

Nov. 18, 1924.

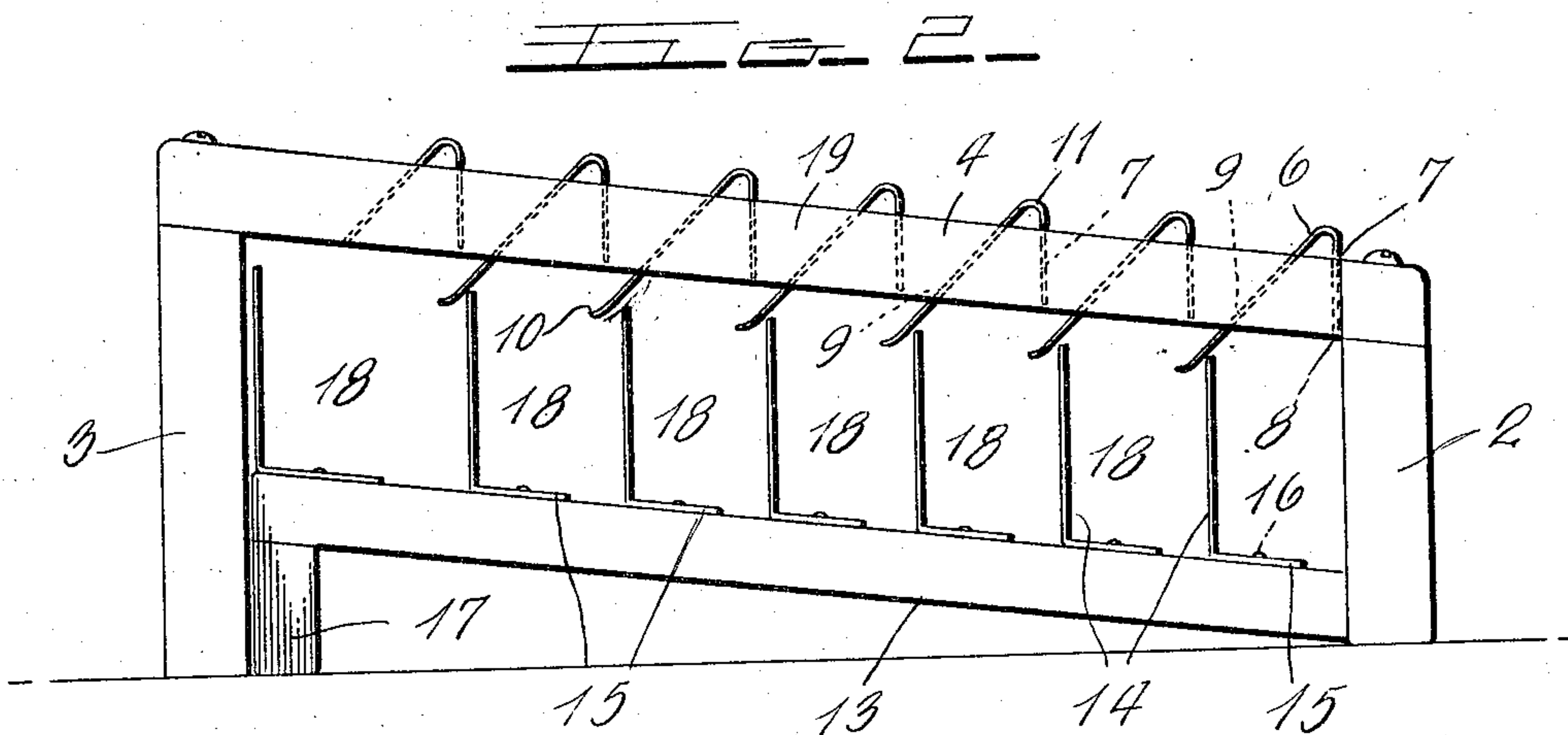
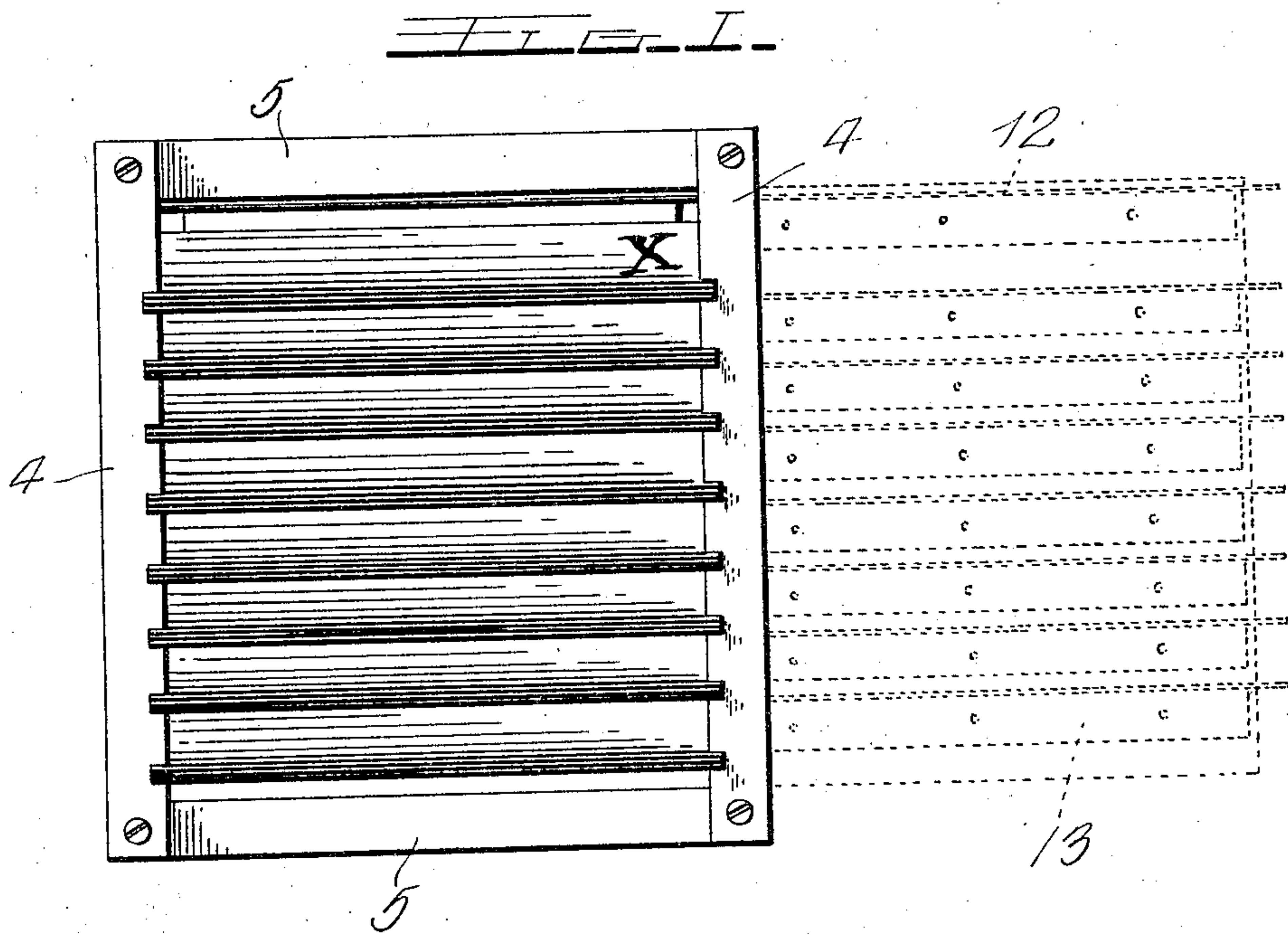
1,515,659

G. W. COX, JR

SORTING DEVICE

Filed Feb. 3 1921

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

FIG. 3.

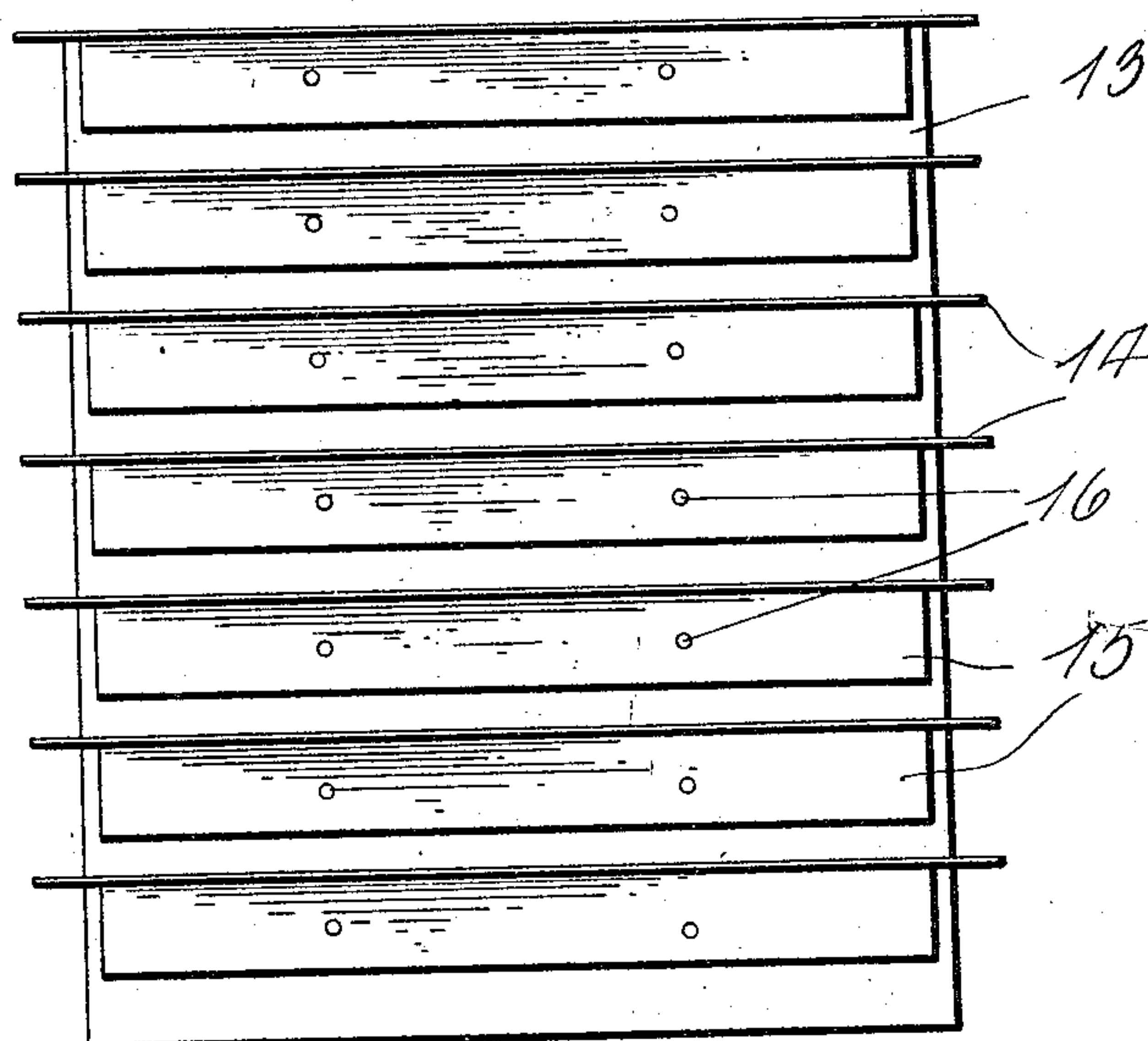
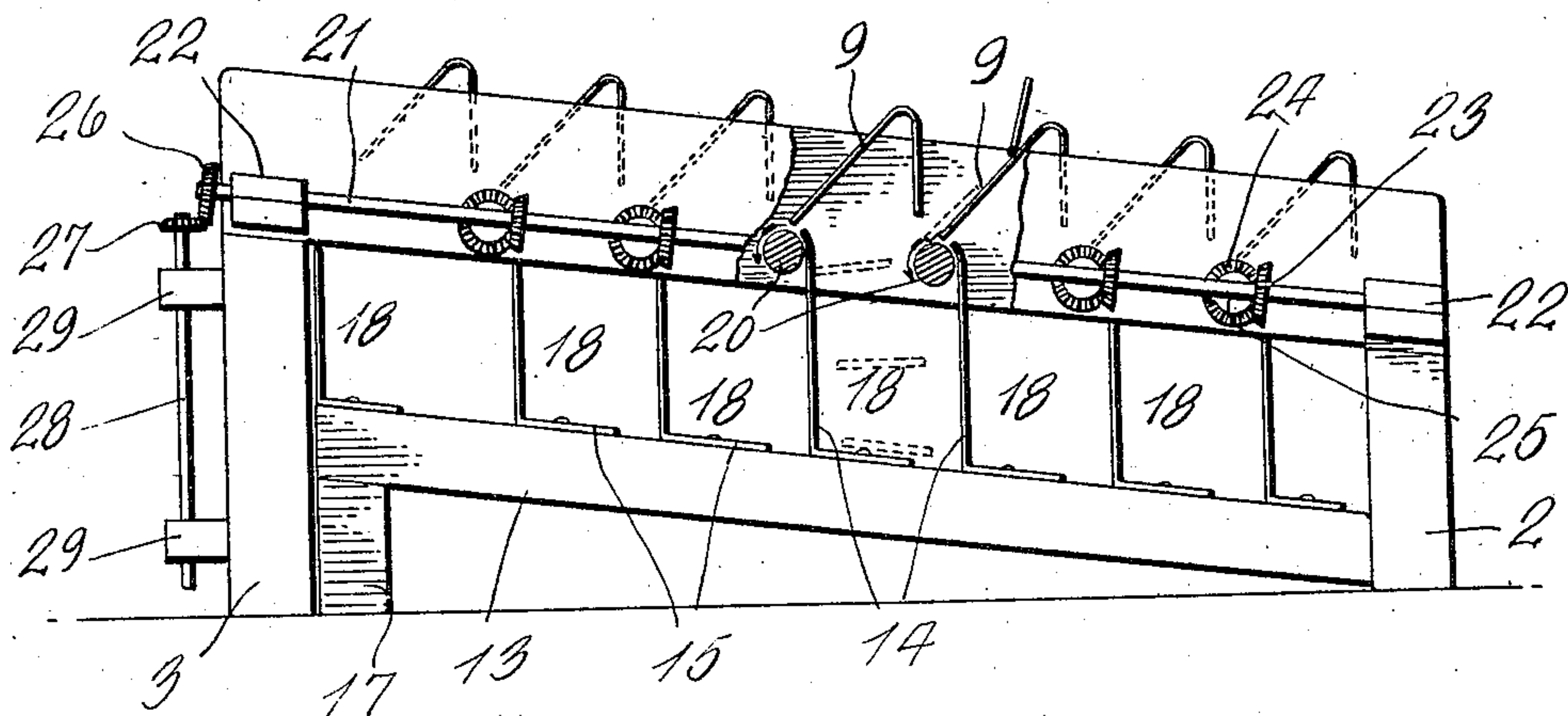


FIG. 4.



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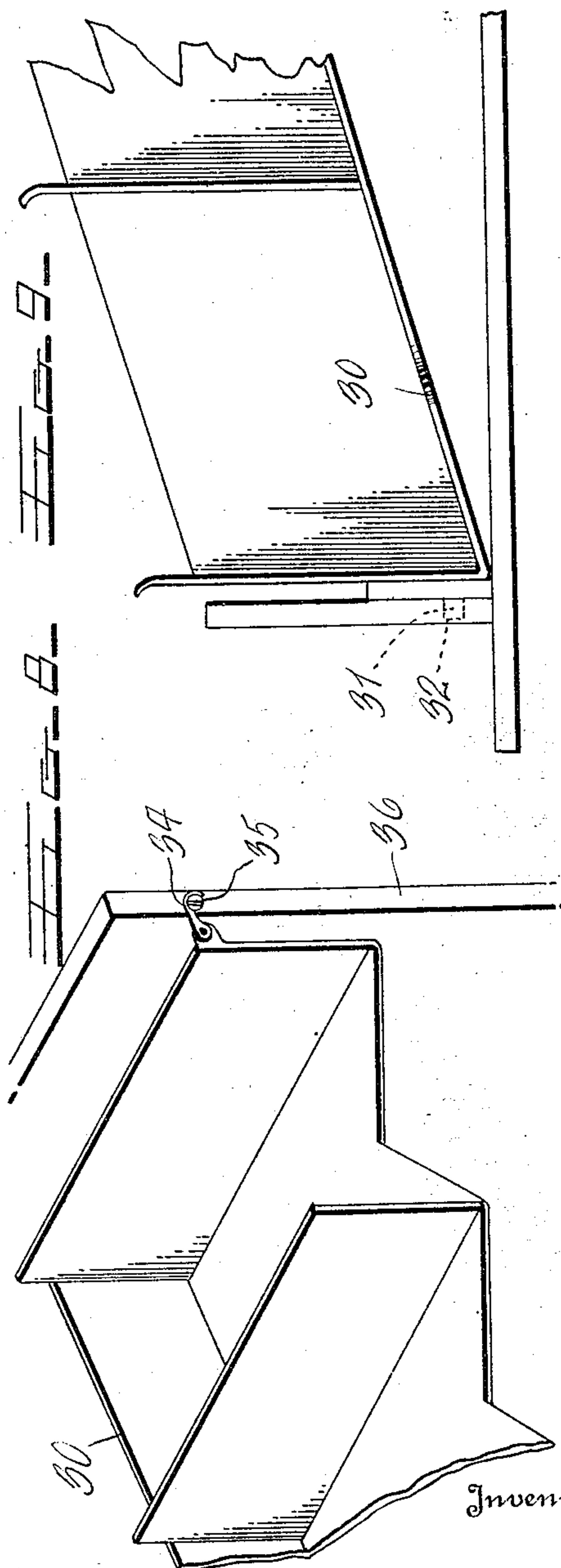
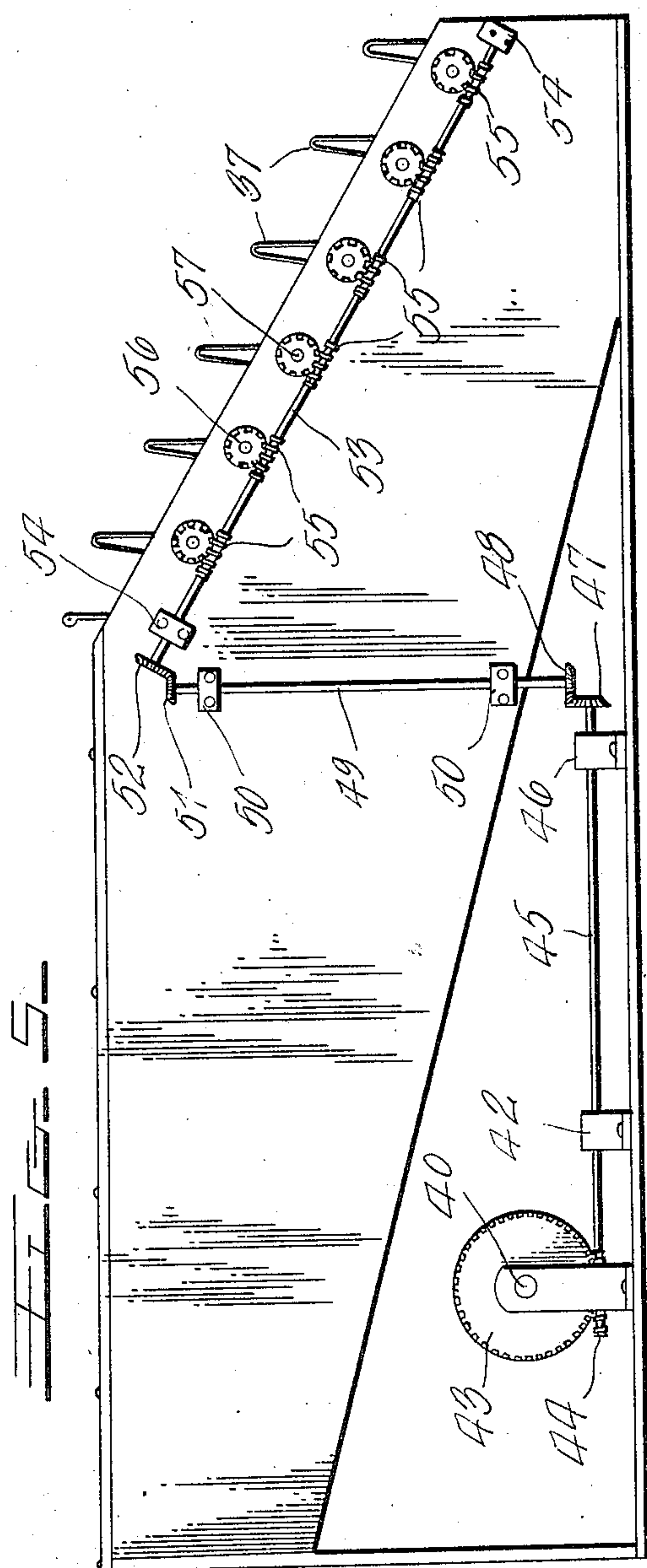
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4 Sheets-Sheet 5



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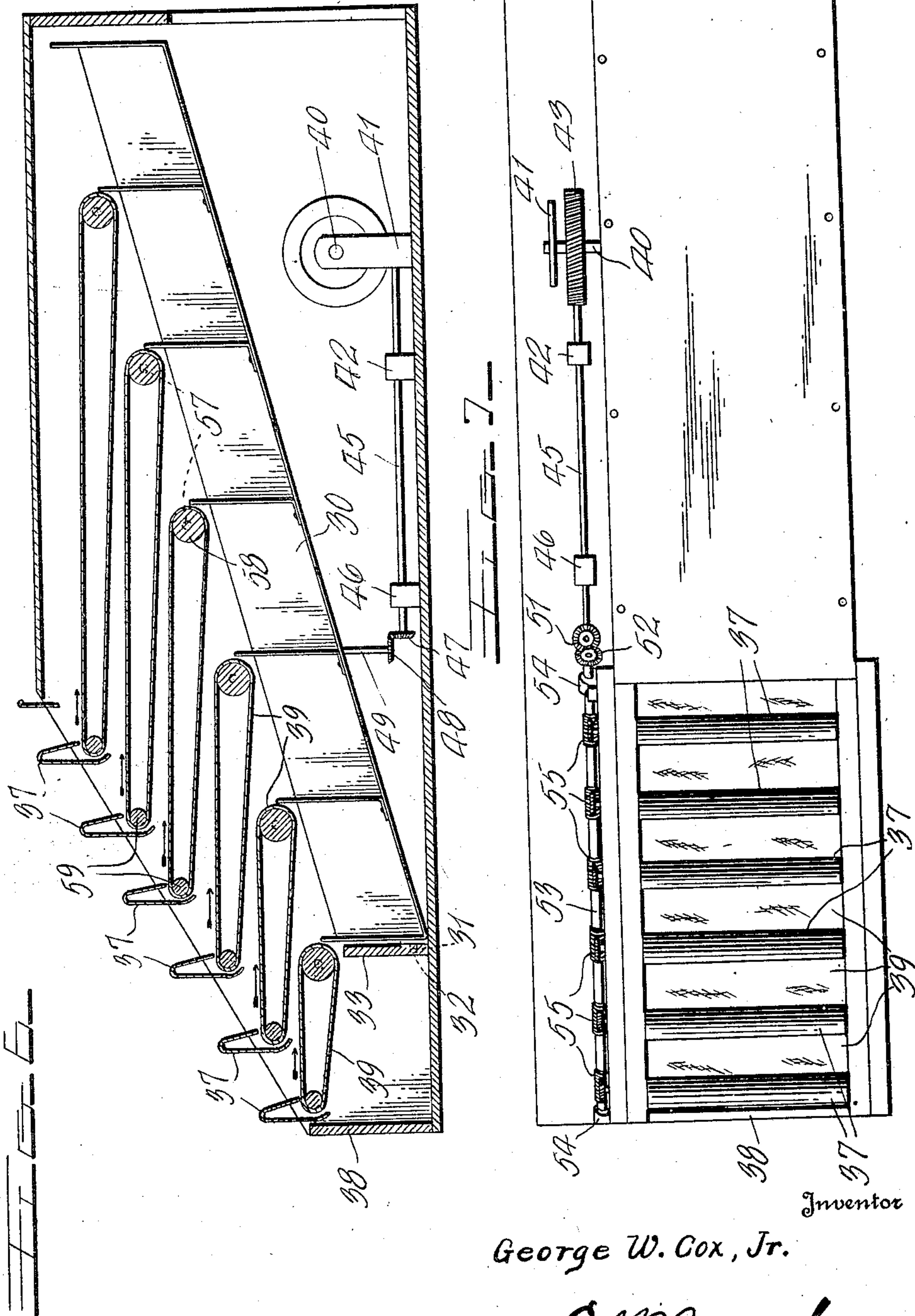
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SORTING DEVICE

Filed Feb. 3 1921

4 Sheets-Sheet 4



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Patented Nov. 18, 1924.

1,515,659

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 DEVICE.

Application filed February 3, 1921. Serial No. 442,068.

To all whom it may concern:

Be it known that GEORGE W. Cox, Jr., a citizen of the United States, residing at Washington, in the District of Columbia, has invented certain new and useful Improvements in Sorting Devices, of which the following is a specification.

This invention pertains to means for sorting articles such as checks, sales slips, vouchers, coupons, car mileage slips, money orders, factory job cards, paper money, bonds, letters, bank deposit slips, and analogous articles, and it has for its objects, among others, to provide a simple and efficient device for this purpose by means of which the checks, vouchers, slips, cards or other articles, may be rapidly and accurately sorted by their serial numbers, letters, symbols or other indicia or designating characters.

It is a well known fact that in many offices, for instance, where large numbers of checks, sales slips, coupons, certificates, or other papers designated by serial number, or alphabetically, have to be sorted and arranged serially, or alphabetically, much time and labor are required in this sorting. For instance, in many offices of the United States Government, in offices of State governments, in many of the large department stores, and in many large offices and factories, thousands upon thousands and hundreds of thousands of such papers have of necessity to be sorted and arranged alphabetically or in accordance with their serial numbers, or into classes. In department stores and other places the sales slips and papers of like character are not only designated by a serial number or other indicating marks, but in many instances are also designated by class or book number, and in such cases it is necessary to not only sort the sales slips or other papers according to their serial number or their other indicating character, but the sales slips or other papers of each separate class or order. For instance, books numbers 1, 2 and 3, etc., have to be separated in groups, that is, all the sales slips or other papers of book 1, for instance, must be sorted by themselves, and all the sales slips or other papers of, say, book 2 sorted by themselves, and so on.

My present invention has for its objects, among others, broadly, to provide a novel form of device by which these various sortings may be quickly and accurately accom-

plished, all by one and the same device, and one and the same operator, the construction being such as not to require skilled labor in its manipulation.

The present invention has for a further object to provide a device of this general character which shall be simple in its nature, composed of few parts, and those readily assembled and not liable to derangement or injury and readily replaced should occasion require.

The device forming the subject-matter of this application will be particularly well adapted for use in banks, railroad offices, department stores, in the offices of auditors, and in fact anywhere and everywhere that there is occasion to sort and classify papers of this general character.

The present invention contemplates various forms of devices for accomplishing the desired end, which may be operated in various ways, dependent upon the conditions under which it is to be used, and it is to be understood that the device may be equipped for operation on a large or small scale to accommodate the various requirements and the necessities of the office in which it is to be used. It is also to be understood that while in the present instance I have shown a device designed for use for accomplishing the above ends, the same principle, and the mechanism generically considered, may be employed for carrying forward the invention, as will be made clear as the description proceeds.

My present device combines advantages of being rapid, accurate, labor saving, and also economical in the space required.

In some instances it may be desirable to sort all of the vouchers, cards, certificates, sales slips, or other papers or articles, by themselves, from the others, without arranging such slips or the like according to serial number, or it may be desired to sort the papers into groups by letters or combination of letters. This device is equally well adapted for all such purposes.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be particularly pointed out in the appended claims.

The generic principles of the invention are capable of embodiment in a variety of forms some only of which are herein illustrated, those herein shown being what I at

the present time consider preferable. It will be evident, however, that while the forms herein disclosed and now to be described are what I at the present time consider preferable and have found efficient from practice, the same are subject to changes, variations, and modifications in detail, proportion of parts, relative arrangement, etc., and I therefore do not wish to be restricted in the appended claims to the particular construction or arrangement of parts, etc., as herein disclosed, but reserve the right to make such changes, variations, and modifications as come properly within the scope of the protection prayed.

Such changes I consider as coming fully within the scope of my present invention, provided the generic principle of the same is employed.

My present invention, in preferred forms, is clearly illustrated in the accompanying drawings, which, with the numerals of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a plan view of a simplified form of device constructed in accordance with my present invention, with the tray or container shown removed in dotted lines.

Figure 2 is a side elevation with the tray or container in place.

Figure 3 is a top plan view of the tray or container.

Figure 4 is a side elevation with portions broken away and parts in section, showing a modified form of construction.

Figure 5 is a side elevation of still another form of the device.

Figure 6 is a view looking at the opposite side of Figure 5, with parts in section.

Figure 7 is a top plan of Figure 5.

Figure 8 is an enlarged perspective detail with portions broken away, showing one manner of detachably supporting the tray or container in operative position.

Figure 9 is an enlarged perspective detail with portions broken away looking at the opposite end of the tray or container.

Like numerals of reference indicate like parts throughout the several views.

Referring to the drawings, and first calling particular attention to Figures 1, 2 and 3, 1 designates a frame or support of any suitable material comprising end uprights 2 and 3, side members 4, and end members 5. Preferably, though not necessarily, the side members 4 are somewhat inclined from the horizontal, as seen in Figure 2, for convenience in placing the checks or other papers or articles to be arranged and sorted. The size and capacity of the device is unlimited; to increase the capacity it being necessary only to increase the size of the device and the numbers of the compartments now to be described.

The frame or support thus constructed is

provided with a multiplicity of transverse members which are adapted to serve several important functions. As all of these members are substantially alike a detailed description of one will suffice for all. They may be constructed and fixed in position in numerous ways, that shown herein being but one of the many and one which in practice I have found very satisfactory. 6 designates one of the members which is formed preferably of metal having a vertical wall or portion 7 fitted in kerfs in the side members 4 as seen in Figure 2, being there held by frictional engagement of members with walls of the kerfs or in any other convenient way. Each member 6 has a downwardly and rearwardly inclined portion 9, see Figure 2, the lower end of which extends beneath the bottom edge of the side members 4 for a purpose which will soon be made clear, and this free edge is preferably slightly turned rearward as seen at 10 for a purpose which will be explained later on. The angle or junction 11 of the vertical member 7 and the inclined portion 9 is preferably rounded, as seen in Figure 2, so as to avoid sharp corners and prevent injury to the hands of the operator and also to provide increased surface upon which may be applied paint or numbers or other indicia to aid the eye of the operator in dropping the checks or other papers into the device. As seen in Figure 2 the free end of the inclined member 9 of each member 6 extends to or beyond the vertical line of the next adjacent vertical portion 7 for a purpose which will be set forth later.

In order to receive the checks or other papers or articles as they are placed in the device I provide a tray or container adapted to be supported beneath the members 6, as seen in Figure 2. This tray or container 12 is bodily removable in order that when the one tray has been filled with papers it can be readily removed with its contained papers and an empty tray or container substituted therefor. This tray or container comprises a baseboard 13 provided with a multiplicity of vertical members 14 which may be fixed to the base 13 in any suitable way, in the present instance the members 14 being shown as provided with lateral flanges 15 secured to the base 13 by screws or the like 16. If the support or frame be inclined as seen in Figure 2 the base 13 of the container or tray should by preference be disposed in a plane parallel with the side members 4 of the frame or support. This tray or container may be thus supported in any suitable manner, as by suitable blocks or strip or any suitable support 17 at the rear end of the device, as seen in Figure 2.

These vertical members 14, the number of which will vary according to the number of the members 6 in the frame or support 1, extend to a point above and in front of the

lower edges of the inclined portions 9, and in a vertical plane in front of the vertical members 7 of the member 6, or in other words, the rear end of each inclined member 9 extends rearward beyond and to a point below the upper edge of its cooperating or adjacent member 14. The opposite ends of the compartments 18 thus formed are preferably open to facilitate removal of the checks or cards therefrom although it is evident that one end may be closed or if required both ends may be closed with one or more of the closures movably mounted so as to present ready access to the interior of the compartment.

The use of the device is as follows: The members 6, particularly for a beginner in the use of the device, are preferably provided each with some designation such as 1, 2, 3, 4, etc., *a*, *b*, *c*, etc., or painted different colors, or marked in any other way, so as to readily distinguish one from another, and where the device is to be used for short papers, such as bond coupons, etc., each space 19 between two adjacent members 6 may serve for two or more different entrances to each compartment 18. For instance, the first space 19 may serve to receive on the right papers where the dominating digit is 1, and on the left the cipher or nought; the next space 19 in order may be used to receive papers where dominating digits are 2 and 3; and so on.

Now, assuming this to be the case and the tray or container in position as seen in Figure 2, the operator takes the coupons, checks, cards, or other papers, in his hand and drops them one at a time into the appropriate spaces 19. For instance, if the first paper bears a digit 3 at the right hand side and supposing the device to be of the character just described wherein each space serves for two or more digits, the operator drops this card or other paper into the appropriate space 19 designed to receive papers with such right hand digits, and then if the next paper has the right hand digit 8 it is dropped into the space 19 designed to receive such papers, and so on until all the papers have been dropped into the appropriate spaces 19. After this has been done the papers are gathered out of the compartments, the tray or container being removed or not as may be preferred and the piles of papers in the various compartments are collected in their proper numerical order. These papers are then passed through the device again taking the next digit on the left as the dominating digit, and the same mode of procedure gone through with. The papers are again removed from their compartments, being collected in their numerical order, and then they go through the same steps until they have been sorted according to the last digit on the left. However, if

preferred the papers may be sorted by taking the digits from left to right instead of from right to left. After the papers have passed through these various steps they are collected from their various compartments in the order of the compartments, when they will be found to be in proper numerical order throughout. When, however, during the process of sorting, say the operator is throwing or dropping papers by the second digit from the right, and the next paper in order has but one digit (the right hand digit having already been sorted) this paper is dropped into one of the compartments which may have a designation, for instance "X," see Figure 1. Having gone through the second sort, that is having sorted all papers by the second digit from the right, upon the next sort, that is according to the third digit from the right, if the operator comes to a paper which has but two digits (the papers with two digits on the right having been sorted) he drops this into the compartment "X"; and this mode of procedure is followed throughout the entire sorting operation. After all of the papers have been thus sorted those which have been dropped into compartment 18 corresponding to the space "X" will be found in perfect numerical order. After the papers have all been sorted according to the last digit to the left it is not necessary to do anything further except to gather up or collect the papers from the various compartments, placing them in the order of the compartments and putting them behind those which have been placed in the compartment 18 corresponding to the space "X" as above described, when all papers throughout will be found to be arranged in numerical order.

In sorting the papers the operator takes a bunch in his hand holding them substantially vertically and then slides them off one at a time dropping each paper into its appropriate space. While it is preferable that the papers be dropped carefully so that the bottom edge thereof will be substantially parallel with the forward edge of the inclined member 6 this is not necessary because should the papers fall otherwise, for instance, so as to strike the inclined member at one corner of the paper, this impact of the corner will cause the paper to straighten itself out so as to assume such parallel relation before it passes over the rear edge of the inclined member. This straightening process is further completed by similar contact of the paper with the next rearward wall 14 of the compartment 18 into which said paper falls. It will readily be seen that the papers being held in a more or less vertical position with the numbers thereon facing the operator, when they fall upon the inclined member 9 and continue their passage therefrom into their respective com-

partments the papers will fall with the number side down, which is preferable, but this order may be reversed.

Especial importance is attached to the vertical member 7 and its location relative to the inclined member 9, for its presence ensures the straightening of the paper before it continues on its journey. Were this member absent unless a paper were started straight it would continue toward the tray and be deposited in the tray in a crisscross manner. In other words particular handling of the papers is not necessary to ensure their proper deposit in the receptacles. For instance, in dropping a paper in my device, while ordinarily it will be dropped substantially vertical so that its lower edge first strikes upon the inclined member 9 and the lower edge of the paper coming in contact with the said inclined member the paper will slide down the latter and during its course will fall face-downward upon such inclined member and slide off the same, straight, so as to fall flat-wise into the receptacle 18, should the paper or check be thrown carelessly or promiscuously into the device so that its lower edge strikes the vertical member 7 this will serve to throw the check downward flat-wise and straight upon the inclined member 9 before the paper passes over the terminal 10 thereof and thus cause it to be deposited in the receptacle correctly, the same as if it had been inserted carefully, as previously described. It will thus be seen that proper deposit of the papers or checks in the receptacles 18 is assured irrespective of whether they are dropped carefully and in a prescribed manner, thus effecting a great saving of time and compensating the carelessness of an experienced operator or the lack of skill of an inexperienced operator.

By extending the rear edge of the inclined member 9 below the lower face of the side bars 4 and below and to the rearward of the upper edge of the partition or member 14 I make sure that the paper deposited in any one space 19 goes into its appropriate compartment. Furthermore, this also facilitates the insertion and removal of the tray or container, bringing each member 14 thereof into proper position relative to the member 6.

In order to "flip" the paper rearward as it leaves the inclined member 9 the curved or bent terminal 10 is provided in the form shown in Figure 2, which end serves to ensure that the paper as it leaves the inclined member shall assume practically a horizontal position which position it maintains until it reaches the bottom of its compartment.

In order to accomplish this same purpose when larger or heavier papers are

being sorted I provide in lieu of the bent or curved terminal of the inclined member a roller 20, there being such rollers disposed at a point below the terminal of the inclined member 9 as seen in Figure 4, this roller being arranged in such position as to be engaged by the lower edge of the paper as it falls from the inclined member and as this roller is caused to revolve in the direction of the arrow seen in Figure 4 the paper will be "flipped" to the rear so as to fall in horizontal position.

Motion may be imparted to these rollers in any suitable well known way. In Figure 4 I have shown by way of example only a shaft 21, mounted in suitable bearings 22, and provided with a plurality of beveled gears 23 each of which meshes with a beveled gear 24 on the shaft 25 of a roller, so that the rollers are moved in unison. Motion may be imparted to this shaft in any well known way. In the present instance I have shown, merely by way of example, a beveled gear 26 on said shaft meshing with a beveled gear 27 on a shaft 28 mounted in suitable bearings 29 and deriving its motion from any suitable source of power, not shown. The operation is substantially the same as in the form previously described it being understood that the rollers take the place of the bent or inclined terminals 10 of the inclined members 9.

It is evident, however, that both the bent or curved terminals 10 and the rollers 20 may be omitted without departing from the spirit of the invention or sacrificing any of its advantages because in practice the papers generally fall flat into their compartments.

If it be necessary in some cases to employ means to move the papers toward the rear by positive means I may employ rollers in pairs between each pair of which the paper will be caused to pass and thus the rollers would serve to pull the paper along and aid it in its movement, but under ordinary conditions such provision will not be found necessary.

In practice an operator soon becomes so efficient as not to have to depend upon the designations on the various members 6, but manipulation of the papers becomes similar to that of a typewriter operator employing the "touch" system.

One of the objects of this invention is to provide as small an area as possible at the point where the dropping of the papers is made. The above described device fully meets this requirement in small articles. Where large articles are to be sorted and deposited in receptacles it is necessary either to increase the size of the area at the point where the papers are dropped, or if maintaining a small area at this point, to convey the articles to a distant point where they can be properly accumulated in quantity. Such

a device is shown in Figures 5 to 9, inclusive. In this latter form the same essential elements are employed, the tray or container 30 having compartments to serve with each of the sorting spaces being designed to be removed when desired and when in position held in any suitable way. For instance, from Figures 6, 8 and 9 it will be seen that at its lower end, the tray being held in inclined position, it is held by means of a lug or the like 31 engaged in a recess or the like 32 in the upright member 33 of the device while its upper end is shown as supported by means of a hook or the like 34 carried by the upper end of the tray or container and engaged over a pin or the like 35 held in the end wall 36 of the device. Disengagement of this hook from its pin permits of the movement of the tray or container so as to disengage the hook 31 from the recess 32 so that the tray when full can be removed from its place and an empty one quickly and easily placed in proper position.

In this form the uprights 37 are similar in purpose to the members 6 in the form seen in Figures 2 and 4, being fixed to the member 38 of the device in any suitable manner. Instead, however, of falling directly into the compartments from these members 37 over which they are fed the papers are dropped to endless belts 39, one for each space and member 37, the said belts adapted to move in the direction of the arrows seen in Figure 6 and by means of which belts the papers are carried to their appropriate compartments of the tray or container. In the device shown as each succeeding belt has to carry its papers a corresponding further distance the belts are gradually increased in length from the front to the rear of the device, as will be evident upon reference to Figure 6.

Motion may be imparted to these belts in any well known way. In Figures 5, 6 and 7 I have illustrated, by way of example only, one efficient form of mechanism for this purpose, wherein 40 is a shaft mounted in a suitable bearing 41, the said shaft carrying a pulley 42, designed to receive power by belt or otherwise from a motor or any other suitable source of power, and on the shaft 40 is a worm wheel 43 which in turn meshes with a worm 44 on a longitudinal shaft 45 mounted in suitable bearings 46 and carrying a beveled pinion 47 meshing with a beveled pinion 48 on an upright shaft 49 mounted in suitable bearings 50, see Figure 5, and this shaft 49 carries at its upper end a beveled pinion 51 meshing with a beveled pinion 52 on a shaft 53 mounted in suitable bearings 54, and the shaft 53 carries a multiplicity of worms 55 each meshing with a worm wheel 56 on a shaft 57 of one of the rollers 58 of each belt; 59, see Figure 6, being the other roller over which the belt passes. By these

means when the motor is started or power is applied to the shaft 40 by any other means all of the rollers and their belts will be moved in unison and the belts will serve to take the papers from their point of entry and deliver them into their proper compartments or receptacles in the tray or container. It is evident that in lieu of the form of container herein shown and previously described I may employ other forms of receptacles for the papers. For instance, they may be detachably mounted in position to receive the envelopes or other papers, it being understood that letters or mail matter can be assorted according to location and thus delivered into their appropriate mail pouches.

The papers are delivered to the device and dropped into the appropriate spaces by the operator in exactly the same way as are the papers in the form shown in Figures 1 to 4. It is also evident that the device is not of necessity restricted to the sorting of papers. Any articles which it is desired to assort from a promiscuous pile can be assorted into desired classes.

From the foregoing it will be evident that while I have devised simple and efficient means for accomplishing the end in view the devices hereinbefore disclosed are subject to changes, variations, and modifications in detail, proportionate parts, etc., without departing from the spirit of the invention or sacrificing any of its advantages. I therefore do not intend to restrict myself to the exact constructions herein disclosed but reserve the right to make such changes, variations and modifications as come properly within the scope of the protection prayed.

What is claimed as new is:

1. A device for sorting papers or the like, comprising a series of substantially vertical open topped pockets arranged in horizontal alignment, an inclined guide plate overlying each pocket and provided with a terminal leading into the next adjacent pocket, a deflector wall positioned adjacent and at an angle to the guiding surface of said plate, and means carried by said plate for causing the papers to assume a horizontal position when leaving the latter.

2. A sorting device for papers or the like comprising a supporting frame, a plurality of open-top receptacles extending laterally below the frame and arranged in a row positioned longitudinally thereof, and means for guiding papers into said receptacles, comprising a paper guiding plate which extends over one receptacle and leads into the top of the adjacent receptacle and a paper deflecting element which is located above the lower end of said plate, substantially as and for the purposes set forth.

3. A sorting device for papers or the like comprising a supporting frame, a plurality

of open-top receptacles extending transversely below the frame and arranged in a row extending longitudinally thereof, and a paper deflecting and guiding member fixed to the frame above each receptacle, said member comprising an inclined guide plate extending over one receptacle and leading into the adjacent receptacle, and a substantially vertically disposed deflecting element positioned above the lower end of said plate, substantially as and for the purposes set forth.

4. A sorting device for papers or the like comprising a sorting frame, a plurality of open-top receptacles extending transversely below the frame and arranged in a row extending longitudinally thereof, and a paper deflecting and guiding member fixed to the frame above each receptacle, said member comprising an inclined guide plate extending over one receptacle and leading into the adjacent receptacle, a deflecting element positioned above the lower end of said plate, and means carried by said guide plate

for causing the papers to assume a substantially horizontal position before falling into said receptacle, substantially as and for the purposes set forth.

5. A sorting device for papers or the like comprising a supporting frame, a plurality of open-top receptacles extending transversely below the frame and arranged in a row extending longitudinally thereof, and a paper deflecting and guiding member fixed to the frame above each receptacle, said member comprising an inclined guide plate extending over one receptacle and leading into the adjacent receptacle, a deflecting element positioned above the lower end of said plate, and means carried by said guide plate for causing the papers to assume a substantially horizontal position before falling into said receptacle, said means comprising an upturned lip on the lower end of said guide plate.

In testimony whereof he affixes his signature.

GEORGE W. COX, JR.