

March 24, 1925.

1,530,871

H. C. WELTER  
PRINTING APPARATUS

Filed Feb. 1, 1923

3 Sheets-Sheet 1

FIG. 1

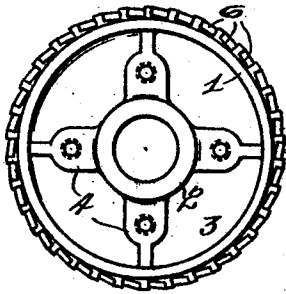


FIG. 2

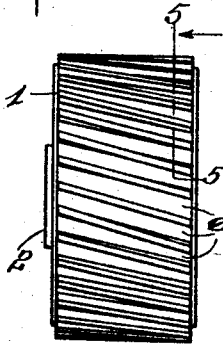


FIG. 3

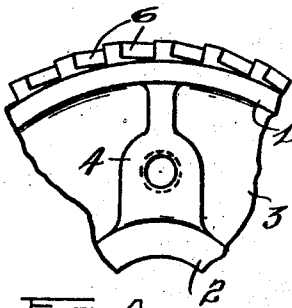
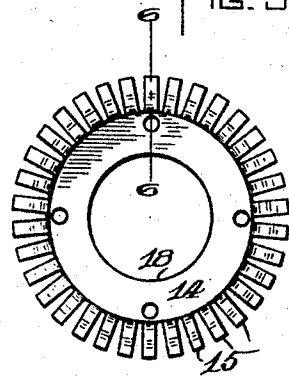


FIG. 4

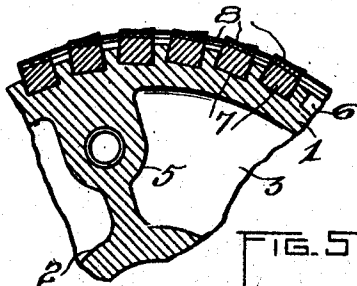


FIG. 5



FIG. 6

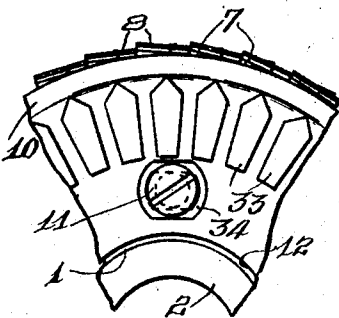


FIG. 7

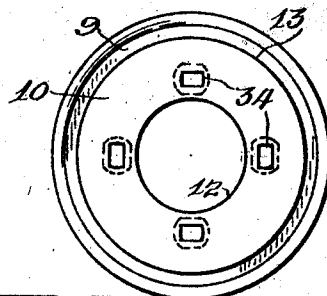


FIG. 9

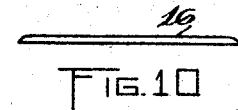


FIG. 10

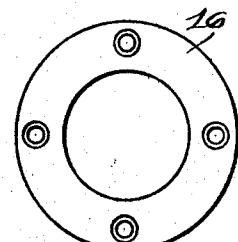


FIG. 11

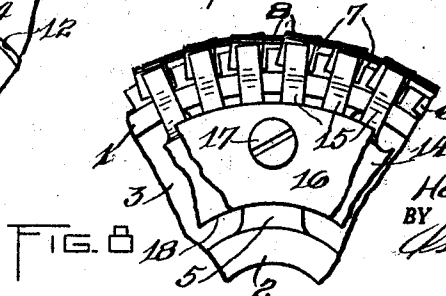


FIG. 8

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**3 Sheets-Sheet 2**

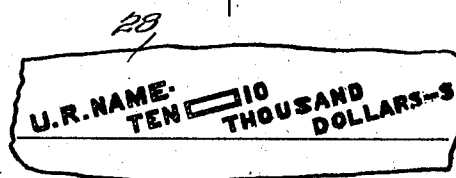
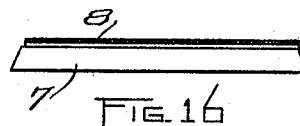
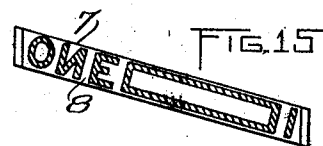
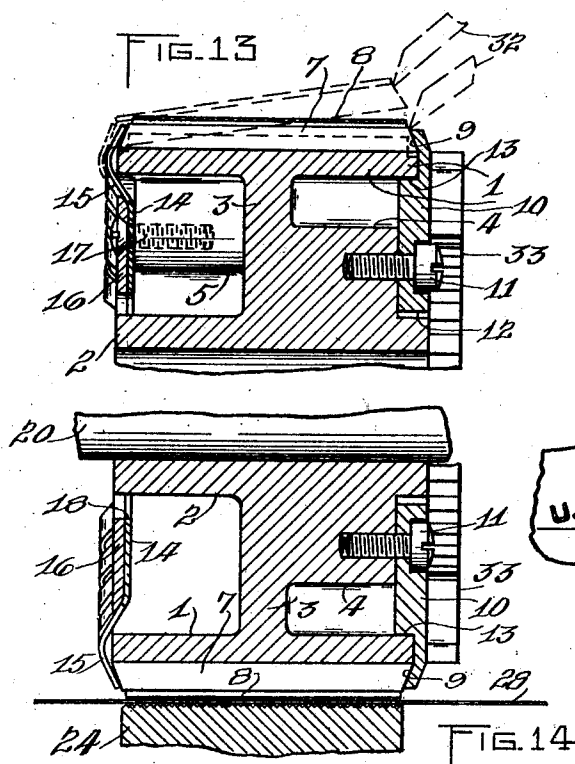
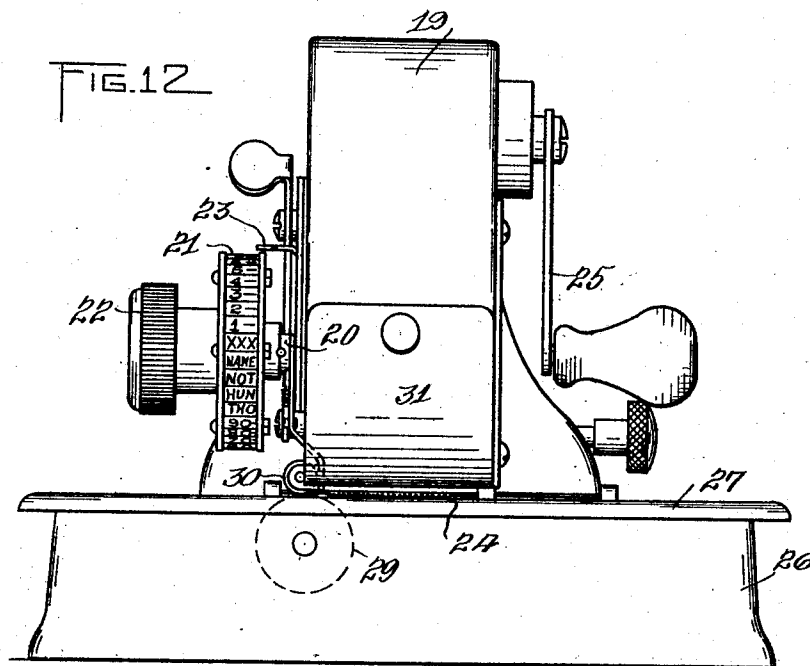


FIG. 17  
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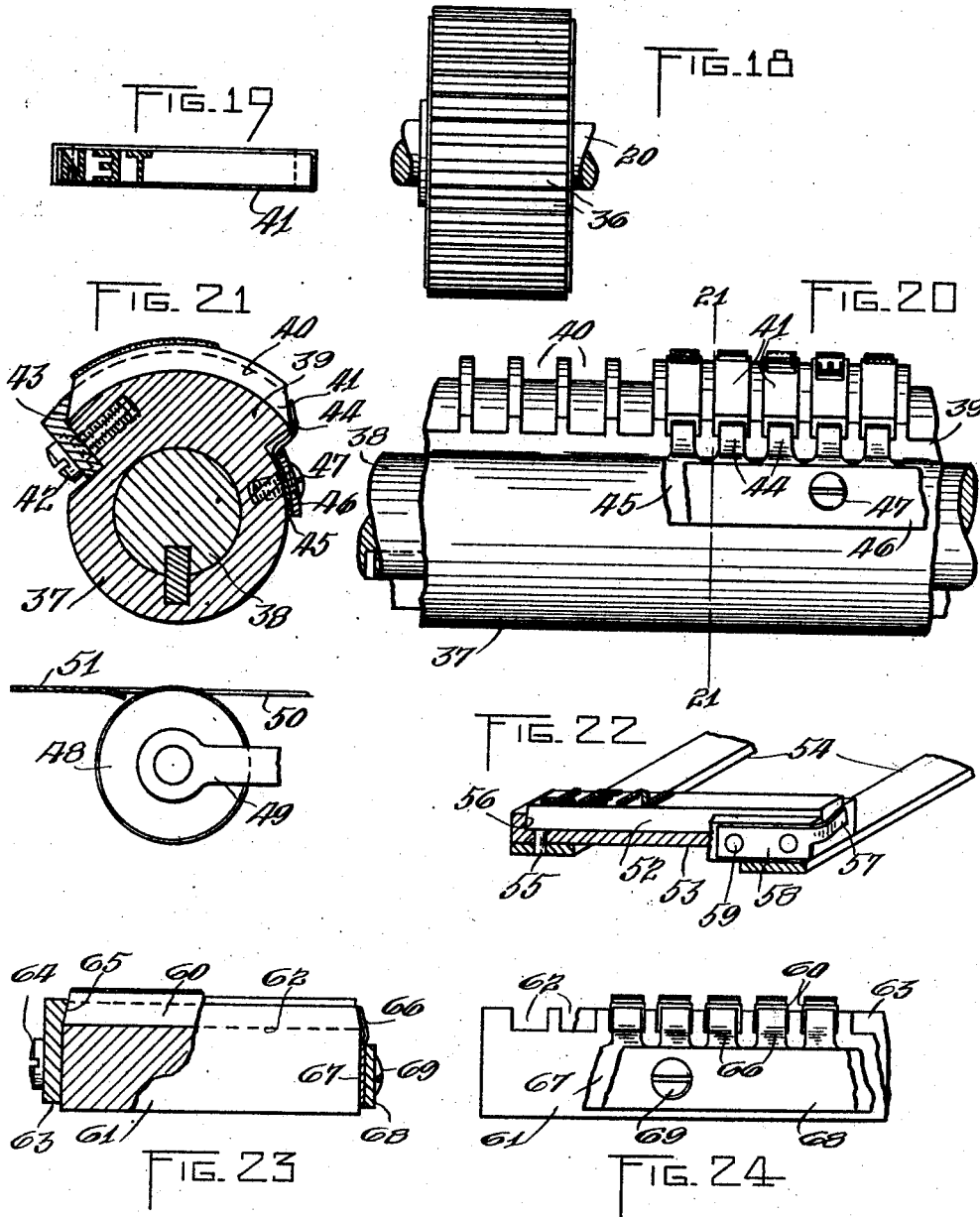
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H. C. WELTER  
PRINTING APPARATUS

Filed Feb. 1, 1923

3 Sheets-Sheet 3



INVENTOR.  
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Patented Mar. 24, 1925.

1,530,871

# UNITED STATES PATENT OFFICE.

HERMAN C. WELTER, OF ROCHESTER, NEW YORK, ASSIGNOR TO HALL-WELTER CO.,  
INC., OF ROCHESTER, NEW YORK.

## PRINTING APPARATUS.

Application filed February 1, 1923. Serial No. 616,369.

*To all whom it may concern:*

Be it known that I, HERMAN C. WELTER, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Printing Apparatus, of which the following is a specification.

The present invention relates to type carriers, and an object of the invention is to provide a carrier on which type bars are removably supported in such manner that one bar may be readily substituted for another.

Although the invention may be adapted to different forms of printing apparatus, it is more particularly intended for use in connection with machines in which a carrier is provided with a plurality of type lines, the carrier being movable to bring the several lines of type selectively into printing position. The various makes of check writing machines usually embody a printing element of this character, the carrier commonly being a cylinder with the type lines formed integrally on its peripheral face. Such a machine, however, is limited in its use to printing specifically the words or characters formed on the cylinder, and it is a further object of the invention, by providing the carrier with removable and interchangeable type bars, to extend the use of the machine to printing on commercial papers other than checks or like negotiable instruments. That is, although a machine may be intended for use primarily as a check writer, by being able to substitute one type bar for another business establishments may for a nominal cost have type bars furnished them bearing distinctive words or characters so that the machine may be used in printing on other papers such as order slips, invoices, receipts, express forms and the like.

In the manufacture of type cylinders with the type formed integrally thereon, a large percentage of the cylinders have to be scrapped owing to one or more of the type lines being defective. This is a waste in the cost of manufacture which it is a further object of the invention to overcome by forming the type cylinder and the type bars separately and removably supporting the type bars on the cylinder so that if one bar proves defective it may readily be replaced by a perfect one.

And, a still further object of the invention

is to provide a type wheel with removable type bars arranged on its peripheral surface at an angle to the axis of the wheel, the bars being so positioned that their printing faces when brought selectively into printing position, will present a flat surface to a correspondingly flat surfaced platen common to the several type bars.

To these and other ends the invention consists of certain parts and combinations of parts as will be fully set forth in the following description and particularly defined in the appended claims.

The accompanying drawings illustrating the invention are as follows:—

Figures 1 and 2 are, respectively, side and face views, with type bars removed, of a preferred form of type wheel made in accordance with my invention.

Fig. 3 is a face view of the resilient retaining member for the type bars.

Fig. 4 is an enlarged fragmentary view of the wheel as seen in Fig. 1.

Fig. 5 is an enlarged fragmentary sectional view as on the line 5—5, Fig. 2, but with the type bars in place.

Fig. 6 is an enlarged sectional detail on the line 6—6, Fig. 3.

Figs. 7 and 8 are enlarged fragmentary side views of the assembled wheel.

Fig. 9 is an inner face view of the rigid type bar retaining member.

Figs. 10 and 11 are side and face views, respectively, of the reinforcing clamping plate for the part shown in Fig. 3.

Fig. 12 shows in front elevation a printing machine in which a type wheel such as shown in the above described figures may be used.

Fig. 13 is an enlarged fragmentary sectional view of the assembled type wheel as taken longitudinally of one of the type bars.

Fig. 14 is a view similar to Fig. 13 showing the relative positions of type wheel and platen.

Figs. 15 and 16 are top and side views, respectively, of one of the type bars.

Fig. 17 is an illustration of the printing done by the printing wheel.

Fig. 18 shows a modification of the type wheel in which the slots for the type bars are parallel with the axis of the wheel.

Fig. 19 shows in detail one of the type bars used in the modification of the invention illustrated in Figs. 20 and 21, Fig. 21

being a sectional view on the line 21—21, Fig. 20, while Fig. 20 is a side view of a type cylinder or wheel on which the type bars are arranged transversely of its axis.

5 Fig. 22 is a perspective view, partly in section, showing the invention as embodied in a machine employing an endless belt as the type carrier.

Fig. 23 is an end view, with parts broken 10 away, of still another modification of the invention in which the type surfaces are arranged in a single plane.

And, Fig. 24 is a side view of the parts seen in Fig. 23.

15 Similar reference numerals refer to similar parts throughout the several views.

Referring first to Figs. 1 to 17, inclusive.

The numeral 1 represents the type carrier which, in this instance, is cylindrical 20 and comprises a wheel formed with a hub 2, a central web 3, reinforcing radial arms 4 on one side of the web 3 and radial arms 5 on the other side of the web. The peripheral surface of the wheel is formed with a 25 plurality of regularly spaced slots 6. These slots are open ended and extend from one side of the wheel to the other and at an angle to the axis of rotation of the wheel, the side walls of each slot preferably being 30 parallel while the bottom wall is in a plane tangential to a concentric circle of the wheel. Fitted within the slots 6 are bars 7, the outer faces of which constitute type faces 8 bearing any suitable words or characters and, 35 when the invention is embodied in a check writing machine, these type faces are preferably serrated so as, in the printing operation, to break the paper in order that ink 40 will be impregnated into the fibers thereof to prevent erasure and fraudulently "raising" of the check.

Any suitable means may be provided for removably holding the type bars in place. In this instance, the top and bottom end 45 edges of the bars are parallel to the side faces of the wheel, but the end faces of the bars are beveled so as to incline upwardly and inwardly, these end faces at one side of the wheel lockingly engaging the undercut annular portion 9 of a rigid circular retaining plate 10 secured by screws 11 to 50 the wheel arms 4, the plate having a central bore 12 for receiving the hub 2 and an annular shoulder 13 for engaging the inner face of the wheel rim. The opposite bevelled end faces of the type bars are yieldingly engaged by a circular plate 14 of 55 spring metal, such plate being slotted radially to form an annular series of regularly spaced spring members 15, one for each bar 7, these spring portions extending outwardly from the body of the plate over the wheel rim and then inwardly substantially 60 parallel with the end faces of the type bars and engaging the bars under tension. The

body portion of the spring plate 14 lies 70 against the wheel arms 5 and is secured thereto by means of a reinforcing ring 16 and screws 17 which latter are threaded into the arms 5, the plate 14 having a center bore 18 for receiving the hub 2.

As hereinbefore stated, the type wheel as just above described may be used in a check 75 writing machine such as shown in Fig. 12. When so employed it is housed within an overhanging head portion 19 of the frame and fixed to a shaft 20 revolvably supported in a member guided for vertical movement in such head portion, the shaft 20 also having fixed thereon a dial wheel 21 and a 80 suitable turning knob 22. In order to bring a selected one of the type faces into printing position, the shaft is rotated by means of the knob 22 until the corresponding indication on the wheel 21 is brought into 85 registration with the index 23. The printing is then effected by moving the type wheel and platen relatively toward each other. In this instance the type wheel is 90 the movable member and is carried toward and from the platen 24 by means of suitable mechanism, not shown, having connection with the type wheel supporting member and the operating crank 25.

The platen 24 is common to all of the 95 type faces. It is mounted in the base 26 of the machine and presents a serrated surface through an opening in the bed plate 27 over which the check 28 is fed in a direction longitudinally of the machine, the 100 check engaging between the feed rollers 29 and pressure rollers 30 and being fed by the rollers 29 a predetermined distance on the return movement of the type wheel after each printing operation, the feeding mechanism not being shown as it forms no part 105 of the invention.

The printing faces of the type bars, it will be understood, when selectively brought 110 into printing position, lie in a plane parallel to the platen which, in turn, is parallel to the bed plate 27 and these bars, when in such position, are at an angle to the direction of feed of the check so that the printing will appear, as illustrated in Fig. 17, 115 on parallel lines diagonal to the line of feed.

An opening, not shown, in the front wall of the head 19 is normally closed by a removable cover plate 31 which when removed 120 permits access to the type wheel for the substitution of one type bar for another, a suitable tool, indicated at 32 in dotted lines in Fig. 13, being used to move a bar 7 longitudinally in its slot against the action of 125 its spring member 15 to disengage the bar from the undercut portion of the plate 10. It might be added, also, that this plate is formed with an annular series of regularly spaced projections 33 between adjacent ones 130 of which a guiding lug, not shown, engages

in the movement of the type wheel toward the platen so as to center the wheel and prevent its rotation during the printing operation, elongated openings 34 being formed in the plate 10 for the screws 11 to permit adjustment of the plate so that the slots between the lugs 33 will register with their respective type bars.

By having the type bars removable a perfect bar may be substituted for a damaged one without the necessity of furnishing an entirely new wheel. Also, should a purchaser desire a certain distinctive line of type for his checks, such as a type line bearing his name so that his name may be printed on the checks in the same manner and preceding the amount for which the check is drawn, the same may be furnished at a very nominal cost while permitting him to purchase a stock machine and not requiring a type wheel to be made special. And, again, by having the type bars removable a user may at any time insert type bars bearing such words or characters as will permit the machine being used in a business establishment for many other purposes other than writing on checks or like negotiable instruments.

In Fig. 18 there is shown a modification of the type wheel in which the slots 36 extend parallel with the axis of rotation. The type bar retaining members in this instance would be the same as those for the wheel 1.

In Figs. 19, 20 and 21 the invention is illustrated as embodied in a printing machine in which the type carrier is an elongated cylindrical member 37 splined to a shaft 38 and having a segmental portion 39 grooved transversely thereof to form regularly spaced open ended curved slots 40 adapted to receive similarly curved type bars 41 the ends of which are bevelled in like manner as the bars 7. Secured to one wall of the segmental portion 39 of the cylinder by screws 42 is a retaining plate 43 arranged at such an angle as to lockingly engage the abutting ends of the type bars 41, while the other ends of the bars are yieldingly engaged by spring members 44 projecting angularly outwardly from a spring metal plate 45 with which they are integrally formed and which is held by means of a reinforcing plate 46 and screws 47 to the body of the cylinder. The curved printing faces of the type bars coact with a roller platen 48 mounted in a support 49 and projecting through an opening 50 in a bed plate 51 over which the check or other instrument is fed, the printing elements in this instance constituting the feeding means and the platen being common to the several type bars which are selectively brought into printing position relatively to the platen by movement of the cylinder along the shaft 38.

Fig. 22 shows the invention as it may be

embodied in a machine in which the type carrier is an endless belt. Each type bar 52 is, in this instance, supported in a grooved block 53 secured to the belt members 54 in any suitable manner, as by the rivets 55. The block 53 may be a casting with the groove open at one end only but having the inner face of the end wall undercut to lockingly engage the abutting bevelled end face 56 of the type bar, the other end of the bar being yieldingly engaged by a spring arm 57 bent angularly from a plate 58 secured by rivets 59 to a side wall of the block.

In the modification shown in Figs. 23 and 24 the type faces of the several type bars constitute a flat surface, and to this end the supporting member is a frame 61 formed with regularly spaced parallel slots 62 for receiving the bars 60. These grooves are open ended and are closed at one end of the frame by a plate 63 secured to the frame by screws 64 and having an undercut longitudinally extending portion on its inner face for lockingly engaging the abutting bevelled end faces 65 of the type bars, the other ends of the bars yieldingly engaging the spaced spring portions 66 projecting from a plate 67 clamped to a side wall of the frame by the reinforcing plate 68 and screws 69.

From the foregoing it will be seen that in the several modifications of the invention the type bars are removably supported on their respective type carriers, in each instance a bevelled end face of the type bars lockingly engaging a correspondingly bevelled surface of a fixed member at one side of the carrier to hold the bars against vertical displacement, while the bars are yieldingly held by spring members engaging their other ends against both vertical and longitudinal displacement. Also, in one embodiment of the invention the type bars are arranged on the periphery of a type wheel at an angle, other than a right angle, to the axis of the wheel and in such manner that each type bar, when brought into printing position, presents a flat printing surface to the paper on which the impression is to be made. Furthermore, with the type bars having a slight yielding movement longitudinally of their respective slots in the type carrier, should the wheel be out of true the bars when brought into contact with the fixed platen will adjust themselves to the platen so that there will be a perfect mating of the serrated surfaces and consequently a clean printing impression.

What I claim is:

1. In a printing apparatus, a cylindrical type carrier having a plurality of spaced slots extending angularly across the peripheral face thereof, the bottom wall of each slot being in a plane tangential to a concentric circle of the carrier.

2. In a printing apparatus, a cylindrical type wheel, and a plurality of angularly disposed type bars extending angularly across the peripheral face of the wheel, the contacting surface of each type bar being tangential to a concentric circle of the wheel.

3. In a printing apparatus, a cylindrical type wheel having regularly spaced slots extending angularly across its peripheral face, and type bars removably supported in said slots, the contacting surface of each type bar being in a plane tangential to a concentric circle of the wheel.

4. The combination, in a printing apparatus, of a platen having a non-curved printing surface, a support for the platen, a cylindrical type carrier, a plurality of type bars extending angularly across the peripheral face of the carrier, the type carrier being rotatable to selectively bring said type bars into printing position and when in such position the contacting surfaces of the type bars being parallel to the plane of the platen.

5. The combination, in a printing apparatus, of a platen having a non-curved printing surface, a support for the platen, a cylindrical type carrier, a plurality of type bars removably supported angularly across the peripheral face of the carrier, the type carrier being rotatable to selectively bring said type bars into printing position and when in such position the contacting surfaces of the type bars being parallel to the plane of the platen.

6. In a printing apparatus, two co-acting printing members having serrated impression surfaces, and yieldable means permitting relative movement of said members on contact with each other to effect proper mating of the serrated surfaces.

7. In a printing apparatus, two co-acting printing members having serrated impression surfaces, and yieldable means permitting longitudinal movement of one of said members on contact with the other member to effect proper mating of the serrated surfaces.

8. In a printing apparatus, a platen having a serrated surface, a support for the platen, a cylindrical type carrier having a plurality of serrated type bars engaging in slots across the peripheral face of the carrier, said carrier being rotatable to selectively bring the type bars into printing position, and yieldable means permitting longitudinal movement of each type bar in its respective slot on contact with the platen to effect proper mating of the serrated surfaces.

9. In a printing apparatus, a cylindrical type carrier formed with regularly spaced slots in its outer periphery, type bars removably supported in the said slots and

having bevelled end faces, a plate secured to the type carrier having a surface lockingly engaging the abutting bevelled end faces of the type bars, a second plate secured to the type carrier, and spring arms projecting from said second named plate and bearing against respective ones of the other bevelled end faces of the bars to yieldingly hold the bars against displacement.

10. In a printing apparatus, a cylindrical type carrier formed with regularly spaced slots in its outer periphery, type bars removably supported in the said slots and having bevelled end faces, a plate secured to the type carrier having a surface lockingly engaging the abutting bevelled end faces of the type bars, a second plate secured to the type carrier, and spring arms projecting from said second named plate and bearing against respective ones of the other bevelled end faces of the bars to yieldingly hold the bars against displacement, each bar being movable against its spring arm to disengage its bevelled end from locking engagement with the said first named retaining plate.

11. The combination in a printing machine, of a bed having a flat surface over which the paper to be printed on is fed, a platen, a type wheel, and regularly spaced type bars arranged on the periphery of the type wheel at an angle less than a right angle to the axis of rotation, the type wheel being rotatable to selectively bring said type bars into printing position, and when in such position the selected type bar and platen having their contacting surfaces in parallel planes parallel to the said bed.

12. The combination in a printing machine, of a bed having a flat surface over which the paper to be printed on is fed, a platen, a type wheel formed with regularly spaced slots extending across the wheel at an angle to its axis of rotation, and type bars removably supported in said slots, the type wheel being rotatable to selectively bring the type bars into printing position, and when in such position the selected type bar and platen having their contacting surfaces in parallel planes parallel to the said bed.

13. The combination in a printing machine, of a bed having a flat surface over which the paper to be printed on is fed, a platen, a type wheel formed with regularly spaced slots extending across the wheel at an angle to its axis of rotation, type bars removably supported in said slots, the type wheel being rotatable to selectively bring the type bars into printing position, and when in such position the selected type bar and platen having their contacting surfaces in parallel planes parallel to said bed, and type bar retaining means on said wheel

permitting the removal and insertion of the several type bars independently of each other.

14. In a printing apparatus, a type wheel  
5 formed on its periphery with regularly  
spaced slots extending across the wheel, type  
bars removably supported in said slots and  
having their end faces at one side of the  
10 wheel bevelled, a plate secured on one side  
of the wheel and having an undercut annular  
surface portion for lockingly engaging  
the abutting bevelled end faces of the  
type bars, and a plate secured to the other  
15 side of the wheel and slotted radially to  
form a plurality of regularly spaced spring  
arms, said spring arms bearing against the  
other end faces of the type bars to yieldingly  
hold the said bevelled end faces in lock-  
20 ing engagement with the undercut surface  
of the said first named retaining plate.

15. In a printing apparatus, a type wheel  
formed on its periphery with regularly  
spaced slots extending across the wheel,  
type bars removably supported in said slots  
25 and having their end faces bevelled, a plate  
secured on one side of the wheel and hav-  
ing an undercut annular surface portion for  
lockingly engaging the abutting end faces  
of the type bars, a plate secured to the  
30 other side of the type wheel and slotted  
radially to form a plurality of regularly  
spaced spring arms, said spring arms ex-

tending outwardly from the body of the  
plate and then angularly inwardly to bear  
against the other bevelled end faces of the  
35 type bars to hold the bars against both  
vertical and longitudinal displacement,  
and a clamping member secured to the  
wheel for reinforcing the said spring arms.

16. In a printing apparatus, a type  
40 wheel formed on its periphery with regu-  
larly spaced angularly disposed slots ex-  
tending across the wheel, the bottom walls  
of the slots being in planes tangential to  
a concentric circle of the wheel, type bars  
45 removably supported in said slots and hav-  
ing type faces parallel to the bottom walls  
of their respective slots, the end faces of  
the bars being bevelled, a plate secured to  
one side of the wheel and having an under-  
50 cut annular surface portion for lockingly  
engaging the abutting end faces of the type  
bars, a plate secured to the other side of  
the type wheel and slotted radially to form  
a plurality of regularly spaced spring arms,  
55 said spring arms extending outwardly from  
the body of the plate and then angularly  
inwardly to bear against the other bevelled  
end faces of the type bars to hold the bars  
against both vertical and longitudinal dis-  
60 placement, and a clamping ring secured to  
the type wheel for reinforcing the said  
spring arms.

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