

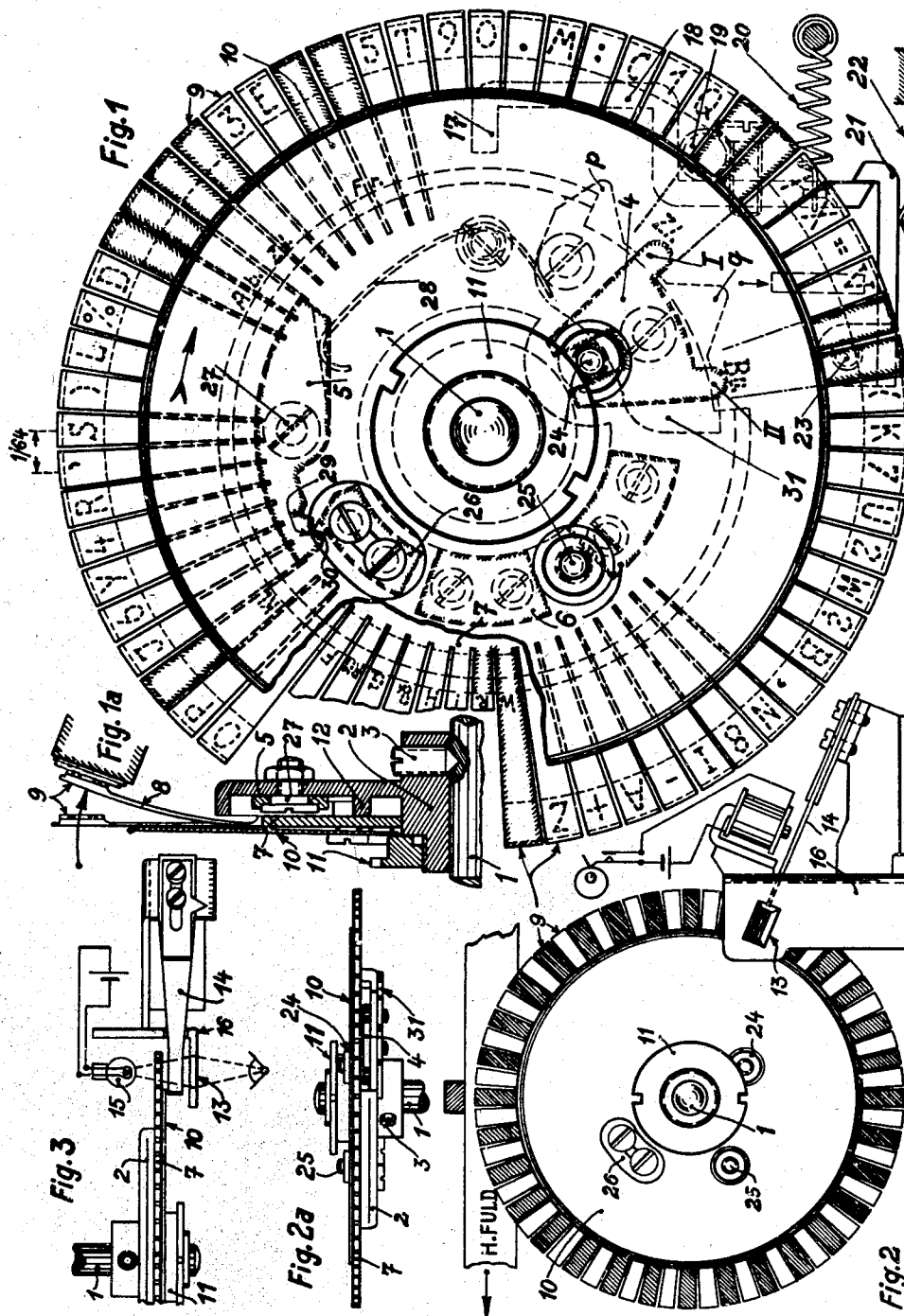
Jan. 15, 1935.

M. AMANN ET AL
TYPE PRINTING DEVICE

1,988,409

Filed Feb. 1, 1934

2 Sheets-Sheet 1



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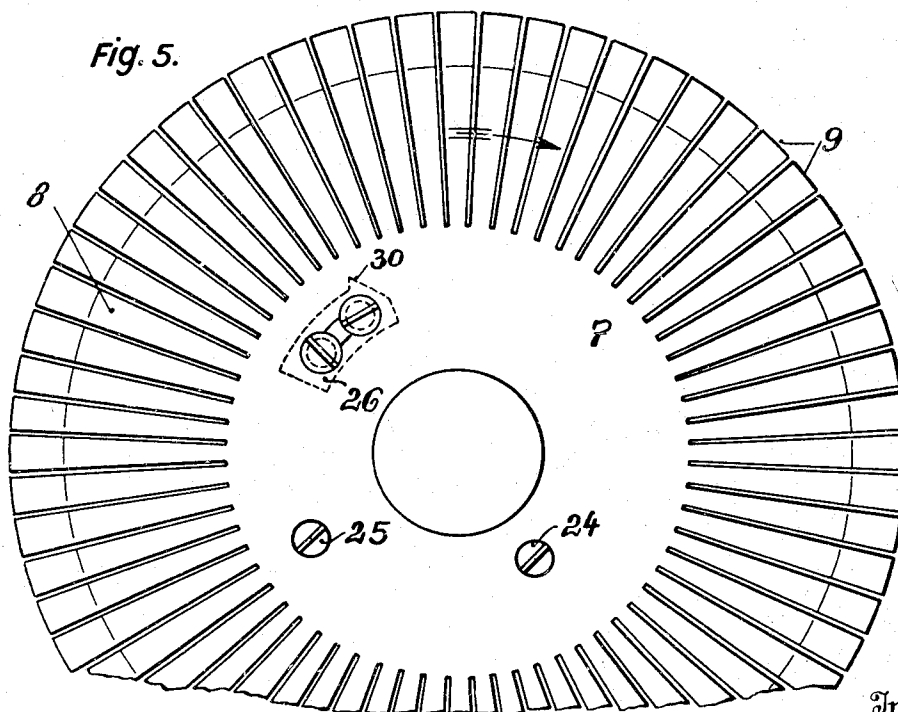
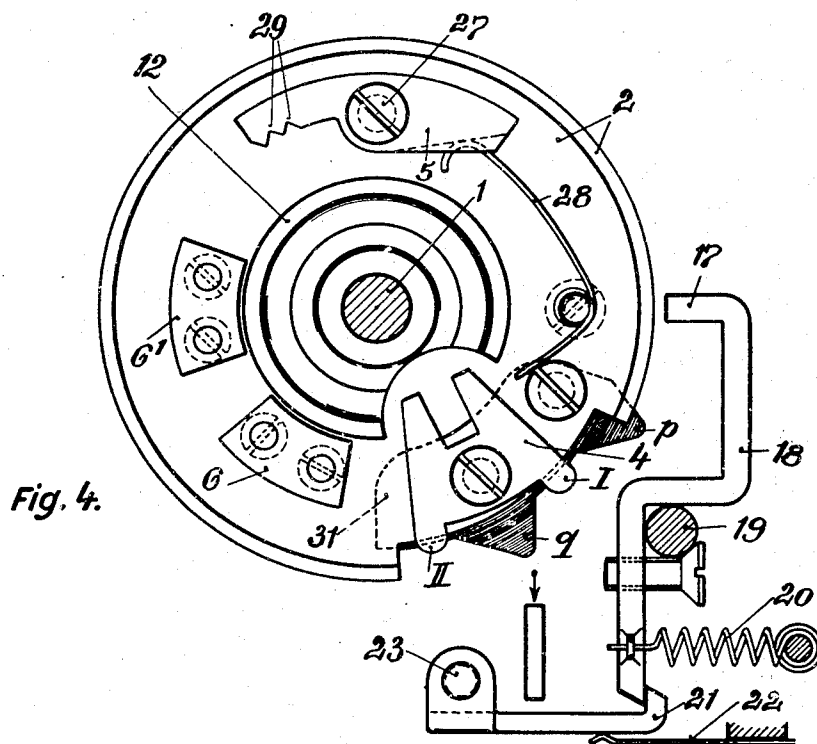
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UNITED STATES PATENT OFFICE

1,988,409

TYPE PRINTING DEVICE

Max Amann and Alfred Lahl, Frankfort-on-the-Main, Germany

Application February 1, 1934, Serial No. 709,376
In Germany December 23, 1932

12 Claims. (Cl. 178—34)

This invention relates to type wheels such as are used for printing on strip and on sheets in printing and registering apparatus and especially in telegraph receiving apparatus. It has reference more particularly to the kind of type wheels which have only one type ring with different groups of type. The inertia of wheels of this type which are necessarily relatively large is such that they have hitherto been suitable only for slow operation or for printing with a moving type wheel. The object of the invention is to provide a device which is suitable for modern high output reception and can be used for sheet printing, that is to say, for printing from a stationary type wheel.

In accordance with the invention, a disc-like type carrier is used, on one side of which are arranged the types of the type ring and this type disc is brought under the action of a hammer which acts at right angles to the plane of the disc. Setting members are also connected with the type carrier, and for selecting the group of type on the type ring, these members are brought under the influence of a separate adjusting member which acts parallel to the plane of the disc. In this way, the type printing device can be reduced to the smallest dimensions and its inertia can be minimized. It can easily be accelerated and stopped for being set to the type to be printed. The type disc can be set to another group of type by means of simple adjusting devices and with the expenditure of only a little power. On the other hand, when printing, the type to which the wheel is set can withstand great stresses.

In order that the invention may be thoroughly understood and be more readily carried into effect, an example of construction in accordance therewith will now be described with reference to the accompanying drawings, in which:—

Figures 1 and 1a show the type printing apparatus in front elevation and in a partial sectional side elevation respectively.

Figures 2 and 2a illustrate the complete arrangement in front elevation and plan respectively.

Figure 3 illustrates in plan the indicating apparatus illustrated in elevation in Figure 2.

Fig. 4 illustrates the carrier of the type disc in front elevation after the type disc has been dismantled therefrom, and

Fig. 5 illustrates the type disc in front elevation, indicating how it is mounted on its carrier.

These drawings show how the type printing apparatus is constructed in detail, how it is

shifted and how its speed of revolution is tested. The example of construction shown therein has a type printing apparatus having a rotatable type disc for carrying the types and a setting device for shifting to the various groups of type. The type ring has two groups of type, the individual types alternating in a manner known per se, and is divided into thirty-two (32) type fields, each type field containing one type of the two groups of type.

The bush of the carrier 2 of the type printing apparatus is fixed on the rotatable shaft 1 of the telegraph receiver by means of a set screw 3 (see Fig. 1a). In order to reduce the moment of inertia of the apparatus, the carrier 2 is made of aluminium or some other suitable light alloy. The carrier 2 (see Fig. 4) is dish-shaped and carries on the inside the adjusting fork device 4 (see Figs. 1, 2a and 4), together with the fixing device 5 as well as the members 6 and 6' and other means for shifting the groups of type. The cam 31 is fixed to the outside of the carrier 2.

The carrier 2 is covered by the type disc 7. This type disc is made of highly elastic sheet metal, preferably of beryllium bronze containing 2.5% of beryllium. In its periphery, there are radial slits so that sectors 8 are formed. The various types 9 are located laterally on the heads of these sectors 8. For increasing the elasticity of the carrying sectors 8, these are made thinner by machining down or the like towards their heads and the hub of the wheel. The sectors, particularly when machined down, are given a preliminary tension which compels them quickly to re-assume their positions of rest after printing. This printing is effected against the action of the preliminary tension on the sectors by striking them on their outer side after setting the printing apparatus, as indicated in Figure 1a. The hardness of the surface of the type wheel can be increased by chromium plating in order that it may permanently better withstand the stresses to which it is subjected when struck. The backs of successive sectors are alternately made of a different brightness, for example by chromium plating the back of only every other sector, that is to say of the type group most frequently used.

The carrying sectors 8 rest under the action of their preliminary tension against the periphery of a disc 10. The supporting point is arranged in such a position that the oscillations due to the rebounding of the sector when it springs back after printing are of a magnitude such that they cannot be harmful. By means of this disc 10 which is mounted on the bush of the carrier 2, the

type disc 7 which is also mounted on this bush is pressed by friction against the annular projection 12 of the carrier 2. The screw nut 11 is used for the purpose of fastening the type disc 7 and the disc 10 on the bush of the carrier 2. The type disc 7 can be adjusted relatively to the carrier 2, by overcoming the friction due to the projection 12. Pins 24, 25 and a member 26 having a stop 30, are fixed to the type disc 7 (see Fig. 5). The fork 4, which is pivoted on the carrier 2, co-acts with the pin 24. The pin 25 acts as a stop and is situated between the two members 6 and 6' of the carrier 2. The stop 30 also lies in one or another of the grooves 29 of the member 5 which is pivoted at the point 27 on the carrier 2. The spring 28 maintains the members 29 and 30 in the relative positions which they may at any time assume. The fork 4 has projections I and II which can be acted upon from the outside when a shifting of the type groups has to be made.

If thirty-two type fields are provided, each containing two types of the two different groups, an adjustment angle of only $1/64$ th of the circumference is necessary. The fork 4 is therefore constructed in such a way that when it is acted upon from the outside, it can displace the type disc 7 by this angular amount relatively to the carrier 2 by means of the pin 24.

The fork-like device 4 for shifting the type groups is actuated from the outside by means of a key 18 which is constructed in the form of a two-armed lever which can turn about the point 19 of the frame of the machine. The actuating end 17 of this key can act on the projection I or II of the fork 4 parallel to the plane of the type disc when the arm 18 is actuated. The latter is acted upon by the spring 20 which engages the second arm of the lever. When at rest, the spring 20 is in tension, since the end of the second arm of the lever key abuts against the pawl 21 which is acted upon by the spring 22 so that it can be swung about the pivot 23 fixed on the frame of the machine in the direction of the arrow with the expenditure of only a small amount of power, by means of a member which is not illustrated in detail. It then releases the lever 18 which actuates the fork-like device 4 under the action of the tension of the spring 20.

The cams *p* and *q* of the member 31 which is fixed to the carrier 2 are adapted to strike off the actuating end of the released lever 18 on rotation of the carrier 2 and thereby to return the lever 18 and retension the spring 20.

The printing hammer, which is not illustrated in the drawings, acts on the carrying sectors of the type disc 7 in the direction of the arrow shown in Figure 1a and strikes the type on the head 9 against the paper and its support.

The apparatus 13, 14, 15, 16 (Figures 2 and 3) is used in conjunction with the type disc 7 as a stroboscopic device for indicating the speed of revolution of the type printing apparatus. A tongue 14 which oscillates at a predetermined frequency being periodically excited for example by electromagnetic means is located in front of the window opening 13. The stroboscopic effect which occurs at the correct speed of revolution is increased owing to the illuminating device 15 which, in order that the available space may be most advantageously used, may be arranged behind the type disc 7 as shown in Figure 3. The light then passes through the radial slits in the disc and is then reflected on the inside of the frame 16 on the backs of the carrying sectors 8 which are of different brightness.

The methods of testing the speed of revolution will be clear from this.

The methods employed for the printing of types or for shifting the group of types to be printed will now be described.

The type printing apparatus illustrated in Figure 1 is shown in the position in which only letters of the alphabet are printed. In the case in question, the letter S is being printed. For setting to another letter or for shifting the type wheel to types of the sign group, the apparatus is rotated further in the direction of the feathered arrow by rotating the shaft 1 of the telegraph apparatus. Means for rotating and setting the shaft 1 and the disc 7 in any angular position of a number of positions corresponding to the number of type fields under the influence of code signals are known per se and are described for example in our Patent No. 1,967,216, dated July 24, 1934, for a Telegraph receiver. After arriving in its new position, the apparatus is stopped and either the printing hammer or the lever 18 is released.

It will now be assumed that a change over to sign printing is to be made. For this purpose, the apparatus is rotated until the projection I of the fork-like member 4 comes to rest opposite the abutment end 17 of the lever 18. In this position, by means of apparatus known per se, as for example that described in our Patent No. 1,967,216 aforementioned, the lever 18 is actuated instead of the printing hammer. This actuation of the lever 18 is effected by pressure of short duration on the pawl 21. Under the action of the released spring 20, the projection I of the fork 4 is now struck and the fork is swung and carries with it the type disc 7 by means of the pin 24. The new position of the disc 7 relatively to the carrier 2 is now limited by the stop 6' against which the pin 25 abuts and is maintained by means of the inner groove 29 of the lever 5 into which the stop 30 snaps. On beginning the further rotation of the type printing apparatus for printing the signal now received, the cam *p* comes in the way of the key 17 and presses it out of the way while overcoming the power of the spring 20 which is again to be tensioned. The lever is again locked since its lower end lies behind the pawl 21.

The sign (') and the letter S are arranged to form one type field and have the same code signal. Therefore, the arrangement is such that for example the sign ' is now printed instead of the letter S when the combination of impulses corresponding to the latter is received and the shaft 1 of the type disc 7 is set into the corresponding angular position.

On reception of the sign Bz for resetting to the group of types corresponding to the letters of the alphabet the shaft 1 and the type disc are set in the angular position in which the projection II of the fork-like member 4 lies opposite the actuating end 17 of the key 18. On releasing the spring 20 by pressure on the pawl 21, the fork 4 is swung back over the projection II by means of the actuating end 17 of the lever 18 and rotates the type disc 7 relatively to the carrier 2. The disc 7 maintains the position which is now assumed by its stop 30 which lies in the outer groove 29 of the lever 5. A further rotation of the shaft 1, which is now for the purpose of printing a letter, first of all re-adjusts the lever 18 and re-tensions the spring 20 by means of the cam *q* of the member 31 fixed to the carrier 2, which cam *q* moves the lever 18 against the tension of the

spring 20 until its lower end is locked by the pawl 21.

The type printing device forms a structural unit and can be dismantled simply by means of the screw 3 from the axis 1 of the telegraph apparatus if another one is to be put in its place because of damage or because it is desired to change the characteristics of the type. The carrier 2 is made of cup-like shape mainly for the purpose of protection against dust and against other external influences. The uniform distribution of the parts which are secured thereon ensures the uniform running of the type printing unit.

We claim:

1. A type printing device, comprising in combination, a rotatable disc-shaped type carrier having a plurality of groups of type arranged in a row on one side thereof, the types of the several groups being arranged alternatively one between another and the said row of types being divided into type fields, each of the type fields containing one type of all groups of types, said type disc having radial slots between the various types, each type being adapted to be acted upon by a printing hammer perpendicularly to the plane of said type disc, a rotary shaft, means for coupling said type disc with said shaft, said shaft being adapted to be set selectively in any one of a plurality of positions corresponding to the number of type fields of said disc, means for shifting the type disc relatively to said shaft for selecting the type of a group in the several type fields, the said shifting means being connected with the type disc, and a setting member acting on said shifting means parallel to the plane of said type carrier.

2. A type printing device, comprising in combination, a rotatable disc-shaped type carrier having a plurality of groups of type arranged in a row on one side thereof, the types of the several groups being arranged alternatively with respect to one another and the said row of types being divided into type fields, each of the type fields containing one type of all groups of types, said type disc having radial slots between the various types, each type being adapted to be acted upon by a printing hammer perpendicularly to the plane of the type disc, a rotary shaft, a bush fixed on said shaft, means for coupling said type disc with said bush, said shaft being adapted to be set in any one of a plurality of positions corresponding to the number of type fields of said disc, means for shifting the type disc relatively to said bush for selecting the type of a group in the several type fields, said shifting means being connected with the type disc and with the said bush, and a setting member acting on said shifting means parallel to the plane of said type carrier.

3. A type printing device, comprising in combination, a rotatable disc-shaped type carrier having a plurality of groups of type arranged on one side thereof in a row, the types of the several groups being arranged alternatively one after another and the said row of types being divided into type fields, each of said type fields containing one type of all groups of types, the said type disc having radial slots between the various types, each type being adapted to be acted upon by a printing hammer perpendicularly to the plane of the type disc, a rotary shaft, a bush fixed on said shaft having a cup-like extension, means for coupling said type disc with said bush, said shaft being adapted to be set in any one of a

plurality of positions corresponding to the number of type fields of said disc, means for shifting the type disc relatively to said bush for selecting the type of a group in the several type fields, the said shifting means being arranged in said cup-like extension of said bush, and a setting member acting on said shifting means parallel to the plane of said type carrier.

4. A type printing device, comprising in combination, a rotatable disc-shaped type carrier having a plurality of groups of type arranged in a row on one side thereof, the types of the several groups being arranged alternatively one beneath another and the said row of types being divided into type fields with each of said fields containing one type of all groups of types, said type disc having radial slots between the various types and carrying sectors adapted to be influenced by a printing hammer perpendicularly to the plane of said type disc and said carrying sectors having a preliminary tension opposite to the direction of the pressing movement of the printing hammer, a rotary shaft adapted to be set in any one of a plurality of positions corresponding to the number of type fields of said disc, means for coupling said type disc with said shaft, means for shifting the type disc relatively to said shaft for selecting the type of a group in the several type fields, said shifting means being connected with the type disc, and a setting member acting on said shifting means parallel to the plane of said type carrier.

5. A type printing device, comprising in combination, a rotatable disc-shaped type carrier having a plurality of groups of type arranged in a row on one side thereof, the types of the several groups being arranged alternatively one beneath another and the said row of types being divided into type fields, each of said type fields containing one type of all groups of types, said type disc having radial slots between the various types and carrying sectors adapted to be acted upon by a printing hammer perpendicularly to the plane of said type disc, a rotary shaft, a bush fixed on said shaft having a cup-like extension, a supporting disc pressing the type disc against said extension of the bush, the said carrying sectors having a preliminary tension opposite to the direction of the pressing movement of said supporting disc and being in contact with said supporting disc, said shaft being adapted to be set in any one of a plurality of positions corresponding to the number of type fields of said disc, means for shifting the type disc relatively to said bush for selecting the type of a group in the several type fields, the said shifting means being arranged in the interior of said cup-like extension of said bush, and a setting member acting on said shifting means parallel to the plane of said type carrier.

6. A type printing device comprising in combination, a rotatable disc-shaped type carrier having a plurality of groups of type arranged in a row on one side thereof, the types of the several groups being arranged alternatively one beneath another and said row of types being divided into type fields, each of said type fields containing one type of all groups of types, the said type disc having radial slots between the various types and carrying sectors adapted to be acted upon by a printing hammer perpendicularly to the plane of said type disc, a rotary shaft adapted to be set in any one of a plurality of positions corresponding to the number of type fields of said disc, a bush fixed on said shaft having a cup-like extension, a supporting disc pressing the type disc against

said extension of the bush, the said carrying sectors having a preliminary tension opposite to the direction of the pressing movement of said supporting disc and being in contact with said supporting disc, means for shifting the type disc relatively to said bush for selecting the type of a group in the several type fields, the said shifting means being arranged in the interior of said cup-like extension of said bush, a setting member acting on said shifting means parallel to the plane of said type carrier, and means connected to said bush for influencing said setting member after its action on said shifting means.

7. A type printing device, comprising in combination, a rotatable disc-shaped type carrier having a plurality of groups of type arranged in a row on one side thereof, the types of the several groups being arranged alternatively one beneath another and said row of types being divided into type fields, each of said type fields containing one type of all groups of types, the said type disc being provided with radial slots between the various types and carrying sectors adapted to be acted upon by a printing hammer perpendicularly to the plane of the type disc, a rotary shaft adapted to be set in any one of a plurality of positions corresponding to the number of type fields of said disc, a bush fixed on said shaft having a cup-like extension, a supporting disc pressing the type disc against said extension of the bush, the said carrying sectors having a preliminary tension opposite to the direction of the pressing movement of said supporting disc and being in contact with said disc, means for setting said disc, said setting means acting on said shaft, means for shifting the type disc relatively to said bush for selecting the type of a group in the several type fields, said shifting means being arranged in the interior of said cup-like extension of said bush, a setting member acting on said shifting means parallel to the plane of the type carrier, a spring acting on said setting member, and means connected to said bush for influencing said setting member and restoring said spring after the action of the setting member on said shifting means.

8. A type printing device, comprising in combination, a rotatable disc-shaped type carrier having a plurality of groups of type arranged in a row on one side thereof, the types of the several groups being arranged alternatively one beneath another and said row of types being divided into type fields, each of said type fields containing one type of all groups of types, said type disc having radial slots between the various types and carrying sectors adapted to be acted upon by a printing hammer arranged perpendicularly to the plane of the type disc, a rotary shaft adapted to be set in any one of a plurality of positions corresponding to the number of type fields of said disc, a bush fixed on said shaft having a cup-like extension, a supporting disc pressing the type disc against said extension of the bush, said carrying sectors having a preliminary tension opposite to the direction of the pressing movement of said supporting disc, and being in contact with said supporting disc, means for shifting the type disc relatively to said bush for selecting the type of a group in the several type fields, means connect-

ed with said bush for limiting the displacement of the type disc relatively thereto, the said shifting means being arranged in the interior of said cup-like extension of said bush, and a setting member acting on said shifting means parallel to the plane of said type carrier.

9. A type printing device, comprising in combination, a rotatable disc-shaped type carrier having a plurality of groups of type arranged in a row on one side thereof, the types of the several groups being arranged alternatively one beneath another and said row of types being divided into type fields, each of said type fields containing one type of all groups of types, the said type disc having radial slots between the various types and carrying sectors, a rotary shaft, a bush fixed on said shaft having a cup-like extension, a supporting disc pressing the type disc against said extension of the bush, the said carrying sectors having a preliminary tension opposite to the direction of the pressing movement of said supporting disc and being in contact with the same, means for shifting the type disc relatively to said bush for selecting the type of a group in the several type fields, said shifting means being arranged in the interior of said cup-like extension of said bush, a setting member acting on said shifting means parallel to the plane of said type carrier and means connected to the type disc and to said bush for maintaining the disc in each of its set positions.

10. A type printing device according to claim 9 including a means connected with the type carrier and associated movable means connected with the bush having two grooves for maintaining the type disc in each of its set positions relatively to said bush.

11. A type printing device, comprising in combination, a rotatable disc-shaped type carrier having a plurality of groups of type arranged in a row on carrying sectors on one side thereof, the types of the several groups being arranged alternatively one between another and said row of types being divided into type fields, each of said type fields containing one type of all groups of types, the said type disc having radial slots between the various types and said carrying sectors, a rotary shaft, a bush fixed on said shaft having a cup-like extension, a supporting disc pressing the type disc against said extension of the bush, said carrying sectors having a preliminary tension opposite to the direction of the pressing movement of said supporting disc and being in contact with the same, means including a pin connected to the type disc and a fork-like member movably mounted on said bush and embracing said pin for shifting the type disc relatively to said bush for selecting the type of a group in the several type fields, said shifting means being arranged in the interior of said cup-like extension of said bush, and a setting member acting on said fork-like member parallel to the plane of said type carrier.

12. A type printing device according to claim 11 wherein the setting member acting on the shifting means is adapted to influence the type disc when in rest.

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