

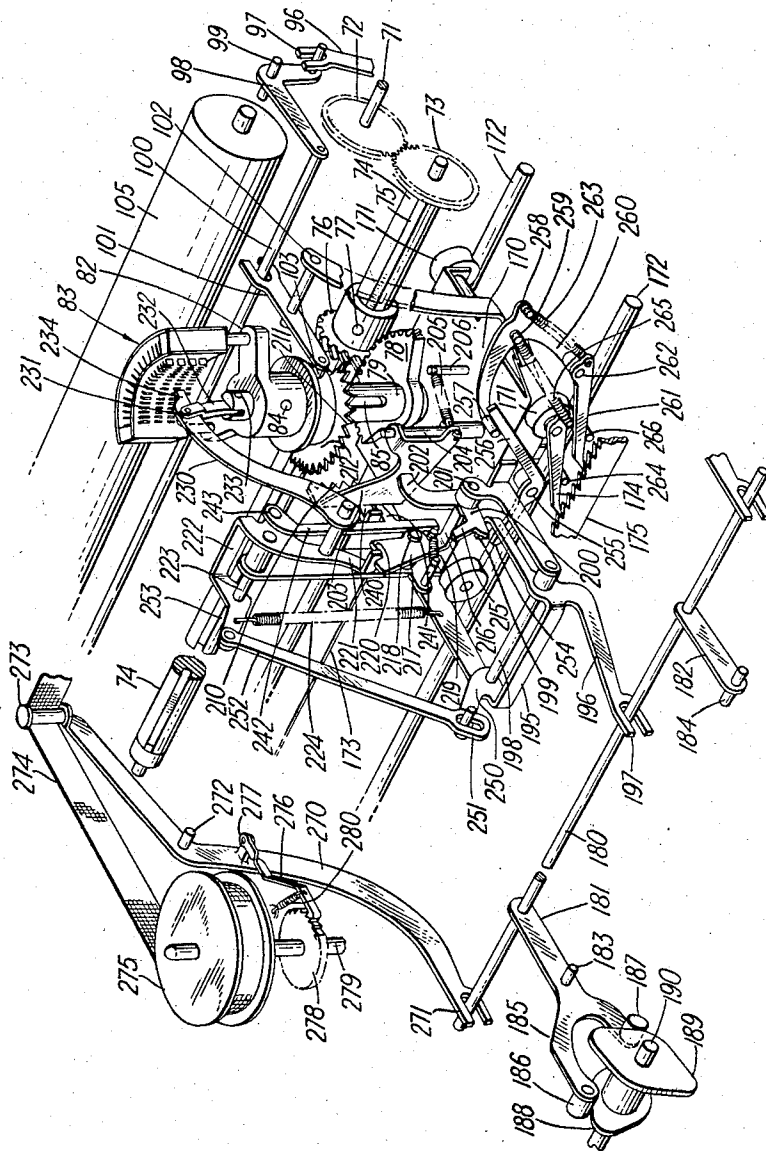
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TYPE PRINTING APPARATUS

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1

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TYPE PRINTING APPARATUS

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This invention relates to telegraph type printing apparatus wherein a type carrier is moved to bring selected types into the printing position under the control of two registering members operated by aggregate motion mechanism which operates under the control of signal recording and selecting mechanism and wherein the type carrier is transversed in front of a stationary horizontal platen to effect page printing. Such apparatus is described, for example, in British patent specifications Nos. 439,745 and 441,090.

The latter of these specifications describes a construction in which the type carrier and its carriage, together with the rails upon which it traverses the paper, are oscillated about a pivot to effect the printing of a type character. In practice such an arrangement involves the oscillation of considerable mass, thus requiring the expenditure of substantial mechanical energy, and as a consequence generating considerable source of noise in operation. This feature has tended to limit the application of this kind of mechanism.

According to the present invention, a type carrier is mounted on a carriage to traverse the printing platen, and the printing mechanism, the type registering mechanism and the carriage stepping mechanism are all operated by a single operating member having a sliding connection with the carriage. Preferably the single operating member takes the form of a bail having a sliding connection with a cradle mounted on the carriage. In addition to the operations previously mentioned, the single operating member may also control the raising and lowering and the feed of the ink ribbon so that in effect it controls all the mechanical operations associated with the printing operation.

Apparatus in accordance with the invention will now be described in more detail with reference to the accompanying drawing, which is a diagrammatic perspective view.

A spindle 71 is turned by means of aggregate motion mechanism described in detail in copending applications Ser. Nos. 504,851 and 504,852 both filed Apr. 29, 1955. The left-hand end of the spindle 71 carries a toothed wheel 72 meshing with a further wheel 73. The toothed wheel 73 is mounted on a shaft 74 formed with a spline or keyway 75 on which slides a gearwheel 76 formed with spiral teeth. The wheel 76 has a small key 77 co-operating with the keyway 75 so that although the wheel can slide on the shaft 74, it cannot turn.

The spiral gear 76 meshes with a gear sector 78 also provided with spiral teeth and turning about a vertical axis on a splined shaft 79. A mounting 82 for a type head, indicated generally at 83, is provided with a key 84 co-operating with a keyway 85 on the shaft 79 so that the mounting is free to slide but not to turn on the shaft. Consequently rotary movements of the spindle 71 produced by the aggregate motion mechanism are transmitted via the shaft 74 and the shaft 79 to the mounting 82 and hence to the type head 83, which thus adopts an angular position corresponding to the position of the aggregate motion mechanism. The type head is provided with four horizontal rows of type members, each row containing sixteen type members so that each of these is brought into the printing position for a corresponding position of the aggregate motion mechanism.

2

A cradle 98 pivoted at 99 is rocked by a second aggregate motion mechanism, part of which is shown at 96, and the remainder of which is described in the aforesaid applications, and which is connected at 97 to the cradle 98. The crosspiece 100 of the cradle 98 extends across the width of the machine and thus controls the movement of a forked lever 101 turning about a fixed pivot 102. The opposite end of the lever 101 is pivoted to a stud 103 on the mounting 82 for the type head 83. Thus rocking movements of the cradle 98 are transmitted to the lever 101 and serve to raise and lower the mounting 82 on the splined shaft 79. Thus each of the four rows of type members of the type head 83 is brought up to the printing level by a corresponding movement of the aggregate motion mechanism controlling the cradle 98.

The splined shaft 79 on which the mounting 82 for the type head 83 slides is supported on a carriage 170 mounted on rollers 171 running freely on rails 172. Guides (not shown) are also fitted to the carriage so as to register it with the rails 172. A light steel wire 173 is connected to the left-hand end of the carriage 170 and is connected at its other end, again not shown, to a spring drum which maintains tension in the wire 173 and constantly urges the carriage 170 to the left. This movement is normally restrained by a retention pawl 174 engaging with a rack 175.

A bail 180 is mounted to rock on arms 181 and 182 pivoted respectively at 183 and 184. The arm 181 is formed on the opposite side of its pivot 183 with a fork 185, the arms of which are provided with cam followers 186 and 187 co-operating respectively with cams 188 and 189. These cams are mounted on a print cam shaft 190 and the cams are set at right-angles to one another so that the bail 180 is positively operated in both directions of motion, completing a full oscillation for a half revolution of the print cam shaft 190.

During the first part of the cycle, the cam 188 actuates the bail 180 to turn in a clockwise direction, that is to say, to move downwardly as seen in the drawing. The bail controls a cradle 195 formed with an arm 196 having a forked connection 197 with the bail 180. Thus as the bail moves downwardly, the cradle 195 is rocked in a counter-clockwise direction about its pivotal axis 198. This causes a further arm 199 on the cradle 195 to move upwardly so as to co-operate with an arm 200 of a lever pivoted to the carriage at 201, and of which the other arm 202 bears against a latch member 203 pivoted at 204 to the carriage and normally turned in a counter-clockwise direction by a spring 205 secured at its opposite end to an anchorage 206.

The latch member 203 is provided for the purpose of obtaining positive registration and locking of the type head 83 in each of its vertical and angular positions. For this purpose, the member 203 is provided with a number of teeth 210, the gaps between which mesh transversely with gaps between corresponding teeth 211 on a registration sector 212 secured to the mounting 82 for the type head 83. There are five teeth 210 on the member 203 giving four gaps between the teeth, each gap corresponding to one of the vertical positions of the type head 83. Similarly there are seventeen teeth 211 on the sector 212 giving sixteen gaps corresponding to the number of angular positions of the type head 83. Consequently when the member 203 is pressed into engagement with the sector 212 under the control of the lever arm 202, the type head 83 is locked in registration both vertically and angularly.

Clockwise movement of the arm 200 about its pivot 201 causes an extension 215 to engage a transverse arm 216 of a print trip lever 217 pivoted at 218. This is

normally urged in a clockwise direction by means of a spring 219 and the action of the extension 215 is to rock it against the effect of this spring. Movement of the print trip lever 217 causes a shoulder 220 to free an arm 221 on a print hammer cradle 222 pivoted at 223 and urged in an anticlockwise direction by a spring 224. Also pivoted to the arm 221 is a print hammer 230, the other end of which is pivoted at 231 to a link 232, the other end of which in its turn is pivoted to the shaft 79 at 233. As soon as the cradle 222 is tripped, it is accelerated by the spring 224 which causes the print hammer 230 to move to the right so that its extension 234 strikes the end of the shank of the type member located in the printing position so as to carry out the printing operation.

In order to safeguard against the possibility of operation of the printing hammer when the type head 83 is not in the correct position, an interlock is provided in the form of a lug 240 on the member 203. This engages a projection 241 on a member 242 pivoted to the cradle 222 at 243. The engagement between the lug 240 and the projection 241 prevents the member 242 moving upwardly and since its pivot 243 is situated to the right of the pivot 223, as seen in the drawings, this prevents counter-clockwise motion of the cradle 222, and thus prevents operation of the print hammer 230 until the member 203 has moved into a position such as to register the type head as previously described.

The return movement of the bail 180 is produced under the control of the cam 189 and serves to rock the cradle 195 in a clockwise direction. This withdraws the registration member 203 from engagement with the sector 212 and allows the type head 83 to be repositioned in accordance with the next signal. At the same time, the rocking of the cradle 195 re-cocks the print hammer cradle 222. This is achieved by motion of the extension arm 250, which has a lost motion connection 251 with a link 252, which at its opposite end is pivoted to an arm 253 on the print hammer cradle 222. Thus clockwise motion of the cradle 195 produces corresponding clockwise motion of the cradle 222 until the arm 221 is again latched by the shoulder 220 on the print trip lever 217.

During clockwise motion, the arm 199 on the cradle 195 bears against one arm 254 of a feed-operating bell-crank lever pivoted at 255 so that this lever turns in a counter-clockwise direction. The other arm 256 of the lever presses underneath a pin 257 on a lever 258 pivoted at 259. The other arm 260 of the lever 258, thus tends to move to the left as seen in the drawing to produce a thrust in a feed pawl 261 pivoted to the arm 260 at 262. This brings the feed pawl 261 into engagement with a tooth of the rack 175 under control of a spring 263 and causes the carriage 170 as a whole to move to the right until the retention pawl 174 engages the next tooth on the rack. In this way the carriage is fed step-by-step to the right with half a revolution of the print cam shaft 190.

Downward movement of the retention pawl 174 is limited to a position in which it just engages the rack 175 by means of a stop 264 against which it is pressed by a spring 265, while the movement of the feed pawl 261 is restricted by a similar stop 266. The rack 175 is pivotally mounted and may be rocked so as to disengage the two pawls 174 and 261, which are restrained from following it by their two stops. When this is done, the carriage returns to the left-hand end of its travel under the pull in the wire 173.

The bail 180 in addition to performing the functions already described, namely, the registration of the type head 83, the operation of the print hammer 230 and the step-by-step feed of the carriage 170 also performs two further functions. Thus as the bail moves downwardly, it rocks a lever 270 which is connected to it by means of a fork 271. The lever is pivoted at 272 and the rock-

ing motion causes its further end to rise so as to lift a small roller 273 around which passes an ink ribbon 274 fed on to a spool 275. In its rest position, this ribbon covers the printing line of the platen of the machine and also lies between the type face of the type head, which is in the printing position, and the platen. Thus the ink ribbon is raised into position for each printing operation and is then lowered again so as to render the newly printed type visible. The motion of the lever 270 also produces the feed of the ink ribbon on to the spool 275. For this purpose a hooked arm 276 is pivoted to the lever 270 at 277 so that as the lever rocks, the arm 276 engages a ratchet wheel 278 on the spindle 279 of the spool 275. The arm 276 is held in engagement with the ratchet 278 by means of a spring 280 and on each rocking movement of the lever 270 advances the ratchet 278 by one tooth. It will be understood that the ribbon 274 is withdrawn from a corresponding spool on the opposite end of the machine, which in its turn is driven by a further lever corresponding to the lever 270, and which is also controlled by the bail 180. Thus this single bail produces all the mechanical motions necessary for the printing operation.

I claim:

1. In telegraph printing apparatus, the combination of a printing platen, a carriage mounted to traverse said platen, a type carrier mounted on said carriage and being movable with respect to said carriage to bring a selected type on said carrier into a printing position, a latch member mounted on said carriage and being movable into engagement with said type carrier to lock said carrier in proper printing registration for various positions of the carrier required for the printing of any type mounted thereon, a movable print member on said carriage for effecting printing of a selected type, carriage-stepping means connected to said carriage to cause said carriage to traverse said platen in steps, and a single operating member operating first to move said latch member into locking engagement with said type carrier and to move said print member to effect printing, and then to move said carriage-stepping means to cause said carriage to move by one step.

2. Printing telegraph apparatus according to claim 1 and including inter-locking means controlled by said latch member for preventing operation of said print member when said latch is in released position.

3. Telegraph printing apparatus according to claim 1 and including guide means for guiding an inked-ribbon between said type carrier and said platen and being movable from a lower position into an upper printing position, and means controlled by said operating member in moving from its first position to its second position to effect raising of said guide means.

4. Telegraph printing apparatus according to claim 3 and including step-by-step ribbon feeding means controlled by said operating member in moving from its second position to its first position to effect one step of feeding operation.

5. Telegraph printing apparatus according to claim 1, said type carrier including a frame mounted on said carriage for vertical movement and for turning movement about a vertical axis, and a plurality of bars slidably mounted in said frame so as to move outwards radially with respect to said axis, on being struck by said print member, each of said bars carrying at its outer end one of the said types.

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