuator only. As hereinbefore stated, each actuator carries 10 depending lugs, one of which engages the vertical projection 7 of one leaf only in each of the groups. In the present instance the lug 10 of the actuator which is reciprocated engages the projection 7 of the 12th leaf, by position, counting from front to rear, in each group. This may be verified by the key-board chart, by counting the numbers of the keys from the upper left hand corner, down the first substantially vertical row, up the second row, and down the third row to the key bearing the numeral 62. The movement of the actuator having pivotally moved every 12th leaf in each group, there are 10 spaces open in each of the rows B^1 and B^2. Since the operator has noted that the last two digits on the check aggregate more than 50, he is aware of the fact that it belongs in row B', between the tabs 8. He also notes that the third digit from the

right is 1, and therefore places the check in the only opening which is provided in the tabs 8, that group which is immediately adjacent the numeral "1", on the strip 48 carried by the cover C. If the check had been numbered 112, the same actuator would have been reciprocated, and exactly the same openings provided in all the groups, but the check would have been placed in the row B^2, between the tabs 9, since 12 is less than 50.

Another example; if No. 743 is being sorted, the key 43/73 (3rd row down, next to last button would be pressed), and the check deposited between the separated tabs 9 in row B^2; in this row because 43 is less than 50, and in the group opposite the number 7 on the strip 48. If the number had been 763 the check would have been placed in the row B', between the tabs 8, and opposite the number 7 on the strip 48.

From the foregoing it is obvious that it is possible to provide 1000 spaces in the combined rows B' and B^2, and that there is a separate space for each check numbered from 1 to 1000, and that, after a check is deposited, it is in its proper position. After the full sort is completed the checks are assembled in a stack by first removing those from the front tabs 9 in the row B^2, then removing the checks from the front tabs 8, row B' and placing them behind the checks already removed, and then abstracting the checks from the second group B^2, etc.

While I have herein described the machine as being driven by an electric motor, it is of course understood that I am not limited to the use of a motor of any particular type for utilization in rotating the cam shaft, as the shaft may be geared to other powered means carried by the machine, or may be otherwise connected to power which is otherwise entirely separate from the machine. Nor am I limited to the utilization of a cam for the purpose of reciprocation of the actuators D, since they may be driven by other gearing positioned between them and the power source.

While the machine is here shown as equipped for the numerical sort, the same principles of operation apply in the sort of papers carrying names, such as the drawer of a check, or papers which carry other alphabetical indicia. In such cases the keys 14 and the strip 48 would bear the letters of the alphabet. In the sort of the name "Parker" for instance, the key "a" is caused to reciprocate, thereby opening a space in each of the groups under each of the letters carried by the strip 48, and the article is deposited in the group under the letter "P" on said strip; on the second sort the letters "r" and "k" are simultaneously considered, and next the letters "e" and "r."

The same principle is applicable to invoice slips, sales slips, etc., bearing a plurality of arbitrary letters, symbols, or numbers, or combination of letters, symbols or numbers. In all cases such indicia are carried on the keys 14 as will classify the latter with the designations carried by the articles being sorted, and such indicia are carried by the strip 48 as will correspond with other indicia carried by the articles being sorted. The indicia carried by the strip 48 and by the keys 14, are easily removable, for the substitution of other designating matter, dependent upon the character of the sort to be made.

In order to reduce friction between the top surface of the fingers 32, and the lower end of the stem 40, I may position an anti-friction ball 40′ in a socket in the lower portion of said stem, as shown in Fig. 11, or may provide a roller 40^2 as shown in Fig. 12. In such cases the lower end of the stem 40 may be bifurcated and straddle the fingers 32, serving as a guide in the reciprocation of said fingers under the power of the rail 18. It is also desirable to provide a small wear plate, of hard metal, on that portion of the projections 7 which is engaged by the lug 10 carried by the actuators.

The rapidity of reciprocation of the carriage 17, and consequently of the rail 18, may be varied at will in actual practice, to accommodate the reciprocations to the speed of the operator, by providing a switch 29 in the form of a rheostat control, as will be understood.

Various other modifications of the structure herein disclosed and described will be suggested to those skilled in the art, but my invention covers all such embodiments as fall fairly within the scope of the appended claims.

What I claim is:

1. A sorting machine provided with a plurality of movable separator elements, and power-actuated mechanism adapted to selectively move any one of said elements.

2. A sorting machine provided with a plurality of movable separator elements arranged in groups, and power-actuated mechanism adapted to selectively and simultaneously move similarly positioned elements in the several groups.

3. A sorting machine provided with a plurality of movable separator elements arranged in groups, an actuator member common to all similarly positioned elements in each group, and power-mechanism adapted to be selectively engaged by each actuator whereby to move predetermined elements in the several groups.

4. A sorting machine provided with a plurality of pivotally mounted leaves arranged in groups and adapted to receive papers therebetween, in combination with powered means for simultaneously pivotally

moving similarly classified leaves in the several groups, to provide paper-receiving spaces therebetween, substantially as described.

5. A sorting machine provided with a plurality of leaves arranged in groups, indicia denoting the classification of each group, and powered means for simultaneously moving a selected leaf in each group to provide paper-receiving spaces adjacent said leaves, substantially as described.

6. A sorting machine comprising a multiplicity of movably mounted leaves arranged in a plurality of groups, each leaf in each group having a different classification, and corresponding to the classification of similarly positioned leaves in the other groups, and powered means for simultaneously moving all leaves of the same classification in the several groups.

7. A sorting machine comprising a multiplicity of movably mounted leaves arranged in a plurality of groups, each leaf in each group having a different classification, and corresponding to the classification of similarly positioned leaves in the other groups, and powered means for simultaneously moving all leaves of the same classification in the several groups, in combination with indicia denoting a different classification of each group.

8. A sorting maching comprising a multiplicity of spaced elements so arranged in groups that similarly positioned elements of each group have the same classification, and powered means for simultaneously moving all the elements of the same classification in the several groups.

9. A sorting machine comprising a multiplicity of spacing elements so arranged into a plurality of groups that correspondingly positioned elements of all the groups have the same classification, a plurality of actuators each of which is adapted for reciprocation to move only the elements of the same classification in the several groups, and powered means for selectively reciprocating each actuator.

10. A sorting machine for articles bearing terminal designations comprising a multiplicity of spacing elements so arranged into a plurality of groups that correspondingly positioned elements of all groups have the same classification, and powered means adapted for actuating the same to simultaneously provide, between adjacent elements, an article-receiving space of the same classification in all the groups, and in accordance with the terminal designations carried by the articles being sorted.

11. A sorting machine comprising a multiplicity of spacing elements arranged in a plurality of groups positioned in separate rows, each element of each group in each row having a separate classification, in combination with powered means for moving in unison an element of the same classification in every group in each row, substantially as described.

12. A sorting machine comprising a multiplicity of members positioned in parallelism and each carrying spacing projections forming a plurality of rows arranged in groups, and powered means for simultaneously moving a member of the same classification in each group.

13. A sorting machine comprising a multiplicity of members positioned in parallelism and each carrying spacing projections forming a plurality of rows arranged in groups, and means for simultaneously moving a member of the same classification in each group, comprising a movable actuator adapted for movement to simultaneously engage a member of the same classification in each group, and powered means for moving said actuator.

14. A sorting machine comprising a plurality of movable separator elements, and powered means for moving each element from its normal position and for thereafter restoring said element to its normal position.

15. A sorting machine comprising a plurality of movable separator elements, power-actuated means mounted in position to be engaged by any of said elements and adapted to move said engaged element from a normal position and to thereafter restore it to said position, and means for selectively engaging any element, with said power-actuated means.

16. A sorting machine comprising a plurality of movable leaves arranged in groups, a plurality of actuators each of which is adapted for movement to separate a correspondingly positioned leaf of each group from the leaf adjacent thereto, and powered means for automatically moving any selected actuator, and for thereafter restoring said actuator to normal position.

17. A sorting machine comprising a plurality of leaves arranged in parallelism, each leaf being provided with a projection positioned in staggered relation with respect to the projection on the adjacent leaf, and powered means for engaging a selected projection and for moving one leaf away from the adjacent leaf.

18. A sorting machine comprising a plurality of leaves arranged in parallelism, each leaf being provided with a projection positioned in staggered relation with respect to the projection on the adjacent leaf, a plurality of actuators so positioned that an actuator is constantly bearing against the projection on each leaf, and powered means for selectively moving each actuator.

19. A sorting machine comprising a plurality of leaves arranged in groups, each

leaf being provided with a projection positioned in staggered relation with respect to the projection on the adjacent leaf, and powered means for simultaneously engaging the projection of similarly positioned leaves in the several groups and for moving said leaves away from the leaves next adjacent.

20. A sorting machine comprising a plurality of leaves arranged in groups, each leaf being provided with a projection positioned in staggered relation with respect to the projection on the adjacent leaf, an actuator bearing upon the projection of similarly positioned leaves in the several groups, and powered means for selectively moving each actuator.

21. A sorting machine comprising a plurality of leaves arranged in groups, each leaf being provided with a projection positioned in staggered relation with respect to the projection on the adjacent leaf, and powered means for simultaneously engaging the projection of similarly positioned leaves in the several groups and for moving said leaves away from the leaves next adjacent and for thereafter restoring said leaves to normal position.

22. A sorting machine comprising a plurality of leaves arranged in groups, each leaf being provided with a projection positioned in staggered relation with respect to the projection on the adjacent leaf, an actuator bearing upon the projection of similarly positioned leaves in the several groups, and powered means for selectively moving each actuator and for thereafter restoring said actuator to normal position.

23. A sorting machine comprising a multiplicity of spacing elements so positioned in separated rows that each element of each row has a different classification, and that between similarly positioned elements of different rows there is a fixed variance of classification, and powered means for simultaneously moving similarly positioned elements of each row.

24. A sorting machine comprising a multiplicity of spacing elements so positioned in groups which are arranged in separated rows that there is a fixed variance of classification between correspondingly positioned elements of all of the groups of one row and between similarly positioned elements in the groups of another row, and powered means for simlutaneously moving similarly positioned elements of each group of each row.

25. A device for sorting promiscuously arranged articles bearing a plurality of designations, including powered means for simultaneously providing a plurality of spaces classified in accordance with one of the designations carried by an article, in combination with means classifying one of such spaces in accordance with another designation carried by said article.

26. In a sorting machine, a multiplicity of movably mounted leaves arranged into a plurality of groups, and powered means for selectively and simultaneously moving correspondingly positioned leaves in all the groups.

27. In a sorting machine a plurality of groups of leaves mounted for independent movement and powered means for simultaneously moving a selected leaf of each group.

28. In a sorting machine a plurality of groups of leaves mounted for independent movement and powered means for simultaneously moving a selected leaf of each group, and for restoring said leaves to normal position.

29. A sorting machine, comprising a plurality of separator elements arranged in parallelism, an actuator adapted for movement to separate one element from its adjacent element, a power-driven member mounted for movement adjacent said actuator and means for selectively engaging the actuator with said member.

30. A sorting machine comprising a multiplicity of separator elements arranged in parallelism and divided into a plurality of groups, an actuator adapted for reciprocation to move correspondingly positioned elements in the several groups, a power-driven member reciprocating adjacent said actuator, and means for selectively engaging said actuator with said member.

31. A sorting machine comprising a multiplicity of separator elements arranged in parallelism and divided into a plurality of groups, a plurality of reciprocably mounted actuators extending adjacent the groups, each actuator being provided with abutments constantly engaging similarly positioned elements in the several groups, a power-driven member reciprocating adjacent said actuators, and means for selectively engaging each actuator with said member.

32. A sorting machine comprising a multiplicity of separator elements, an actuator contacting certain of said elements and mounted for movement in a plane adjacent thereto, a power-driven member reciprocating adjacent said actuator, and a finger pivotally mounted on said actuator and adapted for movement into engagement with said member, whereby to reciprocate said actuator and move said elements from normal position.

33. A sorting machine comprising a multiplicity of separator elements, an actuator contacting certain of said elements and mounted for movement in a plane adjacent thereto, a power-driven member reciprocating adjacent said actuator, and a finger pivotally mounted on said actuator and

adapted for movement into engagement with said member, whereby to reciprocate said actuator and move said elements from normal position, and additional means carried by said member for restoring said actuator to normal position.

34. A sorting machine comprising a multiplicity of separator leaves arranged in parallelism and divided into a plurality of groups, a plurality of actuators mounted for movement in a plane adjacent all of the groups, each actuator contacting similarly positioned leaves only in the several groups, all the leaves in each group being contacted by actuators, a power-driven member reciprocating adjacent said actuators, and a finger pivotally mounted on each actuator and adapted for movement to engage said member, whereby to cause said actuator to reciprocate with said member and to move the leaves contacted by the former.

35. A sorting machine comprising a multiplicity of separator leaves arranged in parallelism and divided into a plurality of groups, a plurality of actuators mounted for movement in a plane adjacent all of the groups, each actuator contacting similarly positioned leaves only in the several groups, all the leaves in each group being contacted by actuators, a power-driven member reciprocating adjacent said actuators, and a finger pivotally mounted on each actuator and adapted for movement to engage said member, whereby to cause said actuator to reciprocate with said member and to move the leaves contacted by the former, and means carried above each of the fingers and indicating the classification of its associated actuator.

36. A sorting machine comprising a multiplicity of separator leaves arranged in parallelism and divided into a plurality of groups, a plurality of actuators mounted for movement in a plane adjacent all of the groups, each actuator contacting similarly positioned leaves only in the several groups, all the leaves in each group being contacted by actuators, a power-driven member reciprocating adjacent said actuators, and a finger pivotally mounted on each actuator and adapted for movement to engage said member, whereby to cause said actuator to reciprocate with said member and to move the leaves contacted by the former, and means tending at all times to restore said finger to normal position, out of engagement with said member.

37. A sorting machine comprising a multiplicity of separator leaves arranged in parallelism and divided into a plurality of groups, a plurality of actuators mounted for movement in a plane adjacent all of the groups, each actuator contacting similarly positioned leaves only in the several groups, all the leaves in each group being contacted by actuators, a power-driven member reciprocating adjacent said actuators, a finger pivotally mounted on each actuator and adapted for movement to engage said member, whereby to cause said actuator to reciprocate with said member and to move the leaves contacted by the former, and means limiting the movement of said finger towards said actuator.

38. A sorting machine comprising a multiplicity of separator leaves arranged in parallelism and divided into a plurality of groups, a plurality of actuators mounted for movement in a plane adjacent all of the groups, each actuator contacting similarly positioned leaves only in the several groups, all the leaves in each group being contacted by actuators, a power-driven member reciprocating adjacent said actuators, a finger pivotally mounted on each actuator and adapted for movement to engage said member, whereby to cause said actuator to reciprocate with said member and to move the leaves contacted by the former, and means tending at all times to restore said finger to normal position out of engagement with said member, said means comprising a resilient member positioned between the actuator and said finger.

39. A sorting machine comprising a frame, a plurality of movably mounted leaves arranged in groups and extending laterally across the frame, a projection so positioned on each leaf as to form a series of staggered projections across the frame, and a series of movable actuators extending longitudinally across the frame, each actuator carrying abutments in contact with the projections of correspondingly positioned leaves only of the several groups, and powered means for moving said actuators.

40. A sorting machine comprising a frame, a plurality of movably mounted leaves arranged in groups and extending laterally across the frame, a series of actuators carried by the frame and extending transversely over the leaves, abutments on the actuators engaging correspondingly positioned leaves only in the several groups, and powered means for reciprocating each actuator.

41. A sorting machine comprising a frame, a plurality of movably mounted leaves arranged in groups and extending laterally across the frame, a series of actuators carried by the frame and extending transversely over the leaves, abutments on the actuators engaging correspondingly positioned leaves only in the several groups, and powered means for reciprocating each actuator and for thereafter restoring it to its normal position.

42. A sorting machine comprising a frame, a plurality of movably mounted leaves arranged in groups and extending

laterally across the frame, a series of actuators carried by the frame and extending transversely over the leaves, each actuator being provided with means engaging correspondingly positioned leaves of the several groups, a powered member reciprocable adjacent the actuators, and means for selectively engaging each actuator with said member.

43. A sorting machine comprising a frame, a plurality of movably mounted leaves arranged in groups and extending laterally across the frame, a series of actuators carried by the frame and extending transversely over the leaves, each actuator being provided with means engaging correspondingly positioned leaves only of the several groups, a powered member reciprocable adjacent the actuators, and means for selectively engaging each actuator with said member, said means comprising a depressible finger pivoted to the actuator and movable into the plane of reciprocation of said member.

44. A sorting machine comprising a frame, a plurality of movably mounted leaves arranged in groups and extending laterally across the frame, a series of actuators carried by the frame, and extending transversely over the leaves, each actuator being provided with means engaging correspondingly positioned leaves of the several groups, a powered member reciprocable adjacent the actuators, means for selectively engaging each actuator with said member, said means comprising a depressible finger pivoted to the actuator and movable into the plane of reciprocation of said member, and a key mounted above said finger and upon a stem which is adapted, under pressure upon the key, to depress the finger.

45. A sorting machine comprising a frame, a plurality of movably mounted leaves arranged in groups and extending laterally across the frame, a series of actuators carried by the frame, and extending transversely over the leaves, each actuator being provided with means engaging correspondingly positioned leaves of the several groups, a powered member reciprocable adjacent the actuators, means for selectively engaging each actuator with said member, said means comprising a depressible finger pivoted to the actuator and movable into the plane of reciprocation of said member, a key mounted above said finger and upon a stem which is adapted, under pressure upon the key, to depress the finger, and means for automatically restoring the key to normal position, out of engagement with said member.

46. A sorting machine comprising a frame, a plurality of movably mounted leaves arranged in groups and extending laterally across the frame, a series of actuators carried by the frame and extending transversely over the leaves, each actuator being provided with means engaging correspondingly positioned leaves of the several groups, a powered member reciprocable adjacent the actuators, and means for selectively engaging each actuator with said member, said member being provided with means for restoring said actuator to normal position.

47. A sorting machine comprising a frame, a plurality of movably mounted leaves arranged in groups and extending laterally across the frame, a series of actuators carried by the frame and extending transversely over the leaves, each actuator being provided with means engaging correspondingly positioned leaves of the several groups, a powered member reciprocable adjacent the actuators, and means for selectively engaging each actuator with said member, said member being provided with means for restoring said actuator to normal position, and means carried by the frame for restoring said leaves to normal position.

48. A sorting machine provided with a plurality of pivotally mounted separator elements, a plurality of movable actuators associated with said elements, each element being positioned for contact by some one actuator, upon movement of the latter, whereby to provide a space between adjacent elements, powered means movable into engagement with and adapted to move any actuator from a normal position, and to thereafter return said actuator to said position, and means for returning the shifted element to normal position.

49. A sorting machine provided with a plurality of pivotally mounted separator elements, a plurality of movable actuators associated with said elements, each element being positioned for contact by some one actuator, upon movement of the latter, whereby to provide a space between adjacent elements, powered means movable into engagement with and adapted to move any actuator to said position, and means for returning the shifted element to normal position, comprising a resilient member constantly resisting movement of said element from normal position.

50. A sorting machine comprising a frame, a plurality of separator leaves arranged in parallelism and extending transversely of the frame, an upstanding projection carried by each leaf and in staggered relation with respect to the projection on the adjacent leaf, a plurality of actuator bars positioned in parallelism and extending over said projections, each actuator being provided with abutments in contact with the projections of certain leaves only, a power-driven member reciprocating adjacent the actuators, and means for selectively

engaging any actuator with said member.

51. A sorting machine comprising a frame, a plurality of movable separator leaves carried by the frame, a less number of reciprocable actuators so contacting the leaves that any leaf may be moved by some one of said actuators, in combination with a power-driven member carried by the frame and reciprocating in a plane parallel to the plane of reciprocation of said actuators, and means for separately engaging any single actuator with said member, whereby to shift from normal position the leaves contacted by said actuator.

52. A sorting machine comprising a frame, a plurality of movable separator leaves carried by the frame, a less number of reciprocable actuators so contacting the leaves that any leaf may be moved by some one of said actuators, in combination with a power-driven member carried by the frame and reciprocating in a plane parallel to the plane of reciprocation of said actuators, and means for separately engaging any single actuator with said member, whereby to shift from normal position the leaves contacted by said actuator, said means comprising a finger pivotally mounted on each actuator and depressible into the plane of reciprocation of said member.

53. A sorting machine comprising a frame, a plurality of movable separator leaves carried by the frame, a less number of reciprocable actuators so contacting the leaves that any leaf may be moved by some one of said actuators, in combination with a power-driven member carried by the frame and reciprocating in a plane parallel to the plane of reciprocation of said actuators, means for separately engaging any single actuator with said member, whereby to shift from normal position the leaves contacted by said actuator, said means comprising a finger pivotally mounted on each actuator and depressible into the plane of reciprocation of said member, and means classifying each finger with respect to the leaves which are contacted by the actuator associated with said finger.

54. A sorting machine comprising a frame, a plurality of movable separator leaves carried by the frame, a less number of reciprocable actuators so contacting the leaves that any leaf may be moved by some one of said actuators, in combination with a power-driven member carried by the frame and reciprocating in a plane parallel to the plane of reciprocation of said actuators, means for separately engaging any single actuator with said member, whereby to shift from normal position the leaves contacted by said actuator, and means movable with said member for restoring said actuator to normal position.

55. A sorting machine comprising a frame, a plurality of movable separator leaves carried by the frame, a less number of reciprocable actuators so contacting the leaves that any leaf may be moved by some one of said actuators, in combination with a power-driven member carried by the frame and reciprocating in a plane parallel to the plane of reciprocation of said actuators, means for separately engaging any single actuator with said member, whereby to shift from normal position the leaves contacted by said actuator, and means carried by the frame for restoring said leaves to normal position.

56. A sorting machine comprising a frame, a plurality of movably mounted leaves arranged in groups and extending laterally across the frame, a series of actuators carried by the frame, and extending transversely over the leaves, each actuator being provided with means engaging correspondingly positioned leaves of each group, a powered member reciprocable adjacent the actuators, means for selectively engaging each actuator with said member, said means comprising a depressible finger pivoted to the actuator and movable into the plane of reciprocation of said member, a key mounted above said finger and upon a stem which is adapted, under pressure upon the key, to depress the finger, and an anti-friction element carried by the lower end of said stem and adapted to contact said finger.

In testimony whereof I affix my signature.

GEORGE W. COX, JR.