July 1, 1958 E. RUTISHAUSER 2,841,393

PAPER-CLAMPING DEVICE FOR ROTARY DUPLICATING MACHINES

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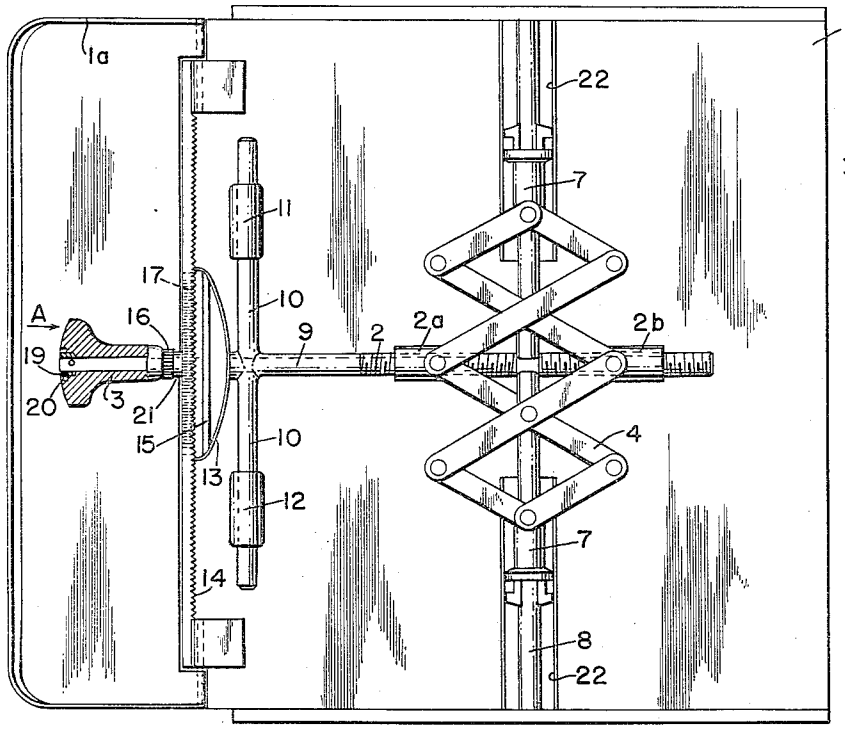


FIG. 1

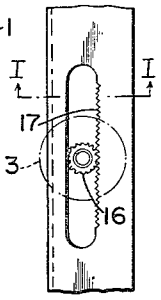


FIG. 2

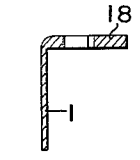


FIG. 3

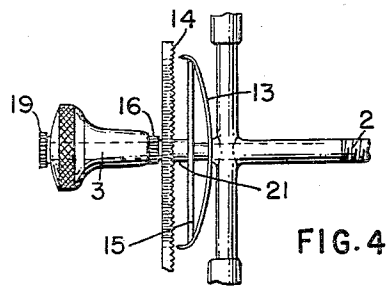


FIG. 4

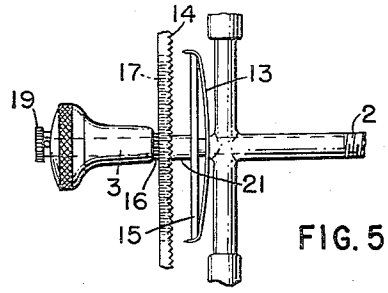


FIG. 5

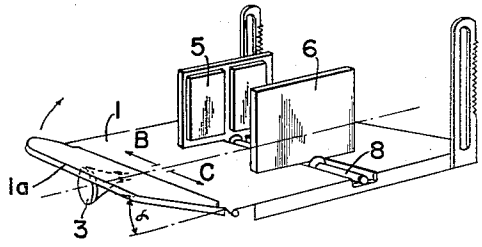


FIG. 6

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PAPER-CLAMPING DEVICE FOR ROTARY DUPLICATING MACHINES

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7 Claims. (Cl. 271—61)

This invention relates to a paper-clamping device for rotary duplicating machines, and more particularly to a mechanism for adjusting the clamping jaws of rotary duplicators.

With modern duplicators, the stack of blank sheets is held on the paper-supporting table by means of clamping jaws which prevent more than one sheet from being fed to the machine at any one time. There are also provisions for shifting the entire clamping device at right angles to the feeding direction. The clamping device itself and the means for effecting its lateral movements are usually actuated by control means which protrude beyond the sides of the machine, which sides constitute the cylinder bearings.

The primary object of my present invention is to provide a single actuating or control organ to perform the various manipulations required to adjust the clamping jaws.

Another object of the invention is to arrange the actuating or control organ within the space occupied by the body of the machine so that the organ will not project beyond such space.

Other objects of my invention will appear from the following description.

In order that the present invention may be fully understood, an illustrative embodiment is described hereinafter in detail, by way of example, and shown in the accompanying drawing in which:

Fig. 1 is a plan view of the paper-supporting table of the device according to the invention, viewed from below;

Fig. 2 illustrates a detail of my device, used for fine adjustments of the lateral position of the device;

Fig. 3 shows a section taken in the plane of the line I—I of Fig. 2;

Fig. 4 shows the control organ or control knob of my device;

Fig. 5 shows the control knob in another position; and

Fig. 6 is a perspective view of the paper-supporting table.

Referring to the drawing in greater detail, to the plate **1** or the main part of the paper-supporting table is pivotally joined the plate **1***a* or the end part of the table. In its operating position, the part **1***a* makes with the part **1** an angle α which is less than 45°. Due to this inclination of the end part of the table, a stack of blank sheets resting on the end part becomes stiffened so that it cannot warp under the pressure of the clamping jaws. When the machine is not in use, the plate **1***a* may be tilted upwardly about an angle of 90° with respect to the plane of the table so that the space required for the storage of the machine will be reduced.

Below the part **1***a* of the table there is a control knob **3** mounted on a threaded spindle **2**. The spindle extends below the main part **1** of the table in the paper-feeding direction. It is provided with right hand and

left hand threads which threadedly extend through bushings **2***a* and **2***b*, respectively, which bushings are secured to the center members of a lazy tongs **4**. The spindle is connected to the control knob **3** by means of disengageable coupling members **19** and **20**, the former being a toothed wheel or gear, and the latter being formed by matingly shaped internal teeth. In the embodiment of the invention, selected for illustration, the toothed wheel **19** is fixedly mounted on an end of the spindle **2**, and the teeth **20** are provided in the control knob **3** which is axially slidable and rotatable with respect to the spindle. When the knob **3** is turned with the gear **19** meshing with the teeth **20**, the lazy tongs are either contracted or extended. The table part **1** has laterally extending slots **22** therein above the lazy tongs **4**, and guide sleeves **7** are secured to the ends of the lazy tongs and carry clamping jaws **5** and **6** having portions which project through the slots **22** above the paper-supporting table (see Fig. 6). Thus, by actuating the knob **3**, the lazy tongs are either contracted or extended to cause the jaws **5** and **6** to either exert a clamping pressure on a stack of blank sheets, or release such pressure. In order to mount the assembly of the spindle **2**, lazy tongs **4**, sleeves **7** and clamping jaws **5** and **6** for movement, as a unit, transversely with respect to the table part **1**, the guide sleeves **7** are slidably mounted on a guide rod **8** which is supported by the table part **1** and extends below the slots **22** in the transverse direction with respect to the direction of the paper feed. Further, a bushing **9** slidably receives the spindle **2** and has rods **10** extending laterally from the opposite sides thereof. The rods **10** are slidably received in bearings **11** and **12** which are secured to the underside of the table part or plate **1**.

The illustrated device embodying the present invention further has releasable latching means operative to prevent lateral movement, as a unit, of the assembly of the spindle **2**, lazy tongs **4**, sleeves **7** and clamping jaws **5** and **6**. Such releasable latching means includes a laterally extending toothed rack **14** carried by the table part **1**, a bow-like double-acting pawl **13** mounted, at its center, on the spindle **2** and engageable, at its opposite ends, with the rack **14** to hold the spindle against lateral displacement relative to the table, and a chordal member **15** extending across the pawl. A tube **21** is axially slidable on the spindle **2** between the knob **3** and the chordal member **15** so that, when the knob **3** is displaced axially along the spindle from the position of Fig. 1 to the position shown in Fig. 4, for disengaging the coupling **19**, **20**, the extension tube **21** pushes the chordal member **15** forward, and the latter acts on the pawl **13** to disengage the latter from its previous engagement with the laterally extending rack **14**. With the pawl **13** in disengaged condition, the spindle **2**, together with the lazy tongs **4** and the clamping jaws **5** and **6**, may be moved in lateral directions, as indicated by the arrows B and C in Fig. 6. The guide sleeves **7** slide along the rod **8**, and the rods **10** slide in the bearings **11** and **12**.

A different position of the control knob **3** is shown in Fig. 5, wherein the control knob has been pushed still further along spindle **2** so that a spur gear **16**, which is mounted on the spindle and connected with the control knob (see also Figs. 1 and 4), is brought into engagement with a rack **17** formed on an offset edge portion **18** of the paper-supporting table (see Fig. 3). By turning knob **3** in the axial position of Fig. 5, it is thus possible to obtain fine adjustments of the lateral position of the spindle **2** and, accordingly, of the entire clamping device.

It is believed that the construction of the form of apparatus for practicing the invention, as shown and described hereinbefore, and the operation thereof, as well

as the many advantages offered by the construction of the invention, will be understood from the foregoing detailed description. Some of the features of the invention are reviewed hereinafter.

My paper-clamping device for rotary duplicating machines includes a control organ disposed below the table supporting the paper to be printed. The control organ is provided on a threaded spindle which also extends below the table and is operatively connected with so-called lazy tongs. Each end of the lazy tongs carries a clamping jaw. On turning the control organ which is constituted by a knob, the clamping jaws are caused by the lazy tongs to move toward one another.

My invention further provides that the spindle and, hence, the entire clamping device may be moved in the direction normal to the longitudinal axis of the spindle with the aid of means controlled by the control knob.

According to one feature of my invention, the control knob also permits fine adjustments of the threaded spindle in the direction normal to its longitudinal axis.

My invention provides a single control organ which suffices to close the clamping jaws and to ensure both coarse and fine lateral adjustments of the clamping mechanism. It will be apparent that the control organ is arranged within the over-all space occupied by the machine.

It will be clear that while I have shown and described my invention in one form only, many changes and modifications may be made without departing from the spirit of the invention defined in the following claims.

I claim:

1. Paper clamping device for rotary duplicating machines comprising a table for supporting a stack of the paper to be printed, a threaded spindle extending longitudinally below said table, two-armed lazy tongs operatively connected to said spindle and extending laterally at the opposite sides of the latter, said table having laterally extending slots therein, clamping jaws connected to the opposite ends of said lazy tongs and having portions extending through said slots so that said jaws are moved toward and away from each other, to respectively clamp and release a stack of paper therebetween, by rotation of said spindle, means slidably supporting said spindle and lazy tongs for bodily lateral movement as a unit with respect to said table, releasable locking means normally holding said spindle and lazy tongs against bodily lateral movement with respect to said table, a control knob on said spindle, coupling means releasably connecting said knob to said spindle for normally effecting rotation of the latter, said knob being movable relative to said spindle to disengage said coupling means and simultaneously to release said locking means for permitting lateral adjustment of said spindle and lazy tongs as a unit, and means operable by said knob upon movement of the latter for release of said coupling means and locking means to effect fine lateral adjustment of the position of said spindle and lazy tongs, whereby said control knob is manipulable to control the positions of said jaws with respect to each other, as well as with respect to said table in the lateral direction.

2. Paper clamping device according to claim 1; wherein said means supporting the spindle and lazy tongs for lateral movement with respect to the table includes a laterally extending guide rod between said table and said lazy tongs, and a guide sleeve secured to each end of said lazy tongs and slidable on said guide rod, said jaws being mounted on said guide sleeves at the related ends of the lazy tongs.

3. Paper clamping device according to claim 1; wherein said means supporting the spindle and lazy tongs for lateral movement with respect to the table includes a bushing on said spindle, rods extending laterally from said bushing in opposed directions, and bearings depending from said table and slidably receiving said laterally extending rods.

4. Paper clamping device according to claim 1; wherein said knob is axially movable relative to said spindle for release of said coupling means; and wherein said locking means includes a laterally extending toothed rack carried by said table, a bow-like double-acting pawl on said spindle engageable with said rack, a chordal member slidable on said spindle and extending across said pawl, and an extension tube slidable on said spindle between said knob and chordal member so that, when said knob is displaced axially to release said coupling means, said extension tube is similarly displaced against said chordal member which, in turn, flattens said pawl to disengage the latter from said rack and thereby permit lateral adjustment of said spindle and lazy tongs as a unit.

5. Paper clamping device according to claim 4; wherein said means for effecting fine lateral adjustment of said spindle and lazy tongs includes a laterally extending gear rack on an offset edge of said table, a spur gear on said knob and rotatable with the latter relative to said spindle and in mesh with said gear rack when the knob is axially displaced to disengage said coupling means and release said locking means, the extent of the axial displacement of the knob required for bringing said spur gear into meshing engagement with the related gear rack being greater than the axial displacement necessary for disengagement of said coupling means and release of said locking means so that, upon axial displacement of said knob to an extent just sufficient to disengage said coupling means and release said locking means, said knob can be shifted laterally to effect coarse lateral adjustment of the spindle and lazy tongs, while further axial displacement of the knob, to mesh said spur gear with the related gear rack, makes it possible to achieve fine lateral adjustmetn of the spindle and lazy tongs by rotation of the knob.

6. Paper clamping device according to claim 5; wherein said coupling means includes a gear fixed on said spindle, said knob having a recess in the end thereof facing away from said extension tube and formed with internal teeth adapted to mesh with the teeth of said gear fixed on the spindle, said bow-like pawl yieldably urging said knob axially in the direction causing said gear fixed on the spindle to engage in said recess of the knob.

7. Paper clamping device according to claim 1; wherein said table includes a main part and an end part located above said control knob and being angularly adjustable with respect to said main part, said end part making an angle of less than 45° with said main part during the operation of an associated duplicating machine so that a stack of paper on said table is bent in the longitudinal direction to increase the lateral stiffness of the stack and prevent buckling of the latter under the pressure exerted thereon by said clamping jaws, and said end part being arranged at 90° to said main part during storage of the paper clamping device thereby to decrease the space required for such storage.

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