April 17, 1934. J. K. DUNCAN ET AL 1,955,489

SPINDLE AND SPINDLE RECEPTACLE

Filed Oct. 8, 1930 2 Sheets-Sheet 1

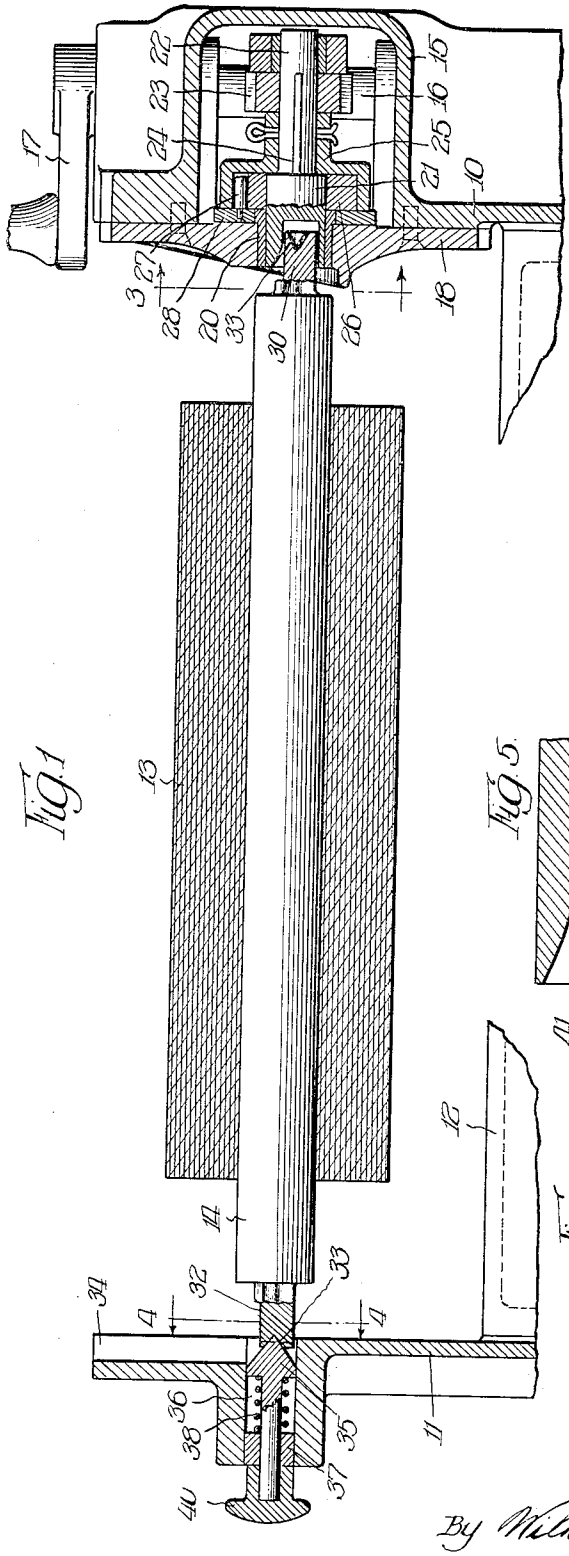

Fig. 1

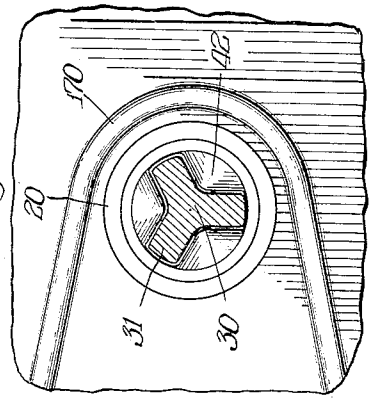

Fig. 3.

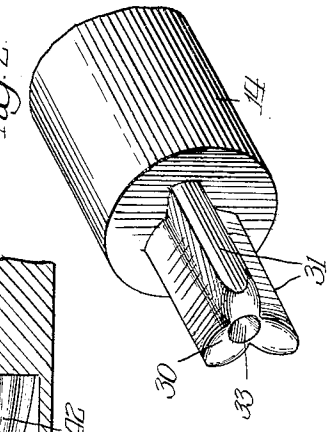

Fig. 2.

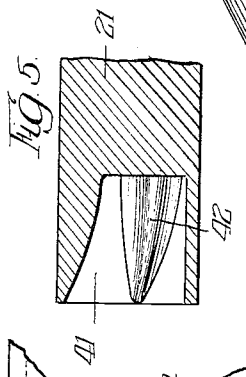

Fig. 5.

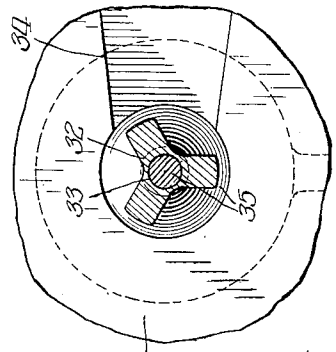

Fig. 4

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SPINDLE AND SPINDLE RECEPTACLE

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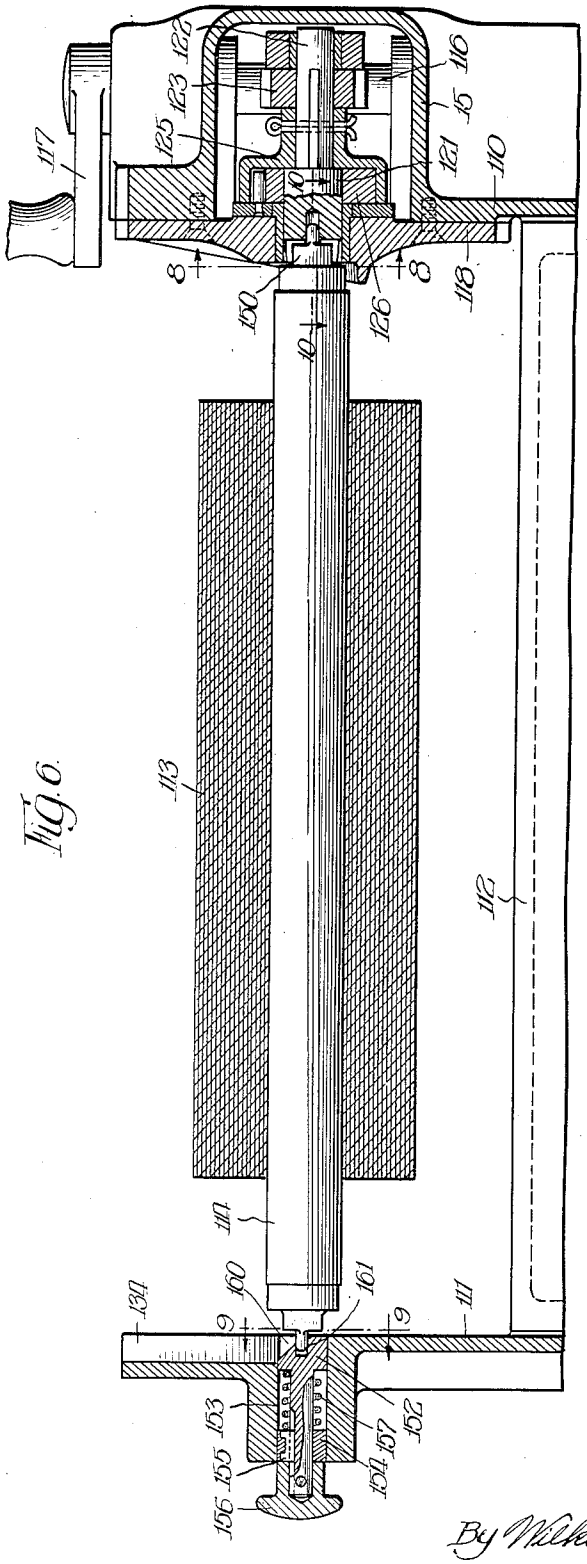

Fig. 6.

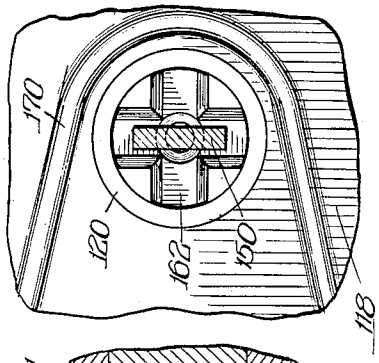

Fig. 8

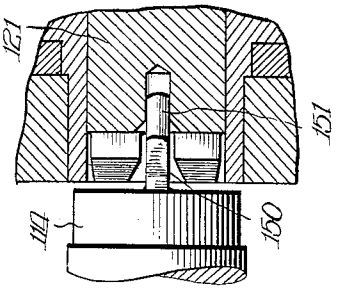

Fig. 10

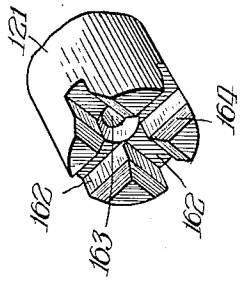

Fig. 7.

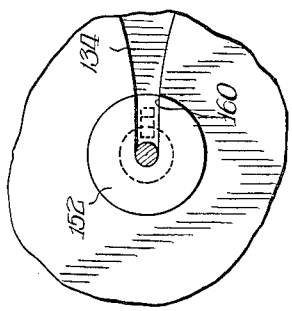

Fig. 9

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Patented Apr. 17, 1934 1,955,489

UNITED STATES PATENT OFFICE

1,955,489

SPINDLE AND SPINDLE RECEPTACLE

James K. Duncan and Rudolph Weide, Chicago, Ill., assignors to Ditto Inc., Chicago, Ill., a corporation of West Virginia

Application October 8, 1930, Serial No. 487,226

2 Claims. (Cl. 242—68)

The invention relates to duplicating machines of the type employing a copying band or matrix, on which a master sheet is first impressed and from which copies to the desired number are taken, and has reference more particularly to a novel form of spindle and receptacle for receiving the spindle to provide means upon which the gelatine band is wound.

The above type of machine commonly known as hektograph machines includes a plurality of spaced side frames having secured thereto a flat platen over which is stretched the gelatine band. The band is wound upon spindles journaled in the frame at each end of the platen and the present invention is primarily concerned with the provision of receptacles designed to receive the spindle ends. It is therefore an object of the invention to provide spindles having novel shaped ends and receptacles for receiving the same, the construction permitting the spindles to be inserted into the machine and removed therefrom with the minimum of time and effort.

A further object is to provide a combination of constructional form of receptacle as related to the spindle end, that when the latter is directed towards the receptacle, engagement will take place automatically without any definite aligning of the parts by the operator, a more specific object residing in the formation given to the engaging parts which function to assist the operator in making interengagement, even if the same are brought into contact with each other out of that rotative angular alignment necessary for correct and complete engagement.

A still further object is to provide a novel construction of spindle end and receptacle therefore which will enable the operator to insert or remove either spindle of the gelatine band using only one hand.

A further object is to provide a novel receptacle for the spindle end which, in addition to forming journaling means, will function to lock the spindles in the frame against accidental removal.

A still further object is to provide a construction of the type described which will be simple to manufacture, durable and which will not easily get out of order.

With these and various other objects in view, the invention may consist of certain novel features of construction and operation as will be more fully described and particularly pointed out in the specification, drawings and claims appended hereto.

In the drawings, which illustrate an embodiment of the device and wherein like reference characters are used to designate like parts—

Figure 1 is a plan view, parts being shown in section of one end of a duplicating machine showing a spindle and supporting means for the spindle constructed in accordance with the present invention;

Figure 2 is a perspective view of one end of the spindle;

Figure 3 is a sectional view taken along line 3—3 of Figure 1 and looking in the direction of the arrows;

Figure 4 is a sectional view taken through line 4—4 of Figure 1 and looking in the direction of the arrows;

Figure 5 is a sectional view showing the socket formation of one of the receptacles;

Figure 6 is a plan view, parts being shown in section of a modified form of spindle and supporting construction;

Figure 7 is a perspective view showing the formation of one of the receptacles;

Figure 8 is a sectional view along line 8—8 of Figure 6;

Figure 9 is a sectional view along line 9—9 of Figure 6; and

Figure 10 is a sectional view along line 10—10 of Figure 6 looking in the direction of the arrows.

The preferred embodiment of the invention is illustrated in connection with a conventional form of hektograph machine comprising side frames 10 and 11, suitably spaced from each other and forming a support for the flat platen 12. Adapted to be stretched over the platen and supported thereon is a gelatin band 13 which is wound upon spindles 14 suitably journaled in the side frame at each end of the platen. In the operation of the machine the gelatin band is unwound from one spindle and wound upon the other. For this operation suitable means is required for causing rotation of the spindle in the desired direction and since this mechanism comprises no part of the present invention, it will be described very briefly. The side frame 10 is provided with a gear housing 15 within which is journaled a longitudinally extending shaft 16 having an operating handle 17 secured to one end. Mounted upon the inner surface of side frame 10 at the location desired for supporting the spindle 14 is a face plate 18 provided with a central opening into which is fitted a bushing 20. Mounted for rotation in the bushing 20 is a shaft 21 having a reduced end 22 to which is keyed a gear 23, by means of the key 24. Rotation of shaft 16 by the operator thus functions to im-

part rotation to shaft 21, since gear 23 has meshing engagement with a corresponding gear keyed to shaft 16.

Since it is necessary at times in the operation of the machine to allow spindle 14 to have rotation independent of shaft 16, the drive mechanism is provided with a clutch comprising a clutch housing 25 keyed to shaft 22 and an internal clutch member 26 adapted to normally engage a plurality of rollers 27 which in turn project from the face of a rotatably mounted disc 28. Shaft 16 is mounted for longitudinal movement in the housing 15 and thus in one position rotation of the same is imparted to gear 23 and shaft 21, the rotation being in that direction to cause disengagement of the clutch members allowing the shaft to rotate. Upon reverse rotation of shaft 16 the clutch members will be locked and this locking of shaft 21 results in movement of shaft 16 in a direction to disengage the gears and cause engagement of similar gears provided at the opposite end of the machine for rotating the spindle journaled in that end.

A feature of the present invention resides in the construction of the spindle 14 so that the same may be conveniently journaled in the side frames and will have engagement with shaft 21 in a manner to prevent relative rotation. The spindle 14 at its ends is provided with projecting studs 30 and 32, the studs having a Y formation resulting in a plurality of projections 31. In this particular modification the faces of the studs are provided with a cone shaped depression 33, located centrally so as to be coaxial with the spindle. For allowing insertion of the spindle the side frame 11 is provided with guides 34 which form a throat adapted for directing and thus facilitating the engagement of the stud 32 with a pin 35. The mounting of pin 35 in side frame 11 is accomplished by providing the frame with an opening 36 within which the pin is located. A bushing 37 closes the outer end of the opening and provides a stop for the coil spring 38 which maintains the pin 35 in its extreme inward position. To the outer end of pin 35 is suitably secured a knob 40 for engagement by the operator to withdraw the pin allowing disengagement of the same with the spindle.

For journaling that end of the spindle provided with stud 30 a socket 41, Figure 5, is formed in shaft 21 and is provided with a plurality of ribs 42, the construction resulting in a receptacle designed for receiving a stud having a formation similar to stud 30, as shown in Figure 3. The insertion of stud 30 in the socket 41 results in the engagement of the projections 31 with the ribs 42 and thus prevents rotation of the parts relative to each other. By reference to Figure 5 it is seen that the ribs 42 have a shape such that the socket 41 is given a flaring formation so that the insertion of stud 30 in the socket is materially facilitated and the interengagement of the ribs with the projections occurs automatically without any definite aligning of the parts previously by the operator.

With the spindle constructed as above, the same is inserted into the side frames by first inserting the stud 30 into the socket 41 and locating the stud 32 in the throat of frame 11 defined by guides 34. It is then only necessary to urge the stud 32 into engagement with pin 35 and upon sufficient force being exerted the pin will be caused by reason of its cone shape to move towards the left, as shown in Figure 1, allowing the stud 32 to be located in position for pin 35 to engage the opening 33. The above procedure can be accomplished by the operator by using one hand only, since a grasping of the gelatin roll and a locating of the ends for engagement with their respective receptacles is all that is necessary. Also, previous alignment of the spindle ends is not necessary since the flaring opening 41 allows easy insertion of stud 30 therein and the construction of the stud and of the opening is such that interengagement between the projections and ribs takes place automatically.

Referring to Figure 6 a modified form of spindle construction and receptacles therefore is illustrated in connection with a conventional form of duplicating machine similar to that shown in Figure 1, in which frames 110 and 111 support a flat platen 112. The spindle 114, having the gelatin band 113 wound thereon, is suitably supported for rotation within the frames by the construction to be described and is adapted to be driven in the desired rotation through shaft 116, having a handle 117 secured thereto. The driving mechanism is located in housing 15 and includes a shaft 121 having a reduced portion 122 to which is keyed a gear 123. Clutch construction formed by a clutch housing 125 and internal clutch member 126 serve to lock shaft 121 against rotation upon the desired rotation being imparted to shaft 116 in the manner as described in connection with the driving mechanism disclosed in Figure 1.

In the present modification the spindle 114 is provided with a stud 150 consisting of a flattened member having a rounded point 151, Figure 10, integrally formed therewith, both ends of the spindle being formed with studs of similar shape. The supporting of the spindle in the side frames is accomplished by suitable receptacles, to be now described.

The side frame 111 is provided with a positioning throat defined by guides 134 which directs the end of the spindle into contact with a pin 152 mounted in opening 153 formed in the side frame. A bushing 154 serves to close one end of the opening and also provides a mounting for the pin 152. To prevent rotation of pin 152 the bushing is provided with a key 155 which engages within the longitudinal slot formed in the shaft of the pin. A knob 156 is suitably secured to the outer end of the shaft and serves to provide an operating handle so that the operator may grasp the same and withdraw the pin 152 against the tension of spring 157. A slot 160 is provided in pin 152 and forms a passageway leading to the opening 161 formed centrally of the pin. The end of shaft 121 is also formed for engagement with the studs 150 in a manner to prevent relative rotation of the parts and consists in a plurality of slots 162, which are provided in the end of the shaft intersecting each other at substantially right angles together with a beveled opening 163 formed centrally of the shaft. For facilitating the insertion of the flattened stud 150 in the slots 162, beveled edges 164 are provided so that the width of the slot is materially increased.

The location of the spindles 114 within the side frame is accomplished by first inserting one end of the spindle in opening 163 allowing the other end to engage the pin 152 by inserting the end in the throat provided in side frame 111 defined by guides 134. A slight pressure upon this end of the spindle will be sufficient to cause rearward movement of pin 152 as the rounded end 151 will contact the beveled face of slot 160 thus resulting in locating the rounded end in opening 161.

Thus this modification also results in easy insertion of the spindle within the side frames, since it is only necessary for the operator to locate the rounded end 151 in opening 163 and the stud 150 on the opposite end of the spindle within the guides 134. By means of the beveled faces 164 location of the flattened stud within slots 162 is practically automatic and occurs without any previous aligning by the operator. Also the above procedure can be accomplished by the operator by using one hand only, since a grasping of the gelatin roll and a locating of the ends for engagement with their respective receptacles is all that is necessary.

As further means for facilitating the insertion of the spindles in the side frames the face plate 18, Figure 1, and the face plate 118, Figure 6, is provided with a rib 170. The rib 170 has a formation such that it defines a horizontal channel, with an opening at the outer edge of the plate and terminating in the vicinity of the receptacles located centrally of the plate. In the vicinity of these receptacles the ribs 170 have their maximum height gradually decrease in height towards the outer edge of the plate. In locating the spindles within the side frames it has been found that engagement of the spindle end with its corresponding receptacle does not always occur, especially if the procedure is hurried, and for this reason the ribs 170 are provided, forming means for directing the end of the spindle towards the receptacle and further prevent movement of the spindle end in a direction beyond the center of the plate.

It is to be understood that we do not wish to be limited by the exact embodiment of the device shown, which is merely by way of illustration and not limitation, as various and other forms of the device will of course be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

We claim:

1. As an article of manufacture a spindle shaft, the ends of said shaft provided with a stud formed into a plurality of projections giving to the stud a Y formation, said stud having a cone shaped depression in its face coaxial with the shaft.

2. In a duplicating machine including side frames, a spindle, the ends of said spindle being formed to provide a stud having radial projections, means for mounting the spindle in the frames including a member rotatably mounted in one frame, a socket formed in the end of the member, and ribs in the socket flaring in a direction to increase the opening of the socket, said ribs engaging the projections when the stud is inserted in the socket.

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