May 3, 1932. K. MURCK 1,856,926

MACHINE FOR DEVELOPING SENSITIZED PAPER

Filed May 28, 1929 3 Sheets-Sheet 1

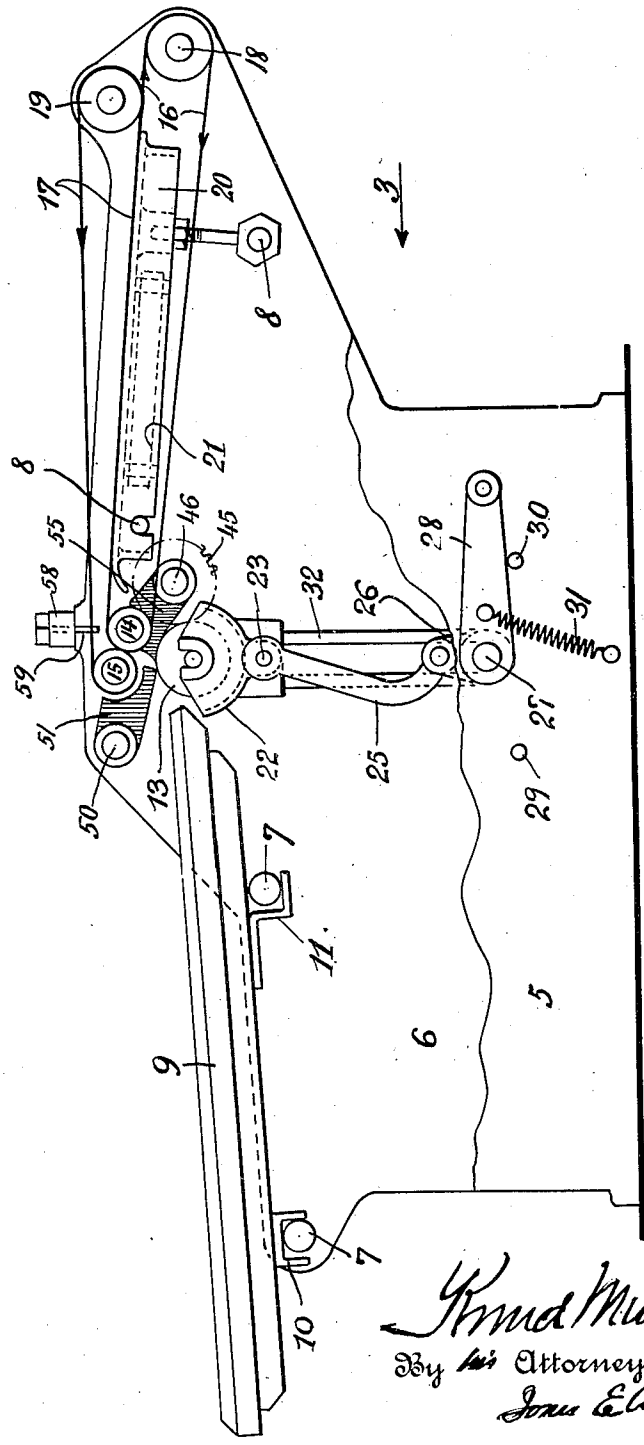

Fig. 1

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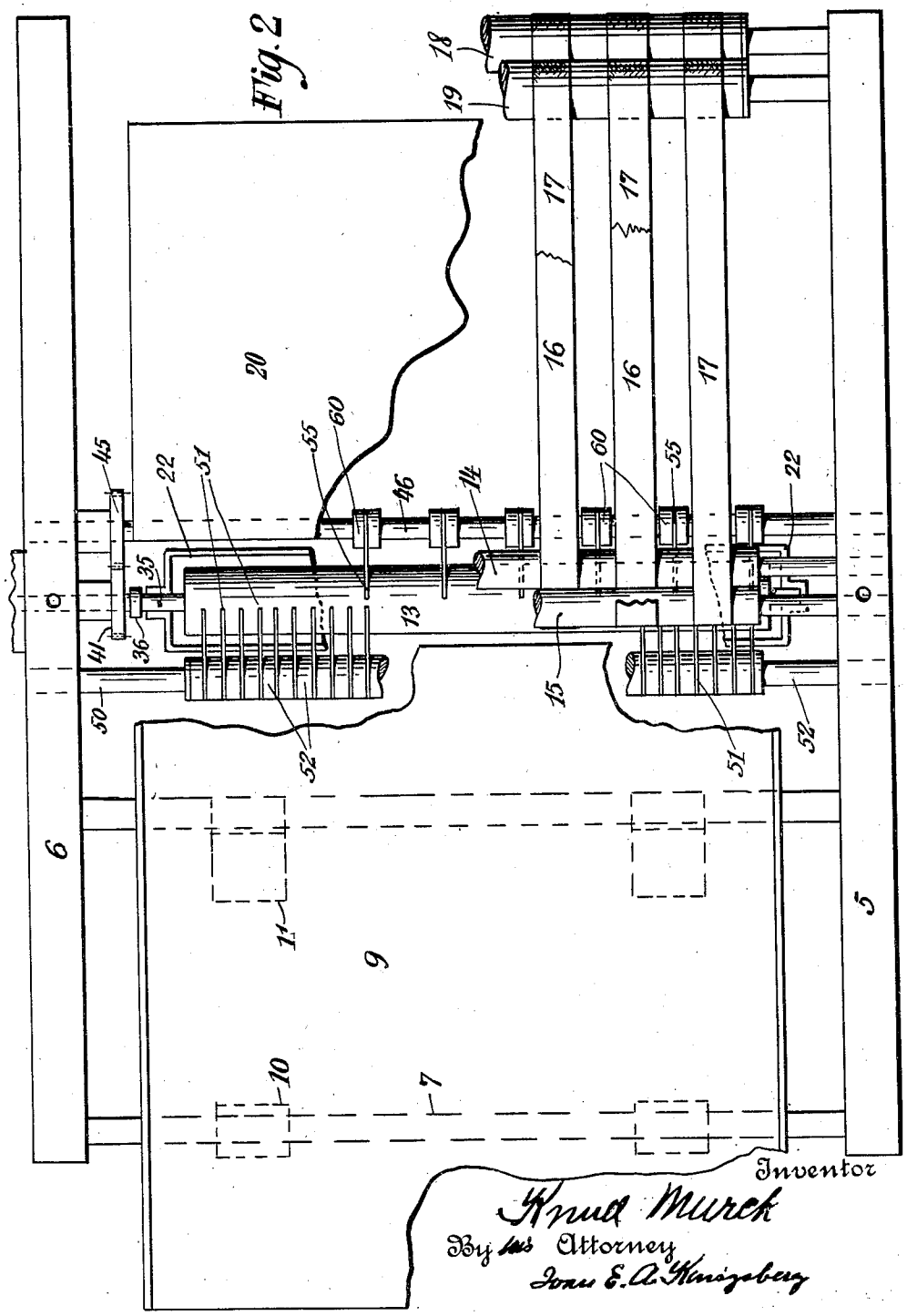
Fig. 2



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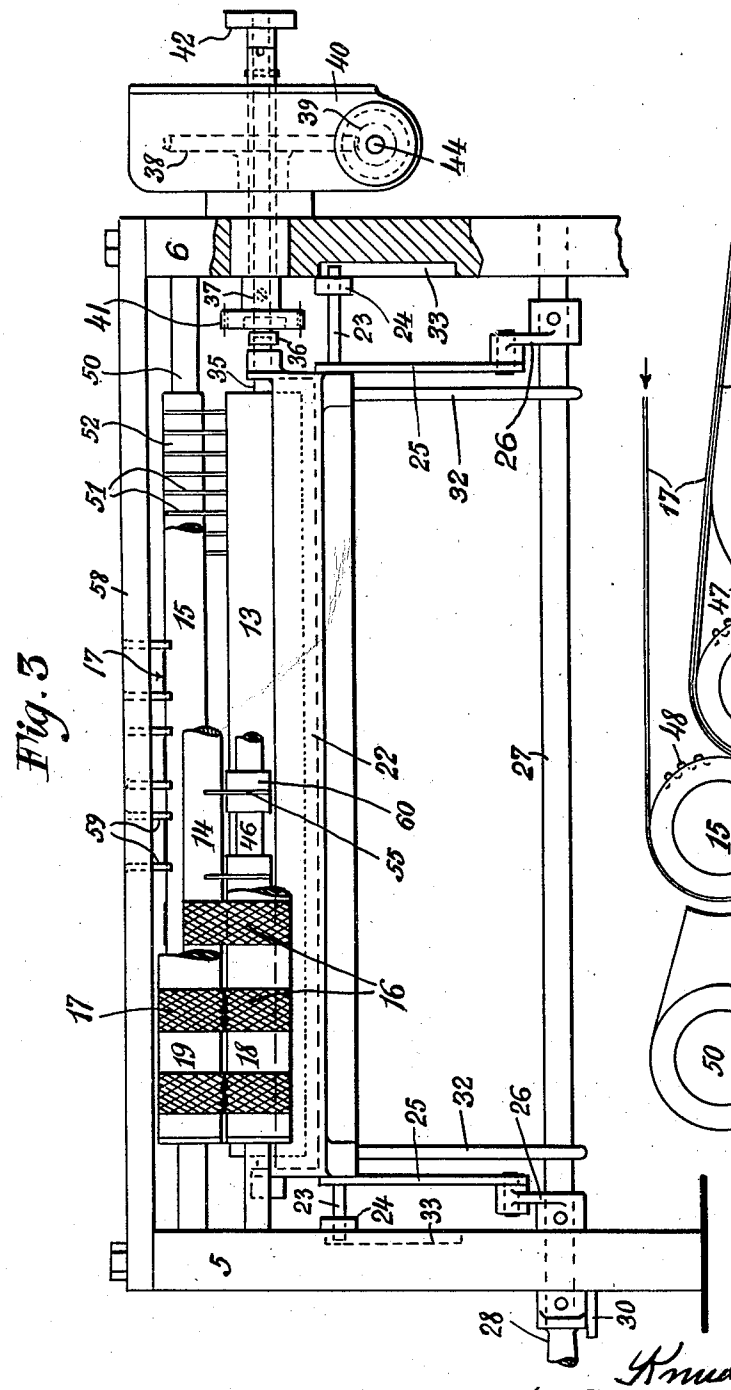

Fig. 3

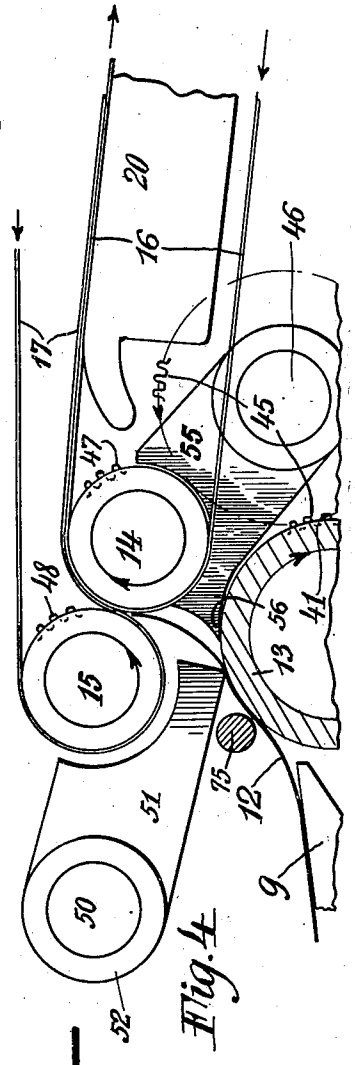

Fig. 4

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UNITED STATES PATENT OFFICE

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MACHINE FOR DEVELOPING SENSITIZED PAPER

Application filed May 28, 1929. Serial No. 366,690.

The object of this invention is to provide a generally improved and novel automatic machine for developing sensitized papers by moistening with a special chemical solution and whereby copies are made by direct printing from originals.

The art of making copies of drawings and tracings includes certain processes in which prints are made from originals directly on sensitized paper and the latter then developed into positive non-fading prints by moistening with special solutions.

In other words, an undeveloped print is made from an original and thereafter developed by moistening, for instance, by contact with a roller which is partly submerged in the developing solution.

It is a further object of this invention to provide a developing machine capable of being operated automatically and at high speed, of simple practical construction and arranged to permit easy access for cleaning and repair purposes.

With these and other objects in view, the invention is embodied in a machine for the purposes set forth arranged and constructed as hereinafter set forth and as illustrated in the accompanying drawings in which

Figure 1 is a side view of the machine with parts removed and parts broken away.

Figure 2 is a plan view of the machine with parts broken away.

Figure 3 is a view looking in the direction of arrow 3 in Figure 1.

Figure 4 is an enlarged detail view showing certain details for feeding the paper through the machine.

The several parts of the machine are generally supported on and between two end frames 5 and 6 which are held together by any suitable means such as tie rods or bolts. Some of these latter are indicated at 7 and 8 in Figure 1.

In the front of the machine, at the left in Figure 1, there is provided a feed board 9 detachably supported on tie rods 7 by clamps 10 and 11 so arranged that the board is removable by a lifting and sliding movement.

The sheet of paper 12 to be developed is laid on the feed board, sensitized face downward and pushed towards and up over the developing roller 13, Fig. 4, and in between two delivery gripper rollers 14 and 15, where the sheet is seized by delivery tapes 16 and 17 which run over the said rollers 14 and 15, and to and over rear tape rollers 18 and 19. The tapes run in contact with each other and deliver the sheet flat between them. A metal delivery board 20 may be placed below the delivering runs of the two tapes and a suitable electrical heating element 21 or other heating means may be placed below the delivery board to insure that the sheet is dry.

The developing roller 13 runs in a trough 22 filled by any suitable means, not shown, with the developing solution. The trough may be lowered and the roller removed for cleaning or other purposes. The trough is therefore provided with end pins 23, 23 carrying spacing collars 24, 24. Links 25, 25 have their upper ends pivoted on the pins 23 and their lowest ends connected to arms 26, 26 secured to a trough shaft 27, Figures 1 and 3.

At one end of the machine outside the frame 5, the trough shaft carries a handle 28 adapted to be held against stop pins 29 or 30 by a spring 31. 32, 32 indicate U-shaped guiding loops which pass around the trough shaft 27 and the upper ends of which are fast in the trough 22. The ends of the trough pins 23 run in guiding grooves 33 in the frames 5 and 6.

In Figures 1 and 3 the trough 22 with the roller 13 is held in its upper operative position with the links 25 and arms 26 on dead center, movement of the arms 26 being prevented by the spring 31 as is obvious. When it is desired to lower the trough, the handle 28 is swung anti-clockwise in Figure 1 onto the stop pin 29 whereby to rotate the shaft 27 so that the arms 26 and links 25 will pull the trough down, the pins 23 and loops 32 guiding the trough so that it moves vertically in an obvious manner. The spring 31 swings with the handle 28 and keeps the trough in its lower position. A clockwise movement of the handle causes the trough to be raised to normal position.

The solution roller 13 has at one end a

shaft 35, Fig. 3 which fits into a coupling 36 on a shaft 37. The latter is in driving engagement with a worm wheel 38 driven from a worm 39 in a housing 40. The shaft 37 carries a gear 41. The coupling 36 is withdrawn from the roller shaft and moved within the gear when it is desired to lower the roller, the gear 41 being then loosened on the shaft 37. This is accomplished by operating a knob 42 on the end of the coupling shaft 37. The knob is pulled out to disconnect the coupling from the roller shaft, all in a well known manner. The worm shaft 44 is driven by a motor, not shown.

The gear 41 drives an idler gear 45 on a stripper shaft 46, Fig. 4. The gear 45 drives the intermeshing gears 47 and 48 on the tape rollers 14 and 15 to operate the tapes.

Means are provided for insuring contact between the paper and the solution roller. On a rod 50, Fig. 4, there is loosely supported a plurality of contact blades 51 spaced apart by collars 52. The combined weight of the blades 51 which rest by gravity on the paper is sufficient to insure contact with the roller, yet the blades yield to the edge of the paper and to unevenness therein so as not to prevent the paper from passing over the roller.

The stripper shaft 46 supports a number of stripper blades 55 which rest by gravity on the roller 13. Each blade is formed with a point 56 and the points of the strippers prevent the paper from passing around the developing roller. The frames support a bar 58 which carries spacing pins 59 for the upper tapes 17. The lower tapes 16 are spaced by the collars 60 which position the strippers 55. When the developer roller is lowered the contact blades 51 fall down and come to rest on a rod 75. The stripper blades 55 fall anticlockwise against the tape roller 14 and rest against the same. When the developer roller is again raised, it automatically engages and lifts the blades 51 and 55 back into normal position.

From the foregoing it will be clear that this invention provides a simple automatic high speed machine in which the sensitized paper is developed by contact with the solution roller sufficient for developing purposes. In actual practise the paper is barely moistened by the contact with the roller, yet the contacting period is sufficient long enough to accomplish the purpose.

I claim:

1. A machine for developing sensitized paper comprising in combination a trough containing the developing solution, a developer roller removably supported in the trough, a plurality of superposed pairs of driven tapes feeding the paper past the developer roller, gravity operated strippers for preventing the paper from clinging to the developer roller, gravity operated members for insuring contact between the paper and the developing roller and means for driving the latter and the said tapes.

2. A machine for developing sensitized paper comprising in combination a pair of frames, a trough containing developing solution adapted to be raised and lowered in said frames from an inoperative to an operative position, means for operating said trough as aforesaid, means for guiding the trough in the frames during the movements aforesaid, a developing roller in said trough, means for feeding the paper past and in contact with the said roller and mechanism for operating said feeding means.

3. A machine for developing sensitized paper comprising in combination a trough, a developing roller supported therein, means for feeding paper past and in contact with said roller including a plurality of gravity operated members for keeping the paper in contact with the paper, a plurality of stripping elements for stripping the paper from the said roller, a plurality of tapes for moving the paper past the roller and away therefrom, means for driving the said developing roller and the said tapes and means for moving said trough and developer roller away from the said tapes for the purposes set forth.

4. A machine for developing sensitized paper comprising in combination a vertically movable trough, a developing roller therein, means for driving said roller, means for disconnecting and connecting the roller from its driving means when said trough and roller are to be lowered, means for feeding the paper past said roller, gravity operated means for keeping the paper in contact with the roller, gravity operated stripping means for stripping the paper from said roller and a plurality of tapes for moving the paper away from the roller.

5. A machine of the character described comprising in combination a pair of frames, paper feeding means mounted therebetween, a trough containing the developing solution, a developing roller removably supported in said trough partially submerged in the solution therein, means for driving said roller, means for moving said trough and roller into operative relation with said paper feeding means and away therefrom, means for connecting and disconnecting the roller from its driving means to move said roller as aforesaid and means actuated by said roller for driving the said paper feeding means.

6. A machine of the character described comprising in combination a pair of frames, paper feeding means mounted therebetween, a trough containing the developing solution, a developing roller removably supported in said trough partially submerged in the solution therein, means for driving said roller, means for moving said trough and roller into operative relation with said paper feeding

means and away therefrom, means for connecting and disconnecting the roller from its driving means to move said roller as aforesaid, yielding means insuring contact between the developing roller and the paper to insure development thereof and means actuated by said roller for driving the said paper feeding means.

7. A machine for developing sensitized paper comprising in combination a trough containing the developing solution, a developer roller in said trough, means for feeding the paper past said roller, vertically disposed freely pivoted blades contacting by gravity with the said roller to insure contact between the paper and the roller, means for supporting the trough and roller in normal operative relation to the said feeding means, mechanism for moving the trough and the roller away from the feeding means and the said blades and a member for supporting the latter when the roller has been moved as aforesaid.

8. A machine for developing sensitized paper comprising in combination a trough containing the developing solution, a developer roller in said trough, means for feeding the paper past said roller, vertically disposed freely pivoted blades contacting by gravity with the said roller to insure contact between the paper and the roller, other vertically disposed freely pivoted blades contacting by gravity with the said roller to prevent the paper from passing around the same, means for supporting the trough and roller in normal operative relation to the said feeding means, mechanism for moving the trough and the roller away from the feeding means and the said blades and means for supporting the latter when the roller has been moved as aforesaid.

9. A machine for developing sensitized paper comprising in combination a trough containing the developing solution, a developer roller in said trough, co-operating tape rollers located above the developer roller and adapted to seize the leading edge of the paper as the latter is fed past the developer roller, tapes on said tape rollers for conveying the developed paper through the machine and a plurality of vertically disposed pivoted blades resting by gravity on the developer roller to insure contact between the latter and the paper as it passes into the machine.

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