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DOUBLE TRUCK PLATE-MATCHING MACHINE

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Fig. 1.

Fig. 2.

Fig. 3.

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[Patent drawings and diagrams]
This invention relates to means for machining printing plates and more particularly has reference to means for machining a keyway in the edge of the plate used in printing a double-truck page.

We are, of course, well aware that devices have heretofore been used for forming a keyway in the edge of a printing plate. Such devices, however, have been open to serious objections. The most common manner of accomplishing this result has been to cast the keyway in a casting machine. This process requires the removal of the regular bevel ring from the bottom of the mold and replacing it with a specially formed ring for casting the keyway. One of the principal objections to this process is that it necessitates some appreciable time to make this change.

An important object of our invention is to overcome the difficulties now encountered in the prior art.

Another object of our invention is to provide a machine for forming a keyway in the edge of a printing plate in a minimum of time.

A still further object of our invention is to provide an apparatus for machining a keyway in the edge of a plate for a double-truck page.

Yet another object of our invention is to provide a double truck plate having a machined undercut portion in one of its edges.

With these and other objects in view, which may be incident to our improvements, the invention consists in the parts and combinations to be hereinafter set forth and claimed, with the understanding that the several necessary elements comprising our invention may be varied in construction, proportions and arrangements, without departing from the spirit and scope of the appended claims.

In order to make our invention more clearly understood, we have shown in the accompanying drawings means for carrying the same into practical effect without limiting the improvements in their useful applications to the particular constructions which, for the purpose of explanation, have been made the subject of illustration.

In the drawings:

Figure 1 is an elevational view of our invention.

Figure 2 is an end view of our invention.

Figure 3 is a top plan view of the apparatus depicted in Figure 1.

Figure 4 is an elevation partly in section of the machine shown in Figure 1.

Figure 5 is a view taken along line 5—5 of Figure 4, looking in the direction of the arrows.

Figure 6 is a view taken along line 6—6 of Figure 4, looking in the direction of the arrows.

Figure 7 is a view taken along line 7—7 of Figure 4.

Figure 8 is a view in perspective, showing our cutter for forming the required bevel.

Figure 9 is a view in perspective, showing the motor for facing off at the overhanging lip.

Figure 10 is a view in perspective of our cutter for trimming the edge of the bevel.

Figure 11 is a sectional view showing the manner of holding two plates undercut according to our inventions on the printing roll.

Figure 12 is an end view of a modified form of our invention.

Figure 13 is a view taken along the line 12—12 of Figure 12.

Figure 14 is an elevation partly in section showing yet another form of our invention.

Figure 15 is a view taken along line 14—15 of Figure 14.

Figure 16 is a view in perspective showing the machining device depicted in Figure 14.

Referring to the drawings, and more particularly to Figure 1, there is shown a standard 1 having a base 2 and a pair of arms 3 and 4. A shaft 5 is secured to the standard by bolts or the like 6.

A cylinder or drum 7 of the same diameter as the printing drum of the printing press is fitted over the arms 3 and 4. A shaft 8 extends through aligned apertures 9 and 10 in the arms 3 and 4 respectively. The shaft is secured against rotary and longitudinal movement by means of screws 11. Webs 12 are also suitably secured to the shaft 8 to support the drum 7.

A ring 13 is mounted on one end of the cylinder 7 and is secured thereto by screws or the like.

The inner edge of the ring is beveled as shown at 14 and the bevel 14' conforms to the customary bevel 14 of a printing plate 15. Referring to Figure 4, it can be seen that, when the plate 15 is positioned on the drum 7, the bevel 14' will coincide with bevel 14 and the ring 13 will serve as a stop for the plate.

In order to form the keyway in a plate for the left hand side of the double truck page, the head end of the printing plate 15 is adapted to rest on the stop 16. The inverse is true of the right hand side as the bottom end rests on the stop.

As best shown in Figure 5, a strap 17 holds the plate 15 on the cylinder 7. One end of the strap is secured by an adjustable screw 18 to a bracket 19 provided on the cylinder. The other extremity of the strap terminates in an eccentric locking device 20 which is adapted to fit over a bracket 21.

The machining portion of our invention com-
prises a revolving tool head depicted generally at 22. The tool head 22 is driven by an electric motor 23 mounted on the bracket 6. It is to be understood, however, that any other suitable source of power may be employed in lieu of an electric motor. As shown in Figures 4 and 7, a sleeve 24 is keyed as at 25 on the shaft 8. As will later be more fully disclosed, the sleeve is movable longitudinally on the shaft but is held from rotary movement by the keys 25. The inner race 26 of a ball-bearing 27 is positioned on a reduced portion of the sleeve. The outer race 29 carries a cutter head 23. A cover plate 30 is provided on the cutter head 23 by screws 31. The plate 30 prevents foreign matter from entering into the bearings 27 and also keeps the upper race 29 in position.

Secured to the cutter head 23, as at 32, is a ring gear 33. The gear 33 meshes with a long pinion 34 carried by the shaft of the motor 23 for rotating the cutting head 23.

The cutting head 33 is provided with a plurality of cutter tools or bits designated 35. Screws 36 removably secure the cutting members in place.

In order to provide a locking edge for double thickness plates, it is necessary that machining will give a much better joint for uniting the plates than any process heretofore employed. By employing a plurality of cutters having different bevels, an excellent and uniform undercut is provided in the edge of the plate. In Figures 8, 9, and 10, we have shown the types of cutters which best accomplish the desired results. The cutter shown in Figure 8 is provided with a bevel 36° for making the necessary undercut; the cutter in Figure 9 is provided with a bevel 33° for facing the overhanging lip formed by cutting the bevel in Figure 8 and Figure 10 shows the cutter having a right angle cutting edge 35° for trimming the lower edge of the undercut.

It will be appreciated that the number of cutters 35°, 36°, and 35° used may be varied to suit any desired working conditions. We have found that excellent results are obtained when six cutters for machining the keyway are positioned as shown in Figure 6. As depicted, we use three cutters 36° spaced sixty degrees apart with the remaining cutters 35° and 35°° arranged as shown. However, it is to be understood that any positioning of the cutting members which will properly machine the desired overhanging lip and bevel may be used.

In order to advance the cutting head 23 into the plate 13, the following arrangement is employed. The end of the shaft 8 is provided with a screw threaded longitudinal bore 37. A shaft 33 having a screw threaded portion 38' is adapted to be screwed into the bore and is provided with a flange 39.

The shaft 33 extends through an aperture 49 in the end of the sleeve 24 and is provided at its outer end with a hand operating wheel 41. It will be appreciated that there can be no longitudinal displacement of the shaft 33 due to the hub 42 of the hand wheel 41 and the flange 39.

From the foregoing it is apparent that by rotating the hand wheel 41, the cutting head 23 will be moved toward the plate 13 and machine the plate to the necessary degree. The cutting head may be moved away from the plate by turning the hand wheel 41 in an inverse direction. Obviously, such an arrangement will permit the operator to move the cutter into and out of contact with the plate 13 in a minimum of time. Moreover, the danger of improperly machining the keyway in the edge of the plate is greatly reduced as the operator can clearly see the progress being made.

Referring to Figure 11, we have shown the manner in which the double truck page is assembled. One of the plates 99 has its beveled edge 51 abutting a stop member 52 provided on a press or other opposite or inner edge of the plate 60 is provided with an undercut portion 54 and an overhanging lip 55. Similarly, a second printing plate 55 is provided with an undercut portion 51 and an overhanging lip 56. A double truck key 56 is inserted into the undercut portion 51 of the head 23 by screws 31. The plate 30 conforms to the bevel of the plate 56.

In Figures 12 and 13, we have shown a somewhat modified form of our invention. Grooves 106 are provided in the bracket 6 and a slide 101 is adapted to move in the grooves. A hand wheel 102 having a screw threaded portion 103 extends through a screw threaded aperture in the slide 101. Sufficiently affixed to the cutting head 23 is a gear 105. As shown, the gear 106 is provided within the plate 56 with gear 106 a gear 105 carried by the shaft of the motor 104 for imparting rotary movement to the cutter head 23. The gears 105 and 106 are preferably of the silent mesh type.

The operation of this form of our invention is essentially the same as that heretofore described. By merely rotating the hand wheel 102, the cutter head is moved into and out of engagement with the printing plate secured to the cylinder 1.

There is shown in Figures 9 to 16 inclusive another form of our apparatus. It should be noted that this form differs from the apparatus shown in Figure 1 in that the plate support is movable and the cutting members are stationary, and it is possible to machine the edges of two printing plates in the same operation.

Referring to Figure 14, we have shown a pair of standards 200 and 201 which are suitably affixed to a base 202. The standard 200 is of greater height than the standard 201 and is provided with an enlarged horizontal portion 203, the purpose of which will be described more fully. A shaft 204 having reduced ends 205 is journaled in the standard 201 in a bushing 203. Another reduced end of the shaft is journaled in an offset portion 207 provided on the standard 200 in a bushing 205. A cylinder or drum 209 provided with supporting webs 211 is keyed to the shaft 204 as at 212. A ring 213, similar in construction to ring 13 shown in Figure 1, is secured around the periphery of the drum 209. Diametrically opposed stops 214 and 215 are secured to the sides of the drum as at 216 and 217 so as to prevent rotary movement of printing plates 216 and 219 with respect to the drum.

In order to properly secure the plates to the drum 209, a strap 221 is fitted around the plates and is provided with a suitable locking device 222.

An essential feature of this form of our apparatus is to provide means for supporting the plate supporting drum 209 may be rotated. As clearly shown in Figure 14, a gear 223 is keyed to the reduced end of the shaft 204 as at 224.

A counterbalance 225 is adjustably affixed to the gear at 226 in a line at right angles to the stops 214 and 215. Obviously, the counterbalance 225 may be shifted on the gear 223 in order
to take care of variations in weight of the pairs of plates being machined.

The gear 223 meshes with a pinion 227 carried by the shaft of an electric motor 228.

The machining portion of the device comprises a non-rotatable but slidable tool carrier 229. As shown in Figures 14 and 15, the horizontal portion 230 of the standard 209 is provided with a horizontal slide or groove 231. The tool carrier 229 is provided with a dovetail 232 which is slidably fitted within the guideway 231.

The tool carrier is provided with a plurality of cutting tools or blades which are removable and replaceable at 235. Inasmuch as the tools 233 are similar in construction to the cutting tools 35 hereinafore described, it is not deemed necessary to describe these members.

In order to advance the tool carrier toward the drum 209, the following construction is provided. As shown in Figure 13, the tool carrier 229 is provided with a threaded longitudinal bore 236. A feed screw 237 is adapted to be screwed into the bore 236. The end of the screw 237 is journaled in a plate 238 secured to the end of the horizontal portion 230, and a collar 239 is shrunk on the screw adjacent the plate 238. An operating handle 241 is secured to the screw adjacent the outer face of the plate 238. The handle 241 together with the collar 239 will prevent axial movement of the screw with respect to the plate.

It is obvious that, by rotating the operating handle 241, the tool carrier 229 will be moved either forward or backward, depending of course upon the direction of rotation.

From the foregoing, it is readily apparent that, when the drum 209 is rotated through the gear train, a keyway may be cut in the edge of the plates by advancing the tool carrier 229 by rotating the hand wheel 241.

Our invention of course finds particular application in the formation of printing plates for the normal double truck page. However, it will of course be apparent that the device is efficacious when it is desired to make a plate to provide a bleed page—that is, a page in which the printed matter extends to the very edge. In such case, the sides of the plate may be readily trimmed all the way down to the side of the type. This will be appreciated from the foregoing description that we have devised an apparatus which will economically machine an undercut edge in a printing plate. Moreover, with this apparatus it is possible to machine an overhanging lip and bevel in double truck page in much less time than by the use of the methods now in use.

While we have shown and described the preferred embodiment of our invention, we wish it to be understood that we do not confine ourselves to the precise details of construction hereinafore set forth, by way of illustration, as it is apparent that many changes and variations may be made therein, by those skilled in the art, without departing from the spirit of the invention, or exceeding the scope of the appended claims.

We claim:

1. An apparatus for machining double truck printing plates comprising a support for a printing plate, a rotatable tool carrier movable toward and away from the printing plate, a plurality of circumferentially spaced cutting members carried by the tool carrier and means to move the tool carrier so that the cutting members move successively into the edge of the plate to form an undercut therein.

2. An apparatus for machining double truck printing plates comprising a support for a printing plate, a rotatable tool carrier movable toward and away from the printing plate, a plurality of circumferentially spaced cutting members carried by the tool carrier and means to move the cutting members toward and away from the printing plate during the rotation of the tool carrier, one of said cutting members making an undercut in the edge of the plate, a second cutting member facing the overhanging lip and a third cutting member facing the lower edge of the undercut.

3. An apparatus for machining double truck printing plates comprising a support for a printing plate, a rotatable tool carrier movable toward and away from the printing plate, a plurality of circumferentially spaced different cutting members carried by the tool carrier and means to move the cutting members into the edge of the plate so that the cutting members move successively into the edge of the plate to form an undercut therein.

4. An apparatus for machining double truck printing plates comprising a support for a printing plate, means to secure the plate to the support, a rotatable tool carrier movable toward and away from the printing plate, a plurality of circumferentially spaced different cutting members carried by the tool carrier, said cutting members being so shaped as to machine an overhanging lip and bevel in the edge of the plate and means to move the cutting members toward and away from the plate during their rotation.

5. An apparatus for machining double truck printing plates comprising a support for a printing plate, a tool carrier movable toward and away from the plate, a plurality of circumferentially spaced different cutting members carried by the tool carrier, said cutting members being so shaped as to machine an overhanging lip and bevel in the edge of the plate and means to rotate the tool carrier.

6. An apparatus for machining double truck printing plates comprising a support for a printing plate, a tool carrier, a plurality of circumferentially spaced cutting members carried by the tool carrier, means to effect a relative axial movement of the support and tool carrier, and means to effect a relative rotatable movement of the support and tool carrier, one of said cutting members making an undercut in the edge of the plate, a second cutting member facing the overhanging lip and a third cutting member facing the lower edge of the undercut.

7. An apparatus for machining double truck printing plates comprising a support for a printing plate, a tool carrier, a plurality of cutting members carried by the tool carrier, means to rotate the plate support, and means to advance the tool carrier to machine a keyway in the edge of the plate.

8. An apparatus for machining double truck printing plates comprising a rotatable support for a pair of printing plates, means to secure the plates to the support, a counterweight associated with said support to provide for variations in the weight of the printing plates, a tool carrier movable toward and away from the support, said tool carrier carrying said tool carrier, means to move said tool carrier, and means to rotate the plate support.

9. An apparatus for machining double truck printing plates comprising a pair of printing plates, a tool carrier, a plurality of cutting members carried by the tool carrier, means to 75
advance the tool carrier toward the support, a
source of power positioned in fixed relationship
with the support, means driven by said source of
power to impart movement in cutting direction
to the tool carrier, said driven means permitting
said advancement of the tool carrier relative to
the source of power, on said said cutting mem-
bers making an undercut in the edge of the plate,
a second cutting member facing the overhanging
lip and a third cutting member facing the lower
eoge of the undercut.
10. An apparatus for machining double truck
printing plates comprising a support for a print-
ing plate, a rotary tool carrier, a plurality of
cutting members carried by the tool carrier,
means to axially advance the tool carrier toward
the support, a power supplying means position-
ed in fixed relationship with the support, means
driven by said power means to impart a rotary
movement to the tool carrier, said driven means
permitting axial movement of the tool carrier
relative to said power means, one of said cut-
ting members making an undercut in the edge
of the plate, a second cutting member facing
the overhanging lip and a third cutting member
facing the lower edge of the undercut.
11. An apparatus for machining double truck
printing plates comprising a drum support for
a printing plate, a rotary tool carrier having
its shaft concentric with that of said drum sup-
port, power supply means, said tool carrier being
rotatively driven by projections thereon engag-
ing complementary projections on the power sup-
ply means, said projections permitting relative
axial movement between the tool carrier and the
power supply means, means to move the tool
carrier toward the drum support, and a plurality
of cutting members carried by the tool carrier.
12. An apparatus for machining double truck
printing plates comprising a drum support for
a printing plate, a rotary tool carrier having
its shaft concentric with that of said drum sup-
port, power supply means, said tool carrier being
slidable along its axis, a ring gear fixed to the
tool carrier, driving means carrying a shaft gear
slidably engaging the ring gear, means concent-
ric with and partially ringed by said carrier
shaft to move the tool carrier toward the drum
support, and a plurality of tools carried by said
tool carrier.
13. An apparatus for machining double truck
printing plates comprising a support for a print-
ing plate, a tool carrier, a plurality of cutting
members carried by the tool carrier, a power
supplying means for imparting movement of
the tool carrier in cutting direction, means for jointly
advancing the tool carrier and the power sup-
plying means toward said support.
14. An apparatus for machining double truck
printing plates comprising a support for a print-
ing plate, a rotatable tool carrier, a plurality
of cutting members carried by the tool carrier,
a power supplying means for rotating the tool car-
rrier, means for jointly advancing the tool carrier
and the power supply means toward said support.
15. An apparatus for machining double truck
printing plates comprising a support for a rotat-
able printing plate, means adapted to secure a
printing plate to said support, counterweight
means adjustable positionable on said support
in various directions and at various distances
away from the axis of rotation of said support,
whercby the center of gravity of said support
may be shifted to coincide with said axis, a tool
carrier, a plurality of cutting members car-
rried by the tool carrier, and means to move the
tool carrier toward said support and parallel to
said axis.
16. An apparatus for machining double truck
printing plates comprising a support for the plate,
rotatable tool carrier movable toward and away from the printing plate, a plurality of cutting members carried by the tool carrier,
one of said cutting members making an undercut
in the edge of the plate, a second cutting member
facing the overhanging lip and a third cutting
member facing the lower edge of the undercut
and means to move said cutting members toward
and away from the edge of the printing plate.
17. An apparatus for machining double truck
printing plates comprising a support for a print-
ing plate, a rotatable tool carrier movable toward
and away from the edge of the printing plate, a
plurality of circumferentially spaced cutting
members carried by the tool carrier, three of said
cutting members being undercutting tools spaced
120° apart, and two lip members and one under-
cut facing member positioned equally distant
between said undercutting cutters and means to
move the cutting tools toward and away from
the edge of the plate.

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