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PRINTER IN WHICH TYPE IS PROJECTED AND TYPE HEAD MOVED TOWARD PLATEN

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Fig. 1

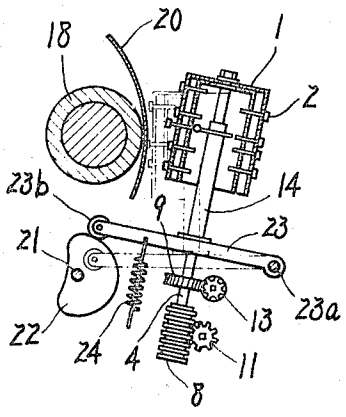


Fig. 3

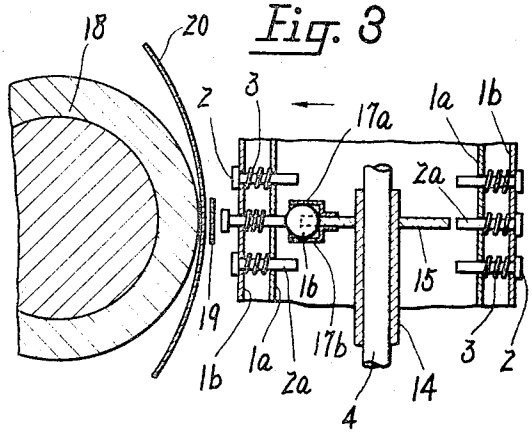
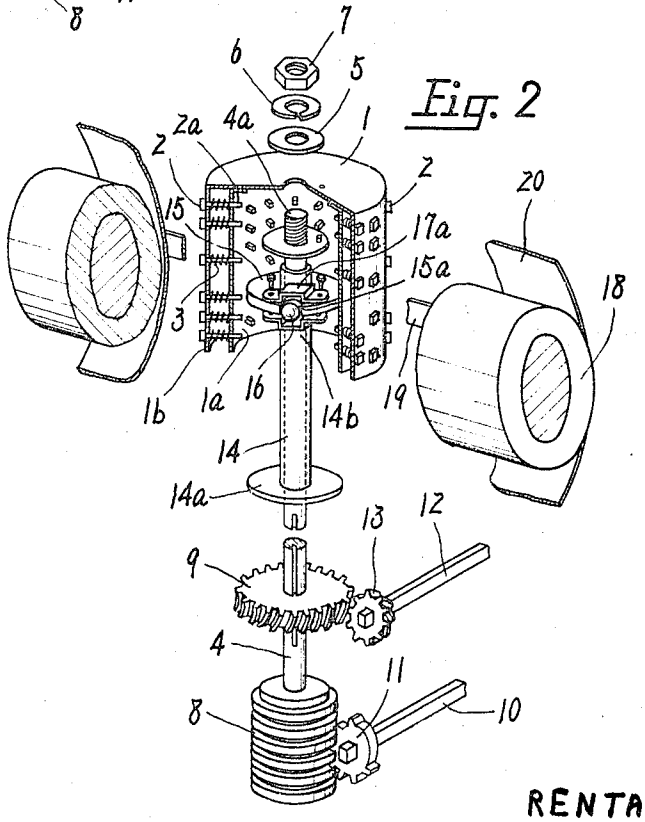


Fig. 2



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PRINTER IN WHICH TYPE IS PROJECTED AND TYPE HEAD MOVED TOWARD PLATEN

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4 Claims. (Cl. 197—55)

ABSTRACT OF THE DISCLOSURE

A printer is disclosed as including an angularly and axially displaceable type drum having types mounted thereon for radial displacement and with their type faces on the outer periphery of the drum. The drum is secured to an axially and angularly displaceable shaft operable by type selecting means. A sleeve slidably embraces the shaft and is fixed against rotation, and this sleeve carries a selecting ball rotatingly engageable with the radially inner ends of the types to project the types radially outwardly as they are moved to a printing position in which they are aligned with a platen spaced from the drum. Operating means are connected to the sleeve to swing the sleeve, shaft and drum toward the platen to engage a selected type, projected radially outwardly by the selecting ball, with a paper or the like on the platen.

This invention relates to a printer.

An object of the present invention is to provide a high speed printer or more particularly a novel printer in which the operating stroke of types in typing is made short, the typing speed is increased and the selecting operation can set in immediately after the typing, and which is therefore adapted to high speed typing.

In the accompanying drawings:

FIG. 1 is a schematic side view of a printer embodying the present invention;

FIG. 2 is a detailed perspective view of a type drum and a selecting mechanism in FIG. 1;

FIG. 3 is a partial detailed side view of FIG. 2.

The type drum and selecting mechanism of the present invention will be explained with reference to FIG. 2. In the drawing, **1** is a type drum having a thin cylindrical inside drum case **1***a* and outside drum case **1***b*. Types **2** are set between the above mentioned cases, the heads of the types are arranged along the peripheral surface of the drum and the supporting bars **2***a* of the types are projected toward the center axis of the drum **1** so that, when these supporting bars **2***a* are pushed with the later described selecting ball, the types may slide outward. **3** is a spring for returning each type **2**.

Type drum is mounted on the upper threaded end **4***a* of an axially and angularly displaceable shaft **4** through the medium of a washer **5**, a lock washer **6**, and a nut **7**. A cylindrical rack **8** is secured to the lower end of shaft **4** to rotate therewith, and a gear **9** is keyed to shaft **4** with shaft **4** being axially displaceable relative to gear **9**. Rack **8** is moved axially by a vertical selection gear **11** fixed on a shaft **10**.

The type driving shaft **4** is slidable in the vertical direction with respect to the rotary gear **9** but is fixed against rotation relative to gear **9**.

The rotary gear **9** is rotated through a rotary driving gear **13** from a rotating direction selecting shaft **12** so that the rotation of the type driving shaft **4** may be controlled.

14 is a hollow pipe which has the above mentioned type driving shaft **4** slidably and rotatably inserted inside it as shown in FIG. 3, is integrally engaged at one end **14***a* with typing plate **23** (see FIG. 1) and is integrally fitted with a selecting ball receiver **15** at the other end **14***b*. A selecting ball **16** is fitted in a circular recess in the periphery of ball receiver plate **15**, and is retained in position by upper and lower plates **17***a* and **17***b*, respectively, which operate conjointly with the recess **15***a* to provide a socket for ball **16** which is rotatable in the socket. As drum **1** is rotated or axially displaced, each type, as it comes into a printing position in alignment with the platen **18**, is projected radially outwardly by engagement of ball **16** with the radially inner end of the type.

18 is a platen, **19** is a ribbon and **20** is a typing paper.

A typing mechanism embodying the present invention shall now be explained with reference to FIG. 1. **21** is a cam driving shaft connected with a typing clutch not illustrated. **22** is a typing cam. A typing plate or lever is indicated at **23** as pivotally mounted at one end on a pivot **23***a* and as having a roller or the like **23***b* on its opposite end engageable with the periphery of a typing cam **22** rotatable about the axis of a shaft **21**. A tension spring **24** biases lever or plate **23** toward cam **22**. Plate or lever **23** is fixedly secured to the part **14***a* of sleeve **14**.

Therefore, by the selecting mechanism not illustrated, when the shaft **10** is rotated by a fixed amount, the type drum **1** will be moved by a fixed amount in the vertical direction, and, on the other hand, when the shaft **12** is rotated by a fixed amount the type drum **1** will be rotated by a fixed amount in the rotating direction through the rotary gears **13** and **9** and the shaft **4**. By both of these selecting operations, any desired type will be brought to the typing position and will be at the same time slid outward by the selecting ball **16** so that the distance between the surface of said type and the platen **18** may be reduced. Then the clutch not illustrated will be operated by a typing starting pulse so that typing may be made with the typing drum **1** as soon as the drum stops. The typing cam will be rotated through the cam driving shaft **21**. By the concave part of said cam, the typing plate **23** will be rotated anticlockwise as shown by the dotted line around the axis **23***a*. The type drum **1** will be swung to be pressed against the surface of the platen **18** so that the above mentioned selected type may be typed on the typing paper **20**. Then, even when the selecting operation sets in simultaneously with the return of said drum **1**, the movement of the supporting bar **2***a* of the type **2** and the selecting ball **16** will be such that said ball **16** will be free to rotate to come smoothly into opposite contact with the supporting bar of the next type.

In the same manner, the type selecting operations may end before the type drum **1** swings to be pressed toward the surface of the platen **18**. Therefore, the typing operation can set in simultaneously with the selecting operation.

As in the above, the present invention has the outstanding advantages that, as soon as any desired type is selected, said type will be slid outward by the selecting ball so that the operating stroke of the type drum in typing may be made so short that high speed typing will be thereby made possible, that the curvature of the surfaces of the type will be reduced, that there will be a sufficient space for the type on each side of the selected type and that the clearness of the typing will be improved. A further advantage is that the swing of the type drum and the movement of the supporting bar of the type and the selecting ball after typing will be so smooth that it will be possible for the next selecting operation to set in immediately and that, as it also possible for the typing operation to set in simultaneously with the type selecting operation, a high speed printer will be made possible.

What is claimed is:

1. A printer comprising, in combination, a type drum;

a plurality of types mounted in said drum in axially and angularly spaced relation and having type faces on the outer periphery of said drum, said types being mounted for displacement radially of said drum; means biasing said types radially inwardly to a retracted position; a platen spaced from said drum; a shaft secured to said drum and mounted for axial and angular displacement to position a selected type in a printing position in alignment with said platen; a sleeve slidably embracing said shaft and fixed against rotation; a type selecting ball mounted on said sleeve within said drum and rotatingly engageable with the radially inner ends of said types to project the types radially outwardly as the types are moved to the printing position by axial and angular displacement of said drum by said shaft; and operating means connected to said sleeve and operable to swing said sleeve, shaft and drum toward said platen to engage a selected type, projected radially outwardly by said type selecting ball, with a paper or the like on said platen.

2. A printer, as claimed in claim 1, including a circular plate fixed to the upper end of said sleeve and formed with a circular recess in its periphery; said type selecting ball being engaged in said recesses; and retaining plates secured to said circular plate and forming, conjointly with said circular plate, a socket rotatably receiving said type selecting ball.

3. A printer, as claimed in claim 2, in which said operating means comprises a plate fixed to said sleeve; means pivotally mounting one end of said plate; a rotatable typing cam engageable with the free end of said last-named plate; and spring means biasing said last-named plate into engagement with said typing cam.

4. A printer, as claimed in claim 3, including a cylindrical rack secured to the lower end of said shaft and engaged by a gear fixed to a rotatable shaft, for effecting axial displacement of said shaft and said drum; and a second gear mounted on said shaft, fixed against rotation relative thereto, and axially displaceable relative to said shaft, said second gear being engaged by a third gear driven by another shaft for effecting angular displacement of said shaft and said drum.

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