July 24, 1934. A. MARCHEV 1,967,676

SPINDLE

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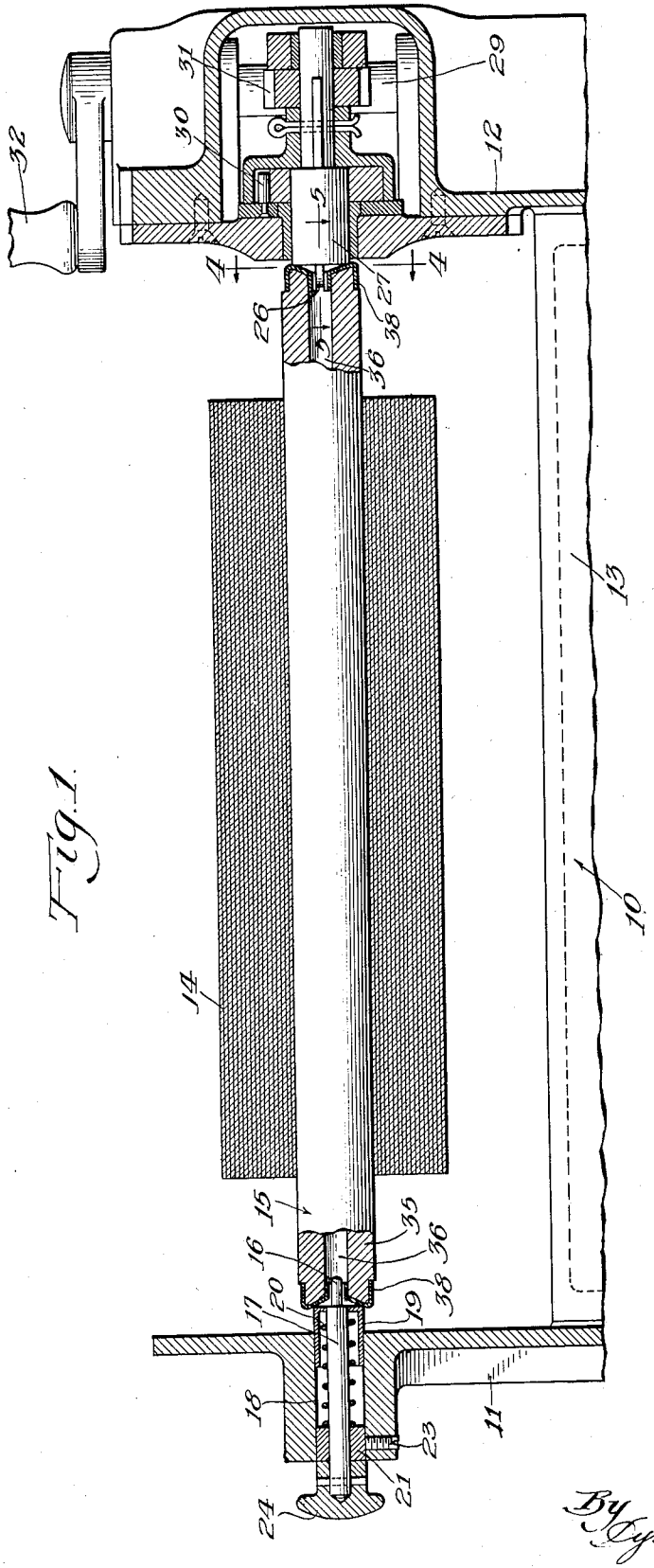


Fig. 1.

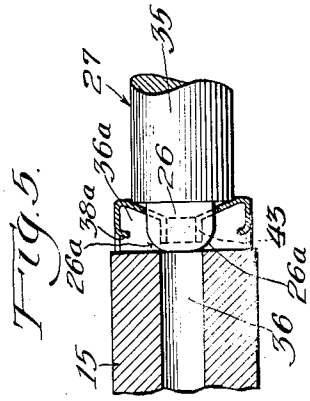


Fig. 5.

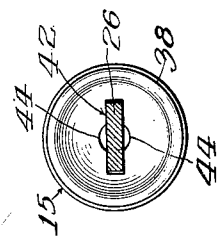


Fig. 4.

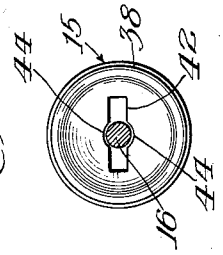


Fig. 3.

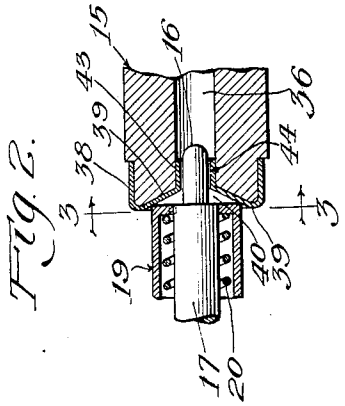


Fig. 2.

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UNITED STATES PATENT OFFICE

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SPINDLE

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6 Claims. (Cl. 242—68)

The invention relates to spindles and is particularly adapted to be embodied in spindles which carry the gelatine bands of hectograph machines, or the like.

The gelatine bands of hectograph machines are rolled upon spindles which may be inserted in or removed from the machines as necessary, the construction of the spindles being such that when they are inserted in the machine they are operatively connected to mechanism whereby they may be rotated to feed the gelatine band across the platen of the machine.

One form of the invention is embodied in a duplicating or hectograph machine which comprises side frames, a flat platen, means at each end of the machine for receiving and holding a spindle, and manually operable means at one end of the frame for driving the spindles. The construction is such that when the gelatine band is wound from one spindle it is wound simultaneously on the other, the gelatine band being advanced across the platen in the usual manner. In this embodiment of the invention, the ends of each spindle are provided with inwardly extending frustro-conical surfaces provided with elongated slots at the bottoms thereof, the side edges of the slots being notched to provide bearing surfaces. The slot in either end may be engaged with a lug projecting from a shaft or pin which forms part of the mechanism for rotating the spindles, the other end being journaled on a pin which engages the bearing surfaces formed by the notches in the edges of the slot at that end of the spindle. The last-mentioned pin is spring pressed into a position wherein it serves as a bearing for the spindle. When a spindle is to be inserted in the machine, either end thereof is brought into approximate registry with the spring-pressed pin and the pin is displaced against the action of the spring until the other end of the spindle may be brought into approximate registry with the lug on the shaft or pin forming a part of the driving mechanism. Generally, the slots and notches in the spindles will engage the co-operating parts of the machine in the proper manner due to the action of the spring but in the event the driving lug simply rests in the adjacent frustro-conical surface and does not enter the slot therein, the slot will be forced over the lug by the spring when the shaft or pin carrying the lug is rotated through a relatively small angle by the driving mechanism.

Apparatus embodying the invention is advantageous as it permits one to insert a loaded spindle in the machine with a minimum of effort and in a minimum of time. The outwardly flaring depressions provided in the ends of the spindle permit one to bring the spindle into approximate registry with the co-operating parts of the machine and then insures that the action of the spring will cause the co-operating members to engage the spindle properly before or immediately after the driving mechanism is set in operation. In other words, the operator need not bring a rather unwieldy roll of gelatine band into accurate alinement with the co-operating parts of the machine when a new roll is being inserted therein. The construction insures that the longitudinal axis of the spindle will be brought into alinement with the longitudinal axes of the pins engaging the ends thereof and insures that the slot will be forced over the lug on one pin so that the spindle is constrained to rotate with the lug.

Other advantages will become apparent as the following detailed description progresses, reference being had to the accompanying drawing wherein

Figure 1 is a fragmentary plan view of a duplicating or hectograph machine, which embodies the invention, certain parts of the machine being shown in section to illustrate certain details of construction.

Fig. 2 is an enlarged fragmentary section taken through one end of a spindle which forms part of the improved machine, the spindle being shown in connection with a pin which journals it.

Fig. 3 is a section taken on line 3—3 of Fig. 2.

Fig. 4 is a section taken on line 4—4 of Fig. 1, and

Fig. 5 is a section taken on line 5—5 of Fig. 1.

Referring to the drawing wherein a preferred embodiment of the invention is illustrated, 10 designates generally the frame of a hectograph machine which, except as hereinafter explained, is of a conventional form. The frame 10 comprises side frames 11 and 12 and a flat platen 13 over which a gelatine band 14 is adapted to be drawn in a manner well known to those skilled in the art.

The gelatine band 14 is wound upon a pair of spindles, one of which is shown at 15, the other spindle (not shown), being disposed at the other end of the machine. The left hand end (Fig. 1) of the spindle 15 is journaled on a pin 16 which is preferably round in cross section. The pin 16 projects from and is preferably formed integral with a pin 17 of larger diameter, which pin 17 passes through a bore 18 formed in the side frame 11. Secured to the inner end of the

pin 17 and slidably journaled in the bore 18 is a cup shaped member 19. A compression spring 20 disposed around the pin 17 and interposed between the cup shaped member 19 and a bushing 21 urges the cup shaped member 19 and the pins 16 and 17 to the right (Fig. 1), the bushing 21 being secured in the bore 18 by a set screw 23. The outer end of the pin 17 is provided with a knob 24 which permits one to retract the pins 16 and 17 against the action of the spring 20. The purpose of this construction will presently appear.

The right hand end (Fig. 1) of the spindle 15 is supported by a flat, narrow lug 26 which projects from and is formed integral with a shaft or pin 27 rotatably journaled in the side frame 12, the construction being such that when the shaft or pin 27 is rotated, the lug rotates the spindle 15. The shaft or pin 27 is operatively connected to a shaft 29 by means comprising a clutch device 30 and gearing 31, the shaft 29 being provided with a handle 32 at one end whereby it may be rotated. The construction of the mechanism for driving the shaft or pin 27 does not form a part of this invention and therefore need not be described in detail. It is sufficient to state that the handle 32 may be turned manually to rotate the pin or shaft 27 in either direction so that the gelatine band 14 may be advanced in either direction across the platen 13.

The spindle 15 preferably comprises a wooden roller 35 provided with bores 36 and slots 36*a* at its ends. Metallic ferrules 38 secured to the ends of the roller 35 are provided with frustro-conical walls 39 which form inwardly extending frustro-conical surfaces at the ends of the roller 35. These frustro-conical surfaces may be said to form outwardly flaring depressions 40. Lugs 38*a* struck from the ferrules 38 project into the slots 36*a* and prevent angular displacement of the ferrules on the roller.

Each of the ferrules 38 is provided with an elongated slot 42, a portion of the metal in the wall being bent back into the adjacent slot 36*a* as indicated at 43. The slots 42 are of such size and shape that the lug 26 will fit snugly in either of them. (See Figs. 1, 4 and 5.) Notches 44 formed in the side edges of the slots 42 are adapted to receive the pin 16, the construction being such that the notches 44 and the bent back portions of metal 43 provide bearing surfaces which engage the pin 16. (See Figs. 1, 2 and 3.) The term "bearing surfaces" is employed in a broad sense to indicate that the left hand end (Fig. 1) of the spindle 15 is supported upon the pin 16. The same term is also employed to indicate that the left hand (Fig. 1) of the spindle 15 is rotatably journaled upon the pin 16.

It will be readily understood that the ends of the spindle 15 are interchangeable and that the manner in which the spindle is interposed into the machine depends entirely on the direction the gelatine band 14 is wound around the spindle.

The operation of the above described apparatus is substantially as follows. If it is assumed that the spindle 15 with its roll of gelatine band 14 is to be inserted in the machine, it will be readily understood that the left hand end of the spindle may be brought into a position wherein the pin projects into its outwardly flaring depression 40 whereupon, if one pushes against the pin 16 with the spindle, the pin 16 will be guided into the notches 44. Then if one continues to push the spindle 15 to the left (Fig. 1) against the action of the spring 20, the right hand end of the spindle may be brought into a position wherein the lug 26 engages the outwardly flaring depression 40 formed in the right hand ferrule 38. The spring 20 will then urge the spindle 15 to the right (Fig. 1) so that the slot 42 in the right hand ferrule 38 will slide over the lug 26 if the lug 26 is not disposed at too great an angle with the slot. However, if the lug 26 does not enter the slot immediately, it will be brought into alinement therewith if the shaft or pin 27 is rotated through a relatively small angle by rotating the panel 32. When the lug 26 comes into alinement with the slot 42, the spring 20 insures that the slot will slip over the lug. The spindle is then alined in the machine and may be driven in either direction by means of the handle 32.

It will be noted that the corners at the outer end of the lug 26 are rounded as at 26*a* to assist in guiding the lug into the slots 42.

A feature of the improved construction is that substantially the entire end surfaces of the spindle 15 guide the pin 16 and the lug 26 into the notches 44 and the slots 42, respectively. Substantially the entire diameter of the spindle is utilized for this purpose and therefore the operator need not make any painstaking efforts to bring the spindle into alinement with the pin 16 and the lug 26 when the spindle is assembled with the machine.

It will be readily understood that when the spindle 15 is to be removed from the machine, one may withdraw the pin 16 from the left hand end (Fig. 1) of the spindle by pulling upon the knob 24. The spindle may then be disengaged from the lug 26.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims, in which it is my intention to claim all novelty inherent in my invention as broadly as possible, in view of the prior art.

I claim:

1. A spindle having depressions in the ends thereof, which depressions are substantially coextensive with the ends of the spindle and flare outwardly in all directions, the inner ends of said depressions terminating in polygonal slots adapted to receive a member for driving the spindle by engaging one of said slots, edges of said slots being notched to form bearing surfaces for a pin supporting the spindle.

2. A spindle having a depression formed in an end thereof, which depression flares outwardly in all directions and terminates at its bottom in an elongated slot adapted to receive a member for driving the spindle by engagement with the edges of the slot, the length of said slot being less than the diameter of said depression.

3. A spindle having depressions formed in the ends thereof, which depressions flare outwardly and terminate at their inner ends in slots adapted to receive a member for driving a spindle by engagement with the edges of one of said slots, the edges of said slots being notched to provide bearing surfaces for a pin adapted to support one end of the spindle.

4. In a duplicating machine provided with side frames and a gelatine band, the combination of a shaft rotatably mounted in one of the frames and having a lug projecting therefrom, a pin mounted

for transverse movement in the other frame, and a spindle for said band carried by said lug and said pin, said spindle having depressions in its ends substantially coextensive therewith, which depressions flare outwardly in all directions and terminate at their bottoms in slots adapted to receive the said lug, the edges of said slot being notched to form bearing surfaces for said pin and the length of said slot being less than the diameters of said depressions.

5. A spindle having an end which is round in cross-section, said end being provided with a depression substantially coextensive therewith and flaring outwardly in all directions, said spindle being provided with a slot at the bottom of the depression to engage a member adapted to drive the spindle by engaging the walls of the slot, said depression being of a diameter greater than the length of the slot.

6. In a duplicating machine provided with side frames and a duplicating band, the combination of a pin rotatably mounted in one of the frames and having a lug of polygonal cross section projecting therefrom, a second pin carried by said frame, and a spindle for said band carried by said pins, resilient means urging one of said pins into engagement with the spindle, said spindle having a depression formed in one end thereof, which depression flares outwardly in all directions and terminates at its bottom in an aperture shaped to fit the contour of said lug, the largest diameter of said aperture being less than the diameter of said depression.

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