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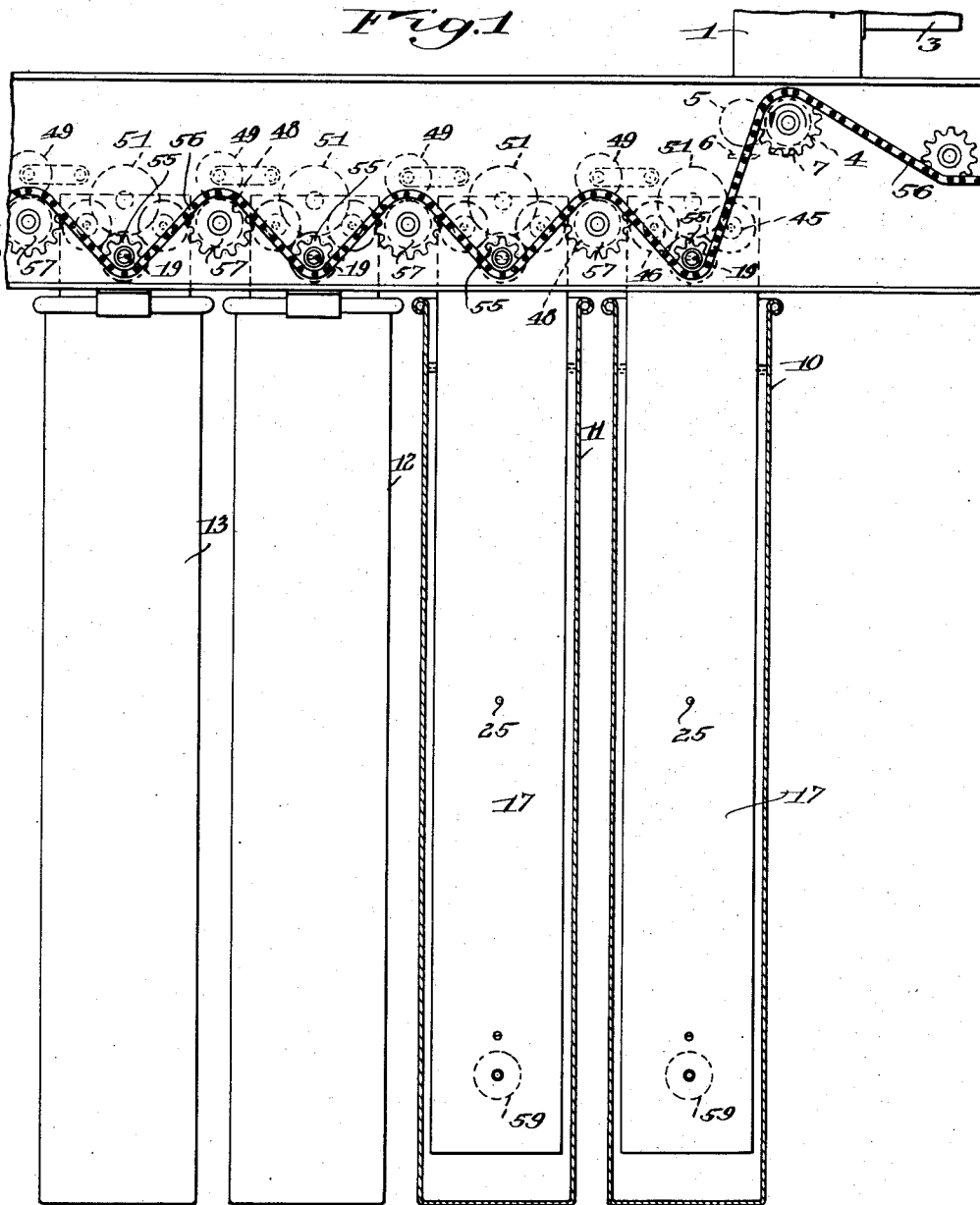
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2,223,767

MACHINE FOR FEEDING PHOTOGRAPHIC PAPER

Filed Dec. 1, 1939

6 Sheets-Sheet 1



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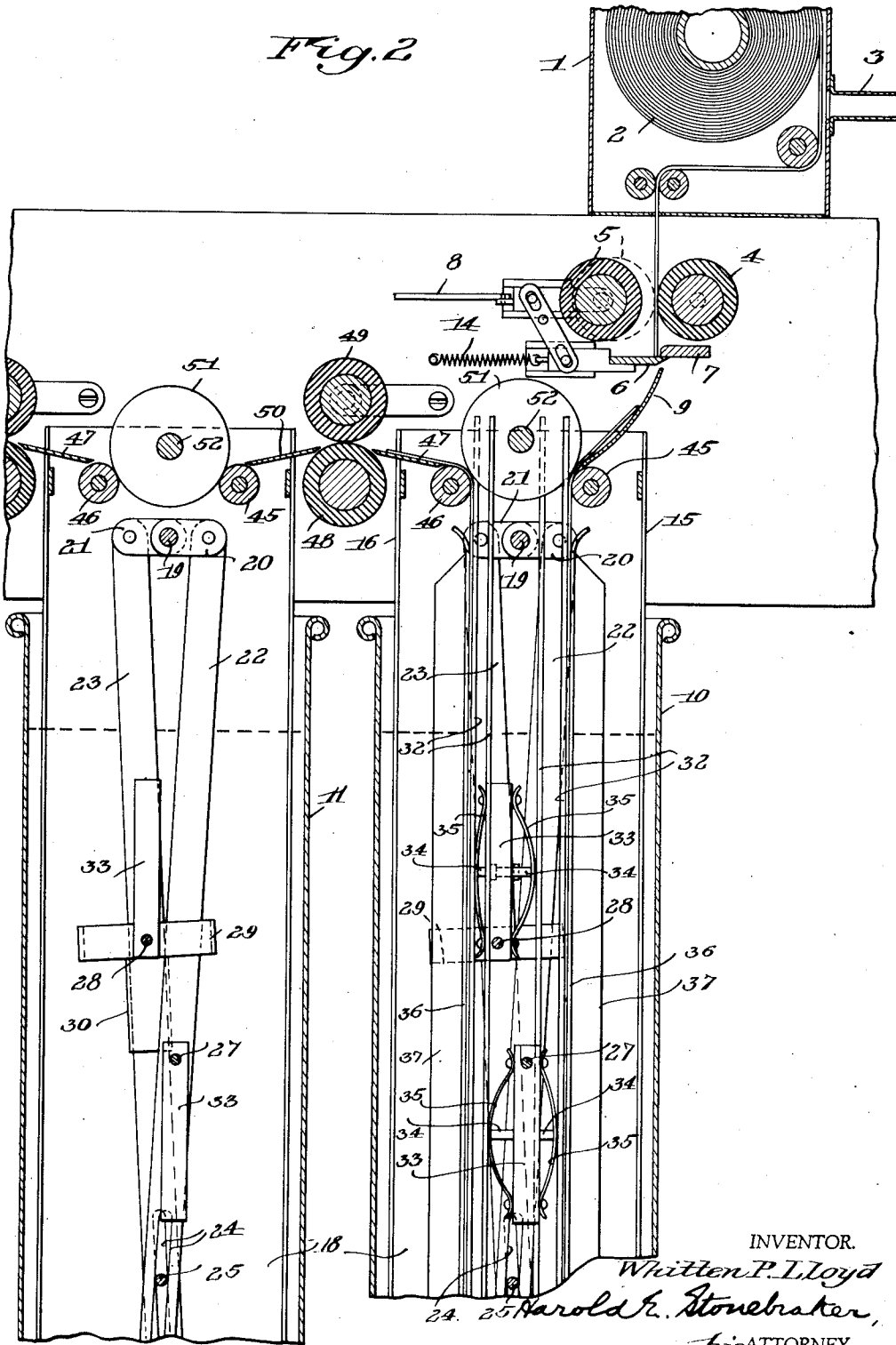
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MACHINE FOR FEEDING PHOTOGRAPHIC PAPER

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6 Sheets-Sheet 2

Fig. 2



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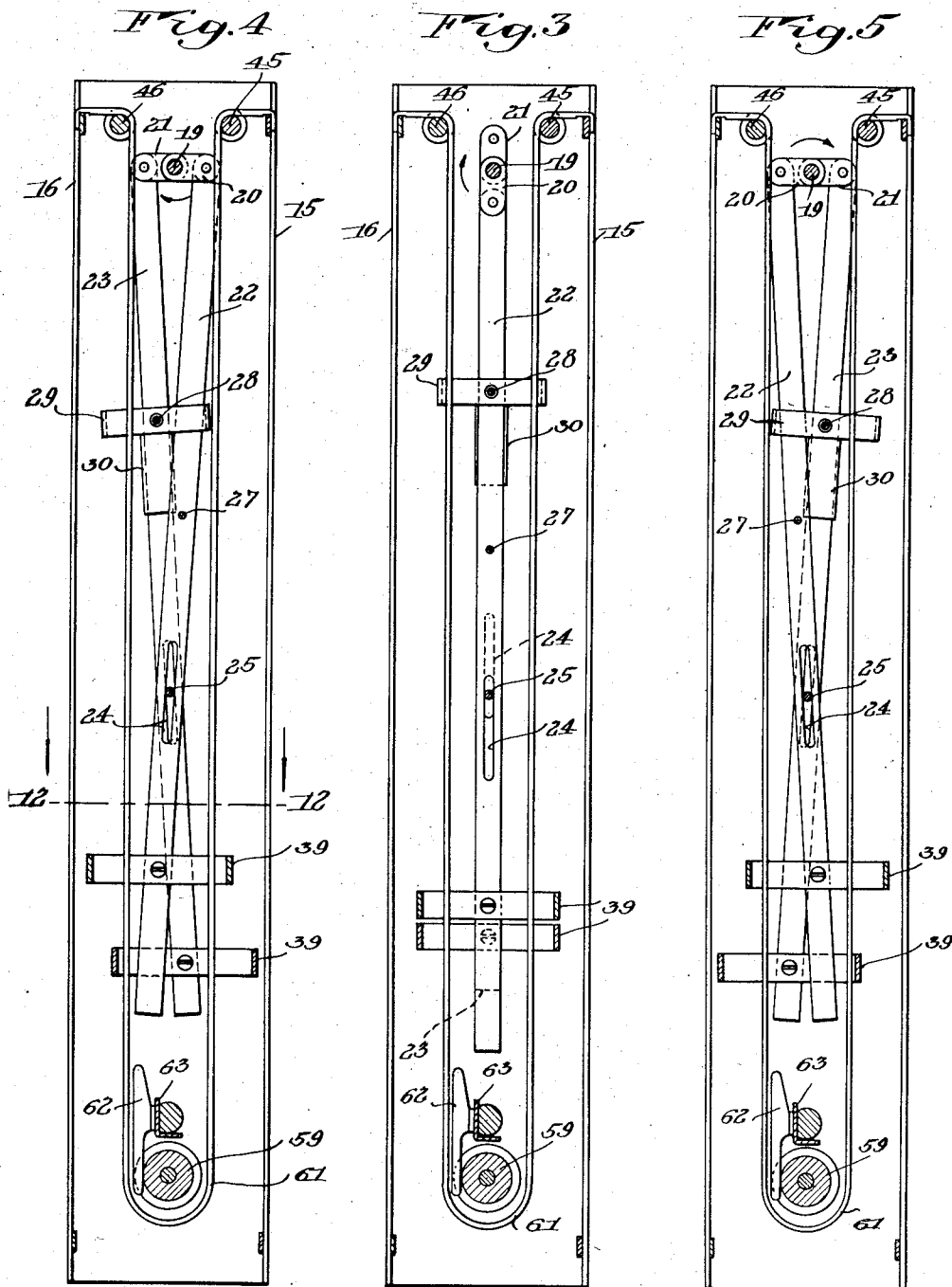
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MACHINE FOR FEEDING PHOTOGRAPHIC PAPER

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6 Sheets-Sheet 3



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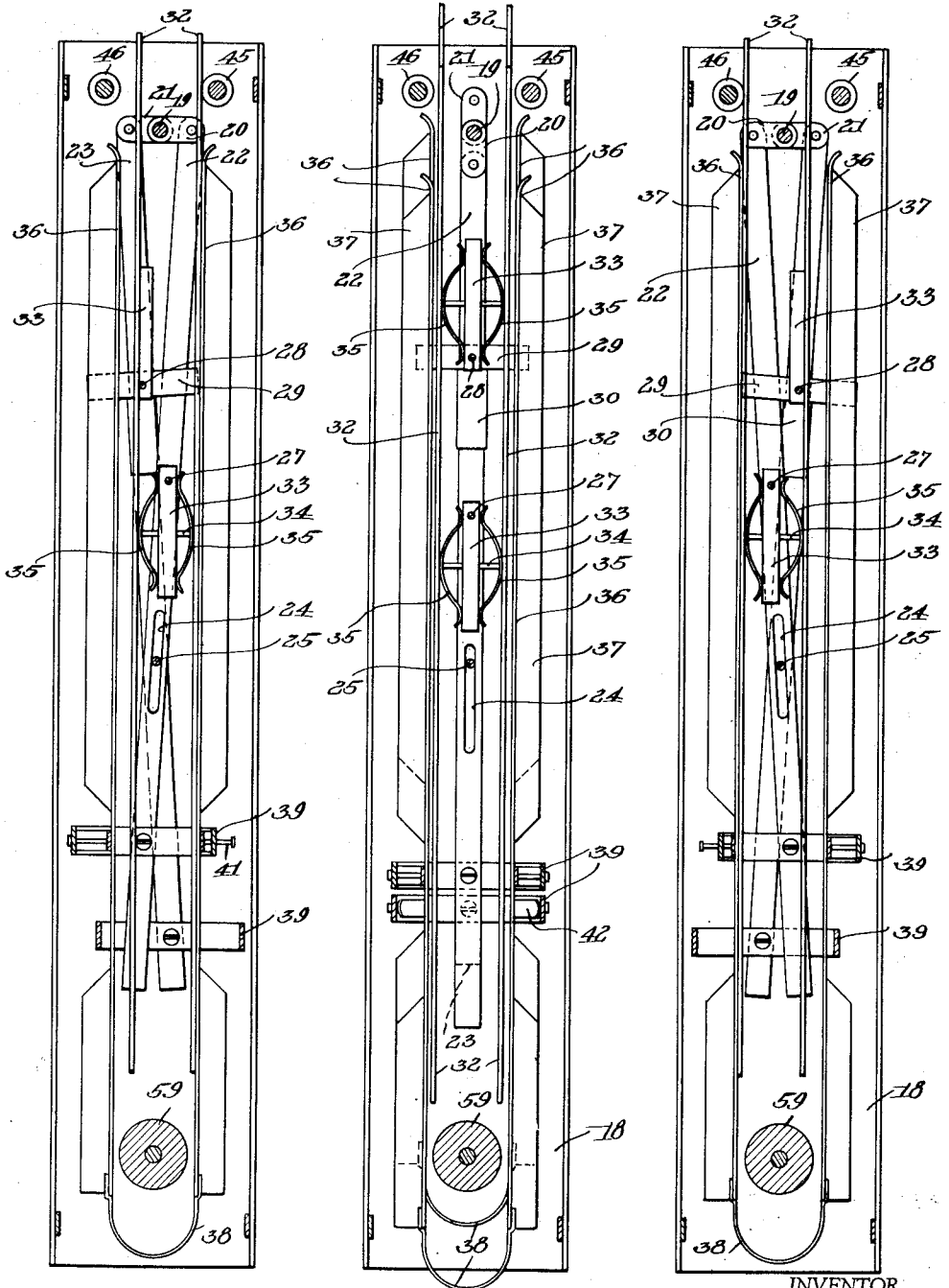
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6 Sheets-Sheet 4

Fig. 7

Fig. 6

Fig. 8



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Fig. 10

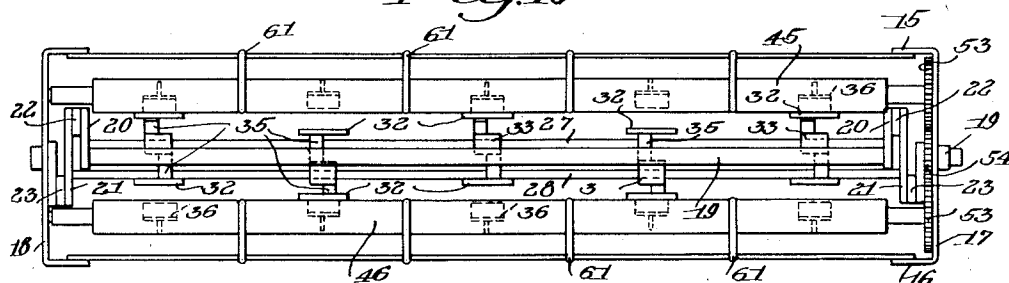


Fig. 9

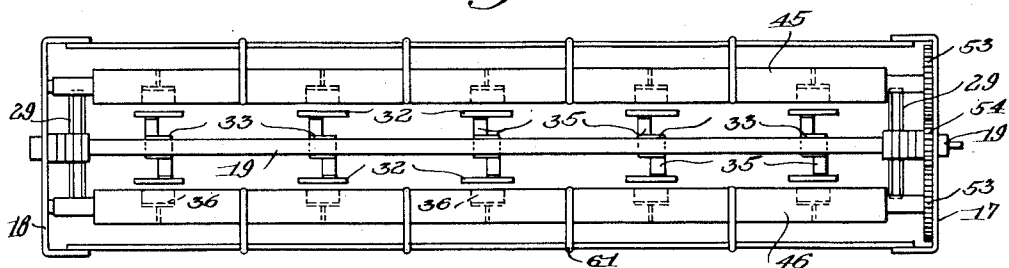


Fig. 11

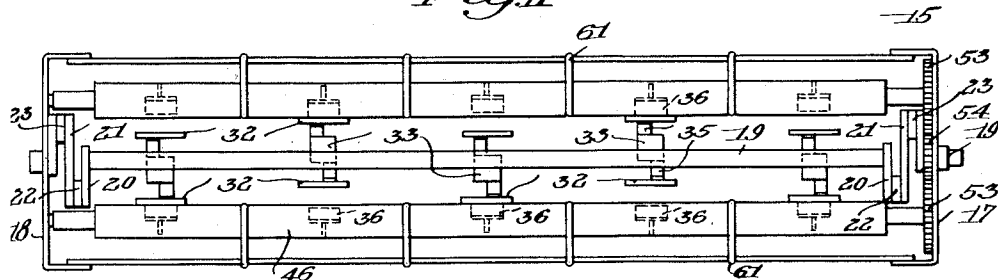
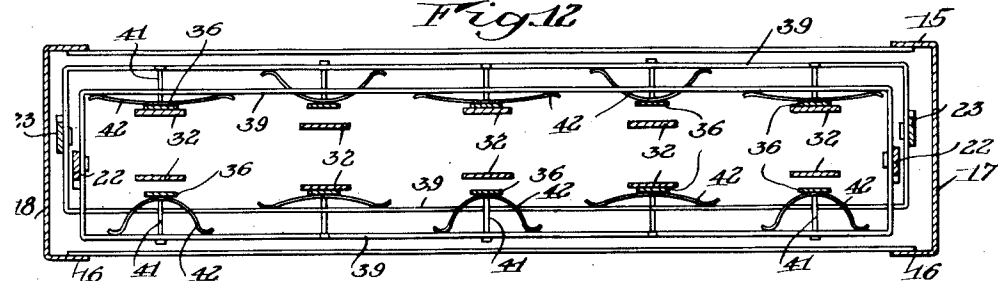


Fig. 12



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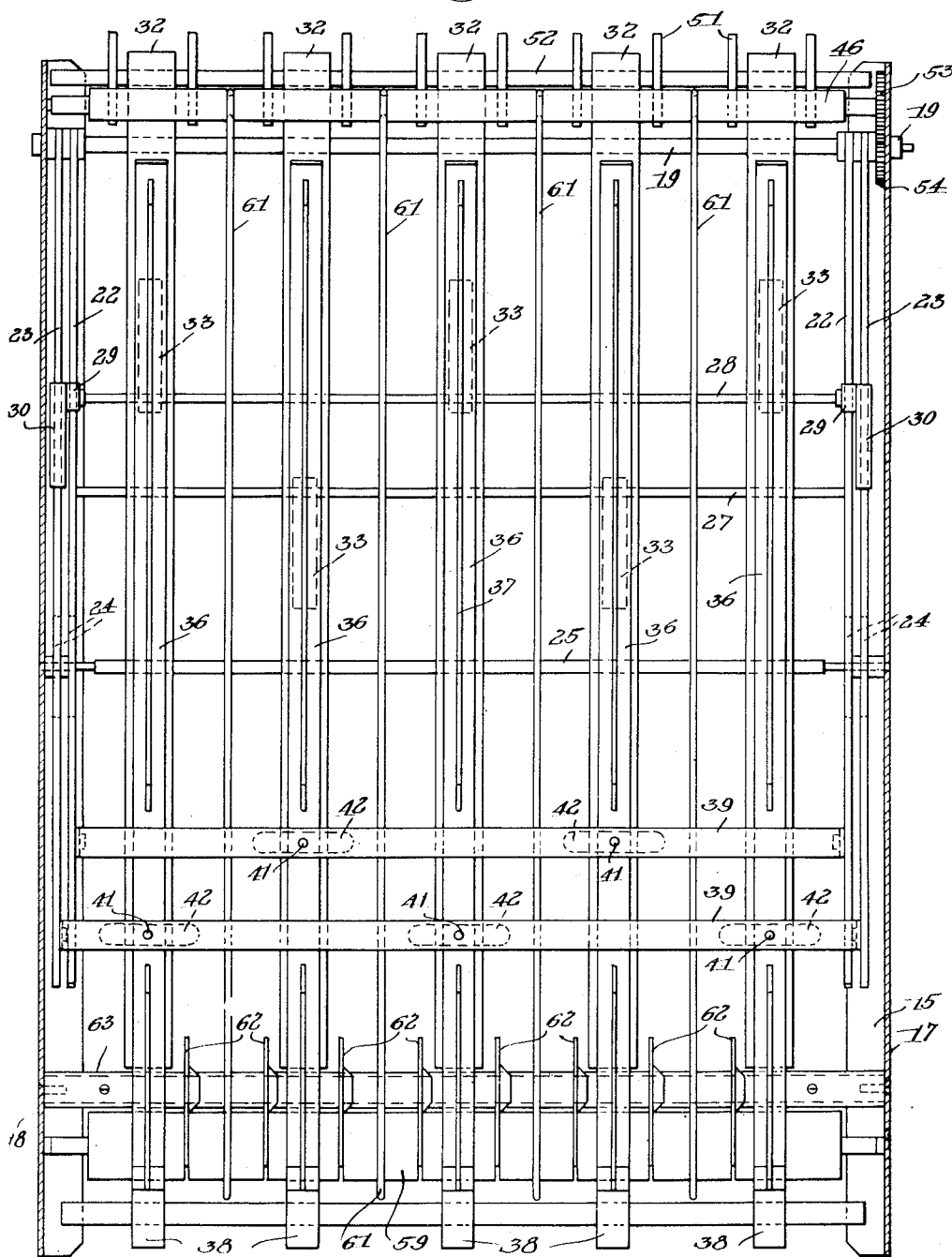
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6 Sheets-Sheet 6

Fig. 13



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UNITED STATES PATENT OFFICE

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MACHINE FOR FEEDING PHOTOGRAPHIC PAPER

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Application December 1, 1939, Serial No. 307,136

9 Claims. (Cl. 271-2.5)

This invention relates to a machine for feeding photographic paper through a liquid containing receptacle for processing, and has to do more particularly with the feeding of photographic paper through several tanks or receptacles, as when subjecting photocopy paper to developing, rinsing, fixing, and washing operations, after exposure.

A principal object of the invention is to afford paper feeding mechanism that can be utilized for impelling through a tank or receptacle either a continuous sheet of paper, following a continuous photocopying operation, or separate sheets of any desired length, where copies on individual short sheets are required, either following a continuous photocopying operation or otherwise.

Another purpose of the invention is to afford paper feeding mechanism that is adaptable to a sheet of any length and of any width, within the practical requirements of a photocopy machine.

Still an additional object of the invention is to afford paper feeding means that grips and propels the paper sheet frictionally, avoiding the use of pins or other instrumentalities that puncture the paper, or of any devices that would render any portion of the surface of the paper useless for copying purposes.

Another object of the invention is to provide paper feeding mechanism including gripping instrumentalities that intermittently engage the paper endwise, and alternately at different points transversely of its line of travel, so that no portion of the sheet is continuously engaged by a gripping instrumentality, and the entire area of the sheet from one edge to the other as well as lengthwise can be fully utilized and developed.

A further purpose of the invention is to afford paper feeding mechanism of the character herein shown, that can successfully and practically be used in a tank or receptacle containing chemicals of the type used in photographic developing processes.

Still another object of the invention is to provide paper feeding mechanism embodying a construction that permits it to be used in connection with a series of adjacently arranged tanks or receptacles, disposed either vertically or horizontally, with such a compact arrangement of parts that the tanks or receptacles can be arranged in close proximity to each other, thus reducing to a minimum the floor space required for the machine.

A further object of the invention is to afford paper feeding mechanism that will grip and feed

opposite portions of a sheet simultaneously in opposite directions, so that the sheet can be fed along one side of a tank, across to the other side thereof, and thence along such other side in the opposite direction, to permit a uniform continuous movement of a sheet into and out of a tank, and to insure thorough contact between the liquid and every portion of the sheet.

An additional purpose of the invention is to afford a construction of practical, durable, and comparatively simple design that can be relied upon to effect the necessary movement of a sheet of paper efficiently and speedily through a receptacle, irrespective of the length or width of the sheet, and without concealing or rendering ineffective any portion of the sheet.

To these and other ends, the invention consists in the construction and arrangement of parts that will appear clearly from the following description when read in conjunction with the accompanying drawings, the novel features being pointed out in the claims following the specification.

In the drawings:

Fig. 1 is a side elevation, partially in section, showing the general arrangement of a series of processing tanks in relation to the other parts of a photocopy machine, and the application thereto of an exemplary embodiment of the invention;

Fig. 2 is an enlarged longitudinal vertical sectional view, with parts broken away, showing the paper roll box, the paper cutting mechanism, and two of the processing tanks to which the paper is successively fed, the first tank illustrating two pairs of gripping members engaged with opposite portions of the sheet to feed said portions downwardly and upwardly respectively, and the gripping members being removed in the second tank to show the relative position of the bars or hangers on which the gripping members are supported, and by which they are operated;

Fig. 3 is a vertical sectional view through one of the paper feeding units, illustrating the neutral position of the supports for the gripping members, at the instant when the latter are all disengaged from the paper sheet;

Fig. 4 is a similar view showing the position of the supports when the controlling shaft has made a quarter-turn in a clockwise direction, the parts being shown in the position which they assume when certain gripping members are feeding the paper downwardly on one side of the tank while alternately disposed gripping mem-

bers are feeding the paper upwardly on the opposite side of the tank;

Fig. 5 is a similar view showing the position of the parts when the operating shaft has made a further half-turn from the Fig. 4 position, and showing the position of the parts when the alternate gripping members are feeding the paper downwardly and upwardly respectively;

Fig. 6 is a vertical sectional view through one of the feeding units, showing the position of opposed pairs of gripping members corresponding to Fig. 3, when in neutral position and all disengaged from the paper sheet;

Fig. 7 is a similar view, corresponding to Fig. 4, showing the position of opposed pairs of gripping members, one of which at the moment is feeding the paper sheet downwardly while the other pair is disengaged;

Fig. 8 is a similar view corresponding to Fig. 5 showing the position of opposed pairs of gripping members, one of which at the moment is feeding the paper upwardly while the other pair is disengaged from the paper sheet;

Fig. 9 is a plan view, corresponding to Figs. 3 and 6, showing the neutral position when all the gripping members are disengaged from the paper sheet;

Fig. 10 is a similar view, corresponding to Figs. 4 and 7, and illustrating pairs of gripping members engaging one portion of the paper sheet and feeding it downwardly on one side of the tank, the opposed pairs of gripping members being disengaged from the paper, and the alternate pairs of gripping members engaging the opposite portion of the paper sheet and feeding it upwardly on the other side of the tank while the gripping members opposed thereto are disengaged from the paper;

Fig. 11 is a similar view, corresponding to Figs. 5 and 8, and showing the relative position of the gripping members when the operating shaft has made a further half-turn from the position shown in Fig. 10;

Fig. 12 is a horizontal sectional view on the line 12-12 of Fig. 4, showing the carrier frames for the outer gripping members, and

Fig. 13 is a longitudinal vertical sectional view through one of the feeding units, showing the gripping members and operating means therefor in side elevation.

The invention may be carried out in a variety of ways, and with different detailed mechanisms, of which the herein disclosed embodiment is intended only as illustrative of one practical adaptation. In general, it includes paper feeding mechanism located within a vertically or horizontally disposed liquid-containing tank or receptacle through which the paper is impelled, moving downwardly in the case of a vertically disposed tank, across the bottom of the tank, and thence upwardly. The feeding mechanism includes gripping members arranged in pairs at opposite sides of the tank or receptacle, the pairs of gripping members at one side of the tank being opposed to similar pairs of gripping members at the opposite side of the tank. The gripping members on one side of the receptacle are operated alternately, that is while certain of the gripping members are engaging and moving the paper sheet downwardly, the alternate gripping members on the same side of the receptacle are disengaged, and at the same time the gripping members on the other side of the receptacle opposed to said alternate gripping members are engaging and feeding the paper sheet

upwardly, or in the direction opposite to the first mentioned travel while the remaining gripping members on said other side of the tank are disengaged from the paper.

The gripping members are arranged in opposed pairs, and during a cycle of operations, or in the disclosed embodiment, during one complete rotation of the operating shaft, each two pairs of gripping members move endwise of the sheet first in one direction and then in the other. One of said pairs of gripping members engage the paper during a portion of their travel in one direction on one side of the receptacle, and the other of said pairs of gripping members engage the paper during a portion of their travel in the other direction on the other side of the receptacle. The gripping members, which engage opposite surfaces of the paper sheet to feed it are in gripping engagement, while the alternate gripping members on the same side of the tank are at the same instant disengaged from the paper and the opposed alternate gripping members on the other side of the tank at the same instant are in gripping engagement with the paper to move it in the opposite direction, so that no portion of the surface of the paper is continuously in contact with any gripping member and every portion of the surface of the paper is exposed to the action of the chemical in the tank during its travel therethrough.

In the specific structural embodiment herein shown, the invention includes opposed pairs of gripping members, each pair consisting of an inner and an outer gripping member engageable with opposite surfaces of the paper sheet and movable first in one direction while engaged with the paper and thence in the opposite direction while released from the paper, during each complete cycle, and the opposed pairs of gripping members grip and feed the paper during opposite directions of movement respectively. The opposed pairs of gripping members are alternately disposed on different supports so that only alternate gripping members engage the paper at a given instant for effecting its movement in one direction.

The operation of each pair of gripping members takes place only once during each cycle, with the result that the paper is fed in one direction along one side of the receptacle by engagement therewith at predetermined points, and at the same instant is fed in the opposite direction along the other side of the receptacle by engagement therewith at alternate points laterally of the sheet, and the sheet is alternately engaged by alternately arranged gripping members at different points laterally for feeding in a given direction during each cycle.

This may be accomplished by mounting the gripping members of each pair upon opposite sides of a pivotal point of a support, there being two such supports in pivotal relation to each other at a point between their ends, and imparting movements to said supports endwise of the sheet in opposite directions and simultaneously rocking them about said pivotal point whereby their ends alternately assume positions on opposite sides of said pivotal point. Thus as a support oscillates during its endwise travel, the inner and outer gripping members carried by it and located on opposite sides of said pivotal point are brought into gripping engagement with opposite surfaces of the paper sheet and moved endwise to feed the paper while engaged therewith.

Referring more particularly to the drawings, in which like reference numerals refer to the same parts throughout the several views, the invention is illustrated in connection with a conventional type of photocopy machine including a paper roll box 1 in which a paper roll 2 is mounted, while 3 is the exposure opening through which an image is projected on to the light-sensitive paper, as usual in this class of machinery where there is a continuously moving copy or subject and a continuously moving sensitized paper traveling at the same speed on to which an image is projected, although the invention is applicable to a machine in which an image is projected on to a sheet of light-sensitive paper while the latter is held stationary, the exposed portion being thereafter fed and severed from the roll.

Where the copy or subject and light-sensitive paper are fed continuously at similar speeds, the paper may be fed continuously through the processing receptacle for developing, or may be cut off as desired, and independent sheets of any size fed through the processing receptacle. The paper upon emerging from the roll box 1 travels between feed rolls 4 and 5, the latter being mounted for bodily movement toward and away from the roll 4 and connected with a movable knife 6 that cooperates with a stationary knife 7, while 8 is a connection or operating means that serves to withdraw the roll 5 and at the same time operate the knife 6 to sever the paper when desired. The knife 6 is held in normal inoperative position by the spring 14.

After leaving the feeding rolls 4 and 5, the paper travels over a deflector or guide 9 and thence successively through the liquid containing receptacles 10, 11, 12 and 13, which are arranged vertically in the present embodiment and are provided with means for effecting movement of the paper first along one side of the receptacle, thence across and along the other side, and outwardly from the one receptacle into the next adjacent one and so on until the paper has passed through all of the processing receptacles for effecting the necessary developing, rinsing, fixing, and washing operations.

The invention has to do principally with the structure employed for effecting feeding of the paper first along one side of a receptacle in one direction, thence across, and finally along the other side thereof in the opposite direction, whence it emerges and passes into the next adjacent receptacle, and while the receptacles are here shown as disposed vertically, this is not essential to the purposes of the invention which may be carried out with equal success in conjunction with a receptacle or series of receptacles horizontally arranged one above the other. The feeding mechanism in each receptacle is the same, and the construction and arrangement of the several parts utilized in the feeding of the paper sheet through one of the receptacles will now be set forth in detail.

Each feeding unit includes a frame comprising front and back walls 15 and 16, and end walls 17 and 18, see Figs. 2 and 10, suitably mounted within the tank 10 and adapted to support the feeding mechanism. The frame just referred to is open at the bottom so that the paper traveling therethrough is fully exposed to the action of the developing solution or other liquid within the tank. The paper gripping members, which will presently be described in more detail, are controlled by operating means in the form of a

crank shaft 19, see Fig. 2, which is continuously driven and has mounted thereon the crank arms 20 and 21, see Fig. 10, which carry the supports for gripping members including downwardly extending supporting bars or hangers 22 and 23. The latter are movable transversely of each other, as shown in Figs. 3 to 5, and are slotted at 24 for engagement with a fixed guide rod 25 secured in the end walls 17 and 18 of the feeding unit frame and acting to govern the position of the supporting bars or hangers as they are alternately moved endwise in opposite directions and oscillated about the pivot or axis 25 as the operating crank shaft 19 is rotated.

The gripping members are carried by the bars 15 or hangers 22 and 23, the inner gripping members on one side and the outer gripping members on the other side of the pivotal axis of the bars. Each pair of gripping members includes an inner and an outer gripping member arranged to engage opposite surfaces of one portion of the paper sheet, and the movement of each pair of gripping members into and out of engagement with the paper sheet is determined by the movement of the support on which they are mounted. In the embodiment illustrated, the two gripping members of a pair are mounted on one support, the inner gripping member being arranged above the pivotal point 25 and the outer gripping member being arranged below said pivotal point 25, so that as the bars 22 are rocked about the pivot 25 by the turning of the crank arm which supports them, the two gripping members of the pair are moved in opposite directions laterally to engage opposite surfaces of one portion of the paper sheet, while at the same time the endwise movement of the support causes the gripping members to feed the paper sheet along until the support has reached the limit of its oscillating movement and returned far enough in the opposite direction laterally to release the paper sheet, whereupon the alternately arranged gripping members on the other support engage and feed the paper in the same direction. During the feeding movement of any given pair of gripping members in one direction, the alternately arranged gripping members on the other support simultaneously engage opposite surfaces of the opposite portion of the paper sheet on the other side of the tank and move it in the opposite direction, and the construction and arrangement of the gripping members on the supports will now be described in detail.

Referring to Fig. 13, the inner bars 22 have fixed thereto and extending therebetween the longitudinal rod 27 upon which certain of the inner gripping members are mounted, while 28 designates a rod extending between and supported by the outer bars 23 and adapted to carry the alternately arranged inner gripping members. The rod 28 is mounted in two yokes 29 at opposite ends thereof, see Figs. 3, 4, 5 and 13, within which yokes the vertical bars 22 are movable laterally, while each yoke carries a sleeve 30 by which it is fixed on the outer bar 23, see Fig. 13. This arrangement permits the necessary transverse oscillatory movements of the bars 22 and 23 about the pivotal axis 25, and the corresponding bodily lateral movements of the rods 27 and 28 which carry the inner gripping members and move them successively into engagement with the inner surfaces of the paper at the instant of engagement with the outer surfaces thereof by the outer gripping members to be described presently.

The inner gripping members are alternately arranged on the rods 27 and 28 in pairs, each pair of inner gripping members including oppositely arranged vertically disposed narrow plates 32, see Fig. 6, which are carried on opposite sides of a block 33 suspended on the rods 27 and 28.

In order to permit yielding engagement between the inner gripping members or plates 32 and the outer gripping members to be described presently, each of said vertical plates 32 is carried on a pin 34 that is movable transversely on the block 33 and limited as to its outward movement away from the block, while held in its outermost position by a leaf spring 35, which permits slight yielding of the gripping member inwardly when required, in order to prevent binding of the inner and outer gripping members and to insure uniform movement of the paper. Each pair of inner gripping members 32 is arranged as shown in Fig. 6, one gripping member of the pair being disposed on one side of the tank and acting to feed the paper in one direction when in engagement therewith, and the other member of the pair being disposed on the opposite side of the tank and acting to feed the paper in the opposite direction when engaged therewith.

The inner gripping members 32 which engage the inner surfaces of opposite portions of the paper sheet cooperate with outer gripping members 36, preferably in the form of vertically arranged narrow plates having strengthening ribs 37, and each pair of outer gripping members 36 being connected at their lower ends by the depending curved portion 38 which acts to hold the lower ends of the outer gripping members in substantially parallel relationship during their various movements.

The outer gripping members 36 are mounted on the rectangular frames or carriers 39, see Figs. 12 and 13, which are secured to the vertical bars 22 and 23 as shown, it being understood that the paper during its travel through the tank passes within the rectangular frames 39 and between the outer gripping members carried thereby and the inner gripping members previously described. The outer gripping members are alternately arranged on the two rectangular frames or carriers 39, the outer gripping members 36 on the upper frame 39 being disposed in transverse alinement with the inner gripping members that are mounted on the longitudinal rod 27, while the outer gripping members which are alternately arranged on the lower rectangular frame 39 are disposed in transverse alinement with the inner gripping members that are supported on the longitudinal rod 28. In order to permit the required yielding action of the outer gripping members, each of the same is carried on a pin 41 that is supported by and has a limited movement laterally of the frame 39, while 42 is a leaf spring acting to retain the outer gripping member 36 in its innermost position and permitting slight lateral yielding thereof outwardly.

With this arrangement, and assuming the parts in the neutral position shown in Figs. 3 and 9, the paper on both sides of the tank and lying between the inner and outer gripping members is disengaged and free and for the instant stationary, but held in position owing to the fact that it is in a wet state and the space between the gripping members is sufficiently restricted so as to retain the paper by light contact therewith. During the feeding operation, the crank shaft 19 is turning continuously in a clockwise direction, referring to Fig. 3, and as it turns from the Fig. 3

position to that illustrated in Fig. 4, the bars 22 move downwardly and oscillate, causing the inner gripping members carried on the rod 27 on the right hand side of the tank to engage the paper against the outer gripping members at the right hand side of the upper rectangular frame 39, and thus grip the paper and feed it downwardly. At the same time, the alternately arranged gripping members on bars 23 engage the opposite portion of the paper at the other side of the tank and move it upwardly. As the bars 22 and 23 and the gripping members respectively carried thereby reach their intermediate or neutral positions, the paper is released, and continued movement causes the opposed pairs of gripping members carried by bars 22 to engage the portion of the paper sheet on the other side of the tank and move it upwardly while the alternately arranged opposed gripping members on bars 23 engage the first mentioned portion of the paper sheet and move it downwardly.

Thus there is an intermittent engagement and propelling of the opposite portion of the paper sheet on both sides of the tank in opposite directions simultaneously and at alternate lateral points, the successive gripping of the sheet of paper on one side of the tank taking place at alternate points laterally of the sheet so that the points at which the paper is successively engaged for feeding in one direction are staggered endwise of the sheet or in the direction of its feed, and every portion of the surface of the paper is thus thoroughly exposed to the action of the liquid during its movement through the receptacle. The gripping members are of sufficient length so that a sheet of paper of any desired length within practical requirements can be fed through the receptacle, and by reason of the location of the gripping members laterally of the paper sheet and engaging opposite surfaces thereof, it is also possible to feed a sheet of any desired width within practical limitations, the minimum width of sheet within the capacity of the machine being determined by the space between two adjacent laterally arranged gripping members, and it is obvious that the machine can be so designed as to place the gripping members sufficiently close together to accommodate any width of sheet that might be desirable.

The paper sheet after leaving the guide 9, see Fig. 2, travels over a roll 45, whence it moves between the inner and outer gripping members on the entrance side of the tank, and upon leaving the tank the paper passes over a roll 46, thence across table 47, between rolls 48 and 49, and across table 50 to the next receptacle, which is constructed and feeds the sheet in the same manner as already described. The paper sheet when traveling over rolls 45 and 46 is guided by a series of rotary disks 51 carried on a spindle 52, see Fig. 2, the disks 51 resting by their own weight against the rolls 45 and 46, which in turn are mounted on spindles carrying the gears 53, see Fig. 10, the latter being engaged and driven by a pinion 54 on the crank shaft 19. The crank shaft extends through the end wall 17 of the frame and carries at its outer end a sprocket wheel 55, see Fig. 1, that is engaged and driven by sprocket chain 56, the latter also engaging and driving a sprocket wheel 57 on the aforementioned roll 48, while the cooperating roll 49 rests by gravity against the roll 48 to press the paper thereagainst as it is fed through. The sprocket chain 56 also drives the aforementioned feed roll 4, movement being imparted to the sprocket chain to rotate the

several rolls mentioned from any suitable source of power.

The paper sheet is guided around and across the bottom of each receptacle by a rotatable roll 59, see Figs. 4, 6 and 13, and between said roll and guide rods 61 which are spaced from and curved around the roll 59 at the bottom of the tank and extend thence upwardly over the previously mentioned rolls 45 and 46 in grooves suitably formed in the latter to receive the rods 61, the ends of the latter being suitably fixed to the side walls 15 and 16 of the frame. In order to guide the paper sheet between the gripping members as it travels upwardly after leaving the roll 59 at the bottom of the tank, guiding plates 62 are provided, see Fig. 4, which have outer vertical edges that direct the paper in between the gripping members at the lower edges of the latter, said guiding plates being suitably mounted on a horizontally disposed support 63 that is secured to the end walls of the frame, see Fig. 13.

The operation of the paper feeding mechanism briefly is as follows: The gripping members are operating continually in the several receptacles, and the paper is fed from the rolls 4 and 5 through the several receptacles in the form of a continuous strip, or a strip of any length may be cut off by operation of the severing mechanism already mentioned. In either event, the sheet of paper, which may be of any width or of any length, travels into the first receptacle 10, being moved downwardly therein by gripping members which intermittently engage opposite surfaces of the paper sheet first at one series of points laterally of the sheet and then at alternate points thereof, causing the paper to travel downwardly in successive steps, then across the bottom of the receptacle and upwardly on the opposite side thereof between similarly operating gripping members which in successive steps engage and move the opposite portion of the paper sheet upwardly at the same time that the entering portion of the sheet is traveling downwardly. The sheet of paper moves thence from the first to the second receptacle and through the several receptacles successively, where it is engaged and moved by feeding mechanism units similar to that already described.

The paper travels smoothly, evenly, and uniformly, and the pressure of the gripping members is sufficiently yielding to prevent undue stretching of the paper at any point and to permit it to accommodate itself to the feed of the machine, where it is fed through in the form of a continuous strip. It will be understood that a sheet of paper of any width, up to the lateral distance between two pairs of gripping members, and a sheet of any length, can be successfully moved through the receptacle by the feeding mechanism described, and in every instance, the paper sheet, regardless of size, is exposed at every portion of its surface clear to its edges, to the action of the liquid within the tank. The machine is thus instantly adaptable to the automatic development of either a small sheet upon which an exposure has been made, or to a continuously exposed and traveling sheet.

While the invention has been described with reference to a certain structural embodiment, it is not confined to the details or particular arrangement herein disclosed, and this application is intended to cover any modifications or other adaptations coming within the purposes of the invention or the scope of the following claims.

I claim:

1. In a photographic developing machine, paper feeding means comprising a series of pairs of gripping members engageable with opposite surfaces of the sheet in spaced relation laterally thereof, said gripping members being disengaged and spaced from the sheet during a portion of the cycle, and supporting and operating means for the gripping members acting to move different pairs of gripping members successively endwise of the sheet and into and out of engagement therewith during such endwise travel.

2. In a photographic developing machine, paper feeding means comprising opposed pairs of gripping members engageable with the surfaces of opposite portions of the sheet, said gripping members being disengaged and spaced from the sheet during a portion of the cycle, and supporting and operating means for the gripping members acting to move them endwise in opposite directions and to bring one pair into engagement with opposite surfaces of one portion of the sheet while traveling in one direction and the opposed pair into engagement with opposite surfaces of the other portion of the sheet while traveling in the opposite direction.

3. In a photographic developing machine, paper feeding means comprising a support that is movable endwise of the sheet and also has an oscillatory movement about an axis between its ends, and a pair of gripping members engageable with opposite surfaces of the paper sheet, said gripping members being mounted on the support on opposite sides of said oscillatory axis whereby they are brought into and out of engagement with the paper sheet by the oscillatory movement of the support.

4. In a photographic developing machine, paper feeding means comprising a pair of supports which are alternately movable endwise of the sheet in opposite directions and have an oscillatory movement about an axis between their ends, and pairs of gripping members mounted on said supports, the gripping members of each pair being located on opposite sides of the oscillatory axis of its support.

5. In a photographic developing machine, paper feeding means comprising a pair of supports having an oscillatory movement about an axis between their ends, means connected to the supports acting to move them successively endwise of the sheet in opposite directions and to impart said oscillatory movement thereto, inner gripping members mounted on said supports on one side of said oscillatory axis and acting successively to engage the inner surfaces of opposite portions of the sheet within a receptacle and outer gripping members mounted on said supports on the other side of said oscillatory axis and acting successively to engage the outer surfaces of the opposite portions of the paper sheet and thereby to feed the two portions of the sheet in opposite directions.

6. In a photographic developing machine, paper feeding means comprising a pair of supports including bars which have an oscillatory movement about a common axis between their ends, operating means connected to said bars and acting to move them alternately endwise of the sheet in opposite directions and to oscillate them about said axis, inner gripping members mounted on said bars on one side of said oscillatory axis, and outer gripping members mounted on said bars on the other side of said

oscillatory axis whereby alternate pairs of gripping members are brought into engagement with the inner and outer surfaces of opposite portions of a sheet of paper to move said portions endwise in opposite directions as said bars are rocked about their axis and moved endwise in opposite directions.

7. In a photographic developing machine, paper feeding means comprising inner gripping members located between opposite portions of a sheet of paper as it is positioned on opposite sides of a receptacle, outer gripping members located adjacent to the outer surfaces of said portions of the paper sheet, said gripping members being disengaged and spaced from the sheet during a portion of the cycle, and supporting and operating means connected to said inner and outer gripping members and acting to move simultaneously two gripping members of a pair into engagement with the sheet and endwise thereof.

8. In a photographic developing machine, paper feeding means comprising inner gripping members located between opposite portions of a sheet of paper as it is positioned on opposite sides of a receptacle, outer gripping members located adjacent to the outer surfaces of said portions of the paper sheet, said gripping mem-

bers being disengaged and spaced from the sheet during a portion of the cycle, and supports which are alternately movable in opposite directions and carry said gripping members, said supports acting to move gripping members on one support into engagement with one portion of the paper sheet and the alternate gripping members on the other support into engagement with the opposite portion of the sheet.

9. In a photographic developing machine, paper feeding means comprising a series of pairs of gripping members engageable with opposite surfaces of the sheet, said gripping members being disengaged and spaced from the sheet during a portion of the cycle and arranged for engagement with the central portion of the sheet at a plurality of points transversely and between the edges thereof, and supporting and operating means for the gripping members acting to move different pairs of gripping members successively endwise of the sheet and into and out of engagement therewith during such endwise travel, said supporting and operating means effecting engagement of a plurality of pairs of gripping members with the sheet and movement thereof in the same direction simultaneously.

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