May 28, 1968 A. J. M. STEPHAN 3,385,213

TYPE-DRUM MOUNTING ASSEMBLY IN PRINT DRUMS

Filed March 13, 1967 3 Sheets-Sheet 1

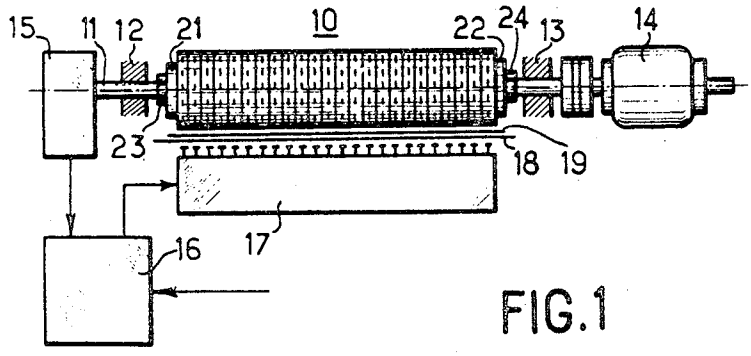

FIG.1

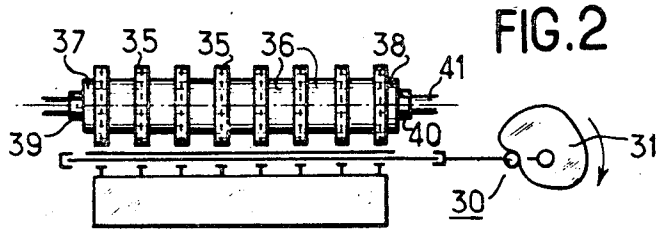

FIG.2

FIG.3

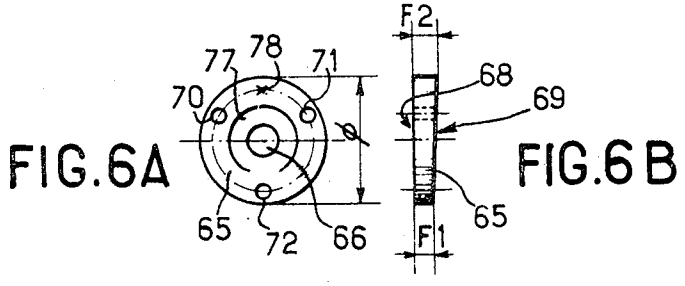

FIG.6A FIG.6B

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TYPE-DRUM MOUNTING ASSEMBLY IN PRINT DRUMS

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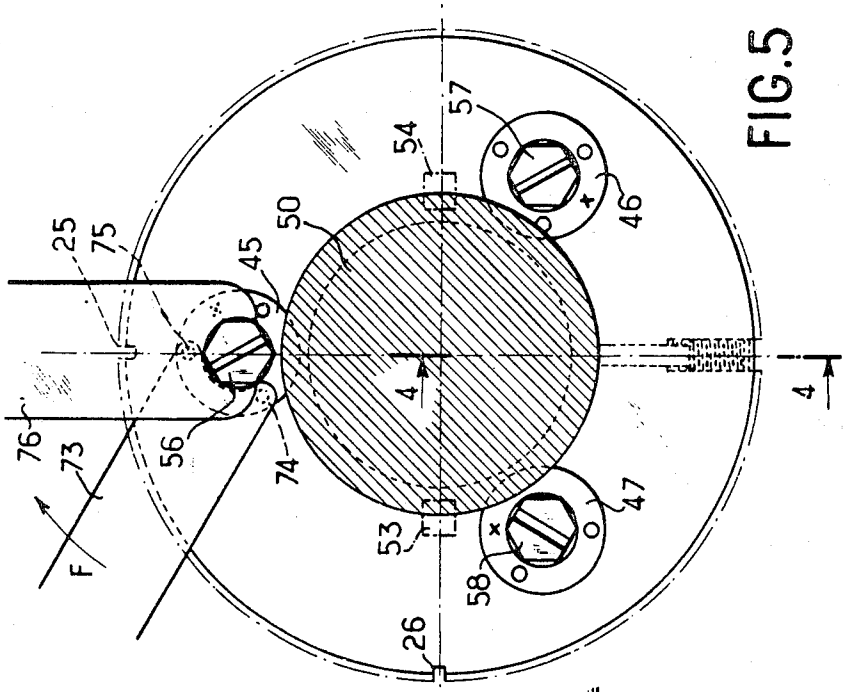

FIG.5

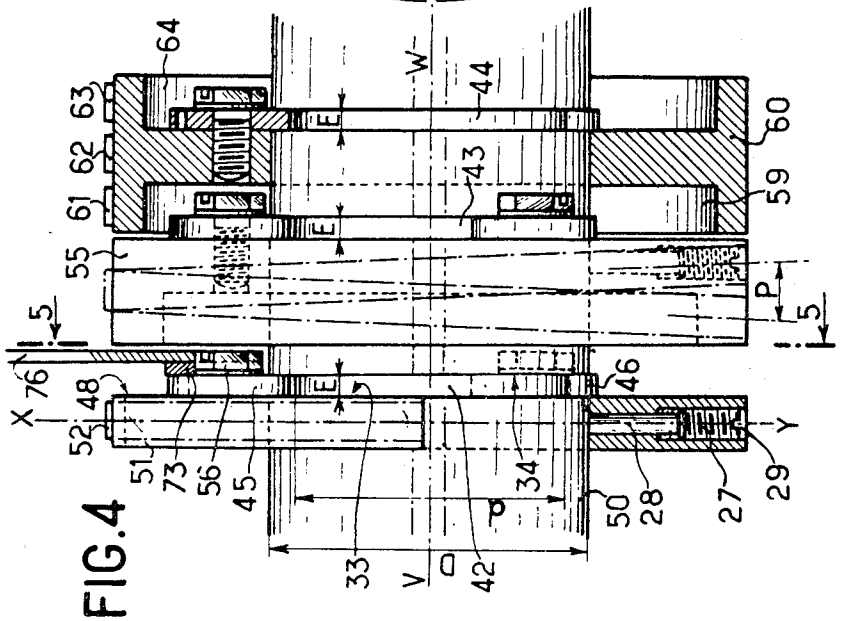

FIG.4

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TYPE-DRUM MOUNTING ASSEMBLY IN PRINT DRUMS

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FIG.10

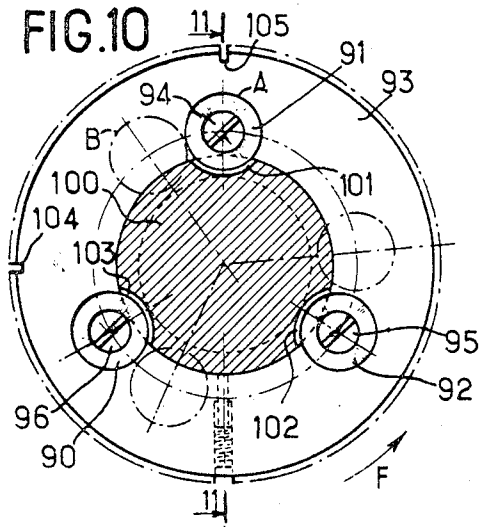
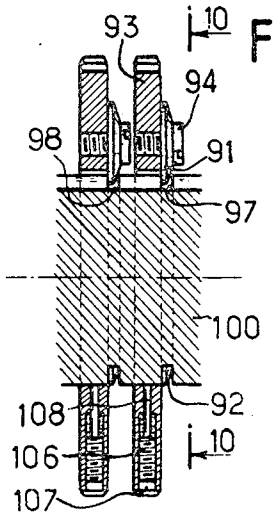


FIG.11



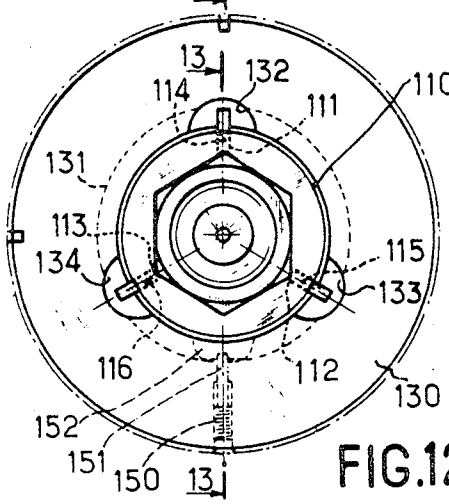


FIG.12

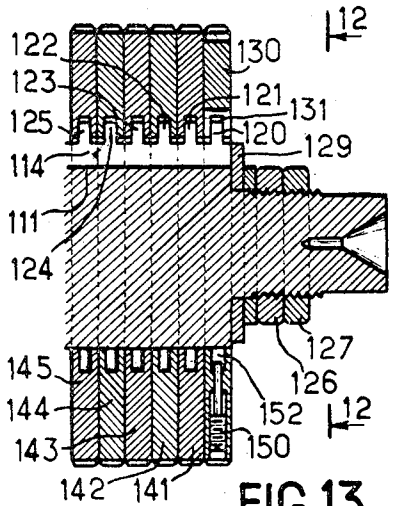


FIG.13

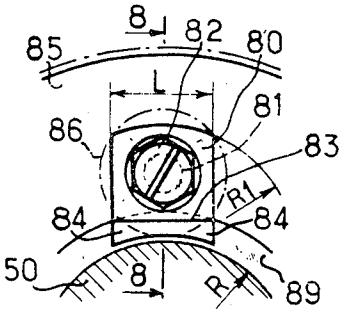


FIG.7

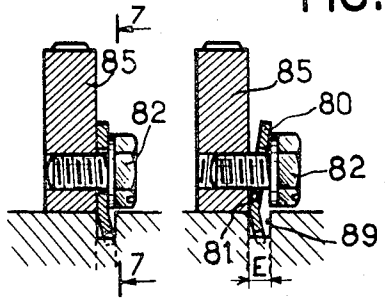


FIG.8 FIG.9

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3,385,213

TYPE-DRUM MOUNTING ASSEMBLY IN PRINT DRUMS

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Claims priority, application France, Mar. 24, 1966, 54,786
14 Claims. (Cl. 101—110)

ABSTRACT OF THE DISCLOSURE

In a printing machine, a type drum comprising a plurality of type wheels mounted separately on a rotating shaft, each wheel being positioned on the shaft by means of a number of positioning members secured on one face of the wheel and each partly engaged in a positioning groove extending around the shaft to permit the adjustment of the angular position of each wheel on the shaft.

The present invention relates to improvements in so-called type-drum printing machines and concerns more particularly improvements in the construction of type drums formed by the assembly of type wheels on a driving support shaft.

Type-drum printing machines are machines whose principle is very well known and which are widely employed to print data or results of calculations in electronic information-processing equipment, such as accounting machines, mathematical machines, statistical machines or the like.

In type-drum printing machines, characters or signs are printed line-by-line on one or more paper sheets or webs by means of an electromechanical assembly comprising a type drum which may be designed in various ways.

Type drums called block drums are known, which comprise a metal cylinder provided on its periphery with series of parallel characters which are either engraved or moulded in relief. Type drums are also known which are formed by the assembly of type wheels or groups of type wheels stacked and fixed on a driving support shaft. This kind of drum is at present most commonly employed for various reasons which will hereinafter be indicated. In these machines, the type drum is actuated, during printing, with a continuous rotational movement about its axis, past a row of striking mechanisms which may be selectively actuated in synchronism with the rotation of the drum for the purpose of printing indications line-by-line on a paper web or sheet disposed with an inked ribbon between the said drum and the row of striking mechanisms. Characters, signs or parts of characters are distributed in various ways, depending upon the machines, along the periphery of the wheels constituting the drum. Most commonly, the rows of characters are parallel with one another, each of them being in a plane perpendicular to the axis of rotation of the drum and comprising a complete series of characters or signs. Printing machines are also known in which the rows of characters of the various wheels are more or less offset from one another and disposed along a helix with the object of synchronising the printing of the characters with the transmission of data emanating from a memory. Machines are also known which comprise a drum provided with type wheels, on which the latter are helically disposed for a particular mode of operation which will hereinafter be referred to. Sometimes, type drums also comprise groups of wheels formed by the assembly of a number of wheels with one another in a block, or

formed by the fashioning of a number of series of characters disposed parallel to one another on a more or less wide common wheel, whereby it is possible to print simultaneously in a number of contiguous columns in a common line.

The printing of characters from a type drum is generally effected by mechanical striking, but may also be effected by various methods in which a dyestuff is transferred on to a paper sheet or on to an intermediate transfer support under the action of a magnetic or electric field, by electrochemical action or by other methods. In a type drum formed by the stacking of type wheels (or groups to type wheels), type wheels are fitted on to a support shaft on which they are then gripped together with or without the interposition of distance rings and held fast on the said support shaft by means of lock nuts screwed on the ends of the said shaft. The alignment of the characters between the various wheels mounted on a common shaft is most generally effected by means of longitudinal keys let partly into the support shaft and partly into slots in the type wheels. This form of construction, which is very widely employed, makes it possible to produce type drums which can receive a large variety of type wheels which can readily be demounted and interchanged and which can rapidly be adapted to the various requirements of the users of such machines. In this connection, type drums may have a part provided with wheels carrying particular mathematical signs or alphabetical characters for the printing of data in languages such as Hebrew, Russian or Greek, or bearing special printing characters known as CMC7 or E13B characters or others with the object of printing indications which can be directly analysed by electronic means, or cheques or other documents, which for this purpose may also be printed with special magnetic or other inks.

A type drum formed by the assembly of independent wheels or groups of wheels also makes it possible, in the case of an accident or for any other reason, to replace one or more type wheels fairly readily without its being necessary to discard complete type drums.

In the majority of type-drum printing machines, and more particularly in machines in which the striking depth is adjusted, it is very important that the periphery of the drum corresponding to the external face of the characters should turn absolutely concentrically to the axis of rotation of the drum, in the case of all the wheels distributed along the drum.

This condition depends directly upon the accuracy of the construction of the various elements of which the drum consists and depends inter alia upon the precision of the machining of the faces of the wheels when they are stacked and gripped on a common shaft, because type drums are sometimes constructed which comprise 102 or more wheels stacked on a common shaft. Under these conditions, differences in the thickness of the wheels, of the order of a hundredth of a millimetre, plus or minus, may result in differences of the order of a millimetre over the length of the drum and render substantially impossible the alignment of the outside wheels of the said drum with the corresponding printing columns. On the other hand, small differences in the parallelism of the faces of the said wheels may cause, when the latter are gripped on the shaft, deformations of the shaft by longitudinal flexure, that is to say, flexure producing bending of the drum, which may be observed even on drums comprising a support shaft of large diameter. This bending produces an eccentricity of the central portion of the drum in relation to its ends to such an extent as to render it unsuitable for use in certain machines. In order to avoid this disadvantage, it has been found necessary to machine the faces of the character

wheels with extreme precision, which is obviously very costly. Various solutions have been proposed for reducing these disadvantages. For example, it has been suggested that the wheels be gripped on the shaft through the intermediary of annuli or washers, having machined surfaces to form a "ball joint" between them, in order that the pressure exerted by the lock nuts may be better distributed over the lateral surface of the wheels, but this does not obviate the bending stresses and deformations produced by the non-parallelism of the faces of the wheels. In practice, attempts are made to compensate for these differences by inserting thin blades at various points between the wheels, but this procedure is not rational.

The present invention is concerned with improvements by which these disadvantages may be obviated by means which eliminate the very causes of the longitudinal stresses on the shaft of the drum and the deformations resulting therefrom. Although necessitating a larger number of assembly members as a whole, the means according to the invention make it possible very substantially to lower the total cost of a type drum by reason of the fact that high precision is not required in the machining of these parts, and by reason of the fact that these means make it possible considerably to reduce the precision which was previously necessary in the machining of certain parts of the type wheels. The means of the invention also make it possible in the majority of cases to readjust with precision the angular positioning of the wheels on the shaft of the drum in order to correct the alignment of the characters printed on a common line, without its being necessary to resort to modifications of the electric control circuits. These means contribute as a whole to an economical production of type drums which meet the severest requirements arising in high-quality type drums.

In a type drum according to the invention, type wheels (or groups of interconnected type wheels) are mounted on the support shaft and each held fast thereon in a predetermined longitudinal position by means of a number of positioning members disposed around the shaft and engaged at least partly in a circular positioning groove either in the drum shaft or in the interior of the wheel. In a first embodiment of the invention, the positioning members for each wheel are disposed around the shaft, fixed to one face of the wheel and at least partly engaged in a circular groove extending around the support shaft in a predetermined location for the wheel. In a second embodiment, positioning members for each wheel are disposed around the shaft and fast with the latter in a predetermined location for a wheel, the said positioning members being engaged at least partly, and without clearance, in a circular groove formed in the interior of the wheel. The angular position of each wheel on the shaft may be modified and adjusted with precision by shifting the wheel-positioning members in the circular groove in which they are engaged. Auxiliary locking means make it possible to hold fast each wheel on the support shaft in a chosen angular position. By this arrangement, the type wheels of a drum are mounted on the shaft without imparting any longitudinal stress thereto. Since the wheels are independent of one another on the shaft, they may be separately angularly adjusted thereon.

For a better understanding of the invention and to show how it may be carried into effect, the same will now be described, by way of example, with reference to the accompanying drawings, in which:

FIGURE 1 is a diagrammatic view of the principal elements of a drum-type printer provided with a complete type drum,

FIGURE 2 diagrammatically illustrates an arrangement of the type wheels on a type drum in a printing machine designed to print one line a number of times,

FIGURE 3 illustrates the profile of a cam which controls the transverse movement of the paper in a machine provided with wheels, in which the characters are helically distributed on each wheel,

FIGURE 4 is a diagrammatic drawing showing various forms of the mounting of type wheels on the shaft of a drum provided with wheel-positioning grooves,

FIGURE 5 is a view in section along the line **5—5** of FIGURE 4,

FIGURES 6A and 6B are views of details of one constructional form of wheel-positioning members engageable in the grooves in a drum shaft,

FIGURES 7, 8 and 9 show other forms of wheel-positioning members,

FIGURE 10 is a view in section along the line **10—10** of FIGURE 11 of a drum provided with means for rapidly positioning the type wheels on a shaft and removing them therefrom,

FIGURE 11 is a view in section along the line **11—11** of FIGURE 10,

FIGURE 12 is an end view of a shaft along the line **12—12** of FIGURE 13, of a drum provided with members adapted to be engaged in grooves formed in type wheels, and

FIGURE 13 is a view in section along the line **13—13** of FIGURE 12.

The diagrammatic drawing of FIGURE 1 illustrates the principal elements of a drum-type printer, which comprises a type drum **10** provided with a shaft **11** rotating in two support bearings **12** and **13**. One end of the said shaft is coupled to a driving motor **14**, while the other end of the shaft is mechanically coupled to a generator **15** of known type for the synchronisation of the striking, which supplies to the storage and comparison device **16** indications as to the angular position of the series of characters on the wheels of the drum in relation to the hammers of the striking mechanism **17**. The mechanisms for the actuation of the hammers are actuated under the control of indications which are transmitted thereto in known manner through a storage and comparison device. A paper sheet or web **18** is disposed with an inked ribbon **19** between the type drum and the striking mechanism hammers to receive impressions. This general arrangement is to be found in a very large number of printing machines in service in which the type drum consists either of a monobloc cylinder provided with series of engraved characters situated in known manner on its periphery, or of a stack of type wheels mounted on the shaft and gripped together between two plates **21** and **22** by means of nuts **23** and **24** screwed on the shaft. Machines are known which are equipped to print lines of characters of 120 columns or more at each printing cycle and which can print at rates of 1000 to 2000 lines per minute. These relatively rapid machines are also of very costly construction and it is not always necessary to employ machines capable of printing at such high rates. Utilising the remarkable performances of the known printing devices, printing machines have been produced which as a whole are less rapid and which perform the printing of each line in a number of elemental printing cycles. FIGURE 2 illustrates an arrangement of type wheels and striking mechanisms in a machine which prints one line in three striking cycles. This machine, which as a whole is less rapid than that illustrated in FIGURE 1, comprises three times fewer striking mechanisms. However, it comprises an additional mechanism **30** for the transverse guiding and displacement of the paper past the striking mechanisms during the printing of each line. This displacement is produced in a number of stages by means of a stepped cam **31**. In order to improve the performances of these machines, some are provided with type wheels on which the characters are helically distributed so as to print successively in a number of columns while the paper is being transversely shifted with a continuous movement past the striking mechanisms by means of a cam **32** (FIGURE 3) specially designed to avoid jerky movements in the mechanisms. The drum of the mechanism of FIGURE 2

comprises type wheels 35 spaced apart by means of intermediate rings 36 disposed between the wheels, the whole being gripped between two plates 37 and 38 by means of two nuts 39 and 40 screwed on the shaft 41.

Simplified machines have also been constructed which comprise a reduced number of wheels on the drum, in principle one-half of the number of series of characters which would be necessary to be able to print simultaneously in all the columns of a line. The drum is then provided with a type wheel to every two columns (FIGURE 11), but there may be employed double (coupled) wheels or even triple wheels spaced apart by a number of columns equal to the number of series of characters on each wheel.

For the printing of a line, after a first striking series, the paper is displaced in one stage by the number of necessary columns (by means of cams, connecting rods, electromagnets, or pneumatic or hydraulic devices or the like) to receive the second impression and then returned into the position for the printing of the succeeding line. The enumeration of these various types of machines is merely intended to show that the invention is applicable at least to the construction of the drums for these machines.

FIGURES 4 and 5 illustrate in condensed form various examples of printing wheels mounted on a type-drum shaft with means corresponding to the first case of the invention, i.e. with positioning members fixed around the shaft, on one face of each type wheel, and engaged at least partly and without clearance in a circular groove formed in the drum shaft. FIGURE 4 illustrates three different types of type wheels mounted on the same shaft 50. A wheel 51, shown half in section, is a single type wheel provided with a single series of characters or signs 52 distributed along the periphery and so disposed that the mean axis of the said characters or signs extends through a plane X-Y substantially midway along the thickness of the wheel. Apart from the means for securing the wheel which are illustrated in FIGURE 4, this type of wheel may also be employed to form type drums for stacking wheels on a shaft as illustrated in FIGURES 1 and 2. The wheel 55 is a wheel of the "helical" type on which characters are engraved in relief and distributed along a helical line, of which the pitch P is equal to the pitch of the printing columns along a line. This type of wheel is employed in printing machines either with a single wheel or with a number of wheels mounted on a drum in accordance with FIGURE 2 and printing in parallel on a common line. As already stated, with these wheels, a continuous transverse movement of the paper (or of the wheel) during the printing of a line is necessary. The wheel 60 is a so-called multiple, group or block wheel, which is provided with three parallel series of characters 61, 62 and 63 which are so constructed that they may be more or less offset from one another in the direction of rotation of the drum. It has been found advantageous to make wheels of this type on which a number of series of characters are in parallel and are simultaneously formed. That portion of the drum shaft 50 which is shown in FIGURE 4 has an external diameter D which is perfectly machined to receive wheels whose bore is adapted to this diameter and absolutely centered around the axis of rotation V–W of the shaft. Positioning grooves 42, 43 and 44 of a width E are formed in the shaft and situated at predetermined distances apart in accordance with the longitudinal positioning of the wheels and the manner in which they are mounted on the said shaft. Each groove has two opposite faces 33 and 34 each in principle in a plane perpendicular to the axis of the drum. They are deepened to a diameter *d* permitting sufficient engagement of the positioning members in the said grooves. Three positioning members 45, 46 and 47 are disposed on the face 48 of the wheel 51 (FIGURE 5) 120° apart about the shaft 50 and secured to the said wheel by means of securing screws 56, 57 and 58. These positioning members consist of annuli of metal, hard plastics or any material considered suitable, which are partly engaged in a positioning groove 42, and the thickness of which is adapted to the width of the grooves. Under these conditions, the wheel 51 is perfectly positioned on the shaft 50 and in relation to the other wheels mounted on the same shaft. This mode of mounting the wheels on the shaft facilitates the construction of a type drum having spaced wheels of the type illustrated in FIGURE 2, but with certain advantages over the previously employed techniques. In the described assembly, it is unnecessary to provide intermediate rings 36 (FIGURE 2) between the wheels. The members constituting the locking means 37, 38, 39 and 40 disposed at the ends of the drum to hold fast the wheels on the shaft are omitted, and any resultant bending stress on the shaft is thereby avoided. The machining of the faces of the wheels and the boring of the latter are simplified by virtue of the fact that absolute parallelism between the said faces of the wheels is no longer so necessary. The angular positioning of the wheels on the shaft is generally determined by construction by means of two longitudinal keys 53 and 54 (FIGURE 5) partly engaged on the one hand in flutes formed longitudinally in the shaft and on the other hand in slots formed in the wheels. However, it is advantageous in many cases, at least during the setting-up of the machine, to be able to readjust in one direction or the other the angular setting of some of the wheels on the driving shaft by sliding the positioning members of the latter in their groove in order to correct differences in alignment of the characters printed on a common line by different wheels. For this purpose, each wheel is provided, for example, with one or more slots 25, 26 situated between characters, along the periphery of the wheel in order to receive keys adapted to exert the necessary force for shifting each wheel on its shaft. Each wheel may be provided with an additional locking system such as that illustrated in FIGURE 4, which comprises a screw 27 engaged in a screwthread 29 and bearing against a bronze cylinder 28 which holds fast the wheel on the drum shaft in a final position. It will be seen that the use of positioning members having some elasticity in the grooves makes it possible to some extent to dispense with the use of the said locking means. A wheel 55 (FIGURE 4) which is a wheel on which the characters are helically distributed, may be mounted on a shaft 50 in the same way as a wheel 51 to serve to make up a drum of the type illustrated in FIGURE 2, but this drum will be employed with a cam 32 of the type illustrated in FIGURE 3 to control a continuous transverse movement of the paper during the printing of a line.

The wheel 60 is a so-called block or multiple wheel provided with a number of series of straight, parallel characters, each for one printing column. Wheels of this type are currently employed to produce by stacking on a shaft a complete drum formed of contiguous wheels as illustrated in FIGURE 1, or to construct a drum having a smaller number of wheels, for use with a mechanism for the transverse movement of the paper as described in the foregoing. In the case of the wheel 60 (FIGURE 4), this may be provided with a cavity 59 in which there may be lodged members for positioning an adjacent wheel and their securing screws. In FIGURE 4, the members for positioning the wheel 60 are disposed in a cavity 64 and engaged in a groove 44 in the support shaft. In this arrangement, the members for positioning a type wheel situated at one end of a drum do not extend beyond the said wheel and this makes it possible to produce by means of assembled elements drums whose small longitudinal extent enables them to be substituted for monobloc drums (engraved cylinders).

The positioning members which are employed to position type wheels on a drum shaft may of course be produced with precision so as to be engaged in grooves also machined with precision. However, FIGURES 6A and

6B show in detail a constructional form of positioning members which have certain advantages and which may be employed to mount wheels on a shaft as indicated in FIGURES 4 and 5, but which require less machining precision. A positioning member **65** (FIGURES 6A and 6B) consists of a metal annulus of a diameter ϕ and formed with a central hole **66** for the passage of a securing screw. The diameter ϕ is made such that, when the said annulus is fixed on a face of a wheel, a portion thereof is engaged (FIGURE 5) in a positioning groove. The faces **68** and **69** of the annulus are plane and non-parallel, so that the thickness of the annulus, in its thinnest portion has a value F1 lower than the width of the positioning grooves, whilst the portion which is opposite thereto has a thickness F2 slightly greater than the width of the grooves. It is advantageous to provide the thickest, or thinnest, portion of each washer with an engraved mark **78** which facilitates the positioning during assembly. The central portion of the face **69** of the annulus is provided with a flange **77**, the surface of which is parallel to the other face of the annulus to enable correct locking of the securing screws by positioning the head of the securing screw on the said flange. It will be appreciated that this type of positioning member does not require any greater precision in its machining, and that it reduces the precision necessary for the machining of the positioning grooves and makes it possible to effect as required a more or less firm braking of the wheels on their support shaft in order where necessary to be able to readjust the angular position of the wheels on the shaft, as has been stated, or a sufficiently strong locking to render unnecessary any other means for locking the said wheels. When the annuli for the positioning of a wheel have been disposed as indicated in FIGURE 5, the thinnest portion of each annulus being engaged in the corresponding positioning groove, and the locking screws **56**, **57** and **58** not being fully tightened on the annuli, the studs **74** and **75** of a stud-type key **73** are introduced into the holes accessible through three holes **70**, **71** and **72** (FIGURE 6A) situated in an annulus **45**. The key **73** (FIGURE 5) is turned in the direction of the arrow F so as to engage a thicker portion of the annulus in the positioning groove until a locking action is obtained, which is readily perceived. The screw **56** is thereafter tightened by means of a key **76** or by means of a screwdriver engaged in the slot in the screwhead if the latter is accessible. In the course of the locking of the screw, the annulus **45** may if desired be "retained," that is to say, it may be prevented from turning and from becoming excessively locked in the groove should a moderate locking in the latter be required. It is obvious that the portion of gradually increasing thickness of the annuli may have the form of a helical cam distributed over the entire perimeter of each annulus, or may be in any other form considered suitable. It is also obvious that, if the positioning members are let into the thickness of a wheel, tools of appropriate shape will be employed for fitting them.

FIGURES 7, 8 and 9 illustrate constructional variants of positioning members of simplified form which may also be produced with relatively low precision.

The member **80** (FIGURE 7) is a member cut out of a metal strip of width L, the thickness of which is in principle very much smaller than the width E of a positioning groove. The member **80** is cut-off at its ends with a radius of curvature R1 similar to the radius of curvature R at the base of a groove **89** in the shaft **50**. The member **80** is formed with a hole **81** whose diameter is slightly larger than the diameter of a securing screw **82**. The member **80** is provided with a camber **83** which imparts to the portions **84** of this member a thickness which is distinctly greater than the width E on the groove. FIGURE 9 shows the mounting of a member **80** in a positioning groove **89**. The portions **84** of the member are first engaged in the groove **89**, and a screw **82** is engaged in the hole **81** in the member and then screwed and locked on the wheel **85** (FIGURE 8). The shape and position of the portions **84** of the member **80** in the groove **89** (FIGURE 7) prevent the latter from turning during the locking of the screw **82**. Depending upon the initial extent of the camber **83** of the member, the portion engaged in the groove **89** will be more or less straightened by bearing on the opposed faces of the groove during the locking of the screw **86**. The force thus exerted on the walls of the groove will be limited by the thickness and flexibility of the metal strip constituting the member **80**, the latter being more readily straightened as it is thinner. A similar positioning of a wheel may be obtained with appropriately cambered members of square or rectangular form or even with metal annuli **86** (FIGURE 7) which are also cambered at **83**. However, in the latter case, it may be necessary to prevent the annulus from turning during the locking of the securing screw. FIGURES 10 and 11 show an example of the application of the invention adapted to permit rapid mounting of the type wheels on the drum shaft and their rapid removal therefrom. In this case, the shaft **100** is formed with positioning grooves **97** and **98** adapted to receive positioning members, and with longitudinal flutes **101**, **102** and **103**, the positioning members consisting, for example of flat, slightly conical annuli **90**, **91** and **92** for the wheel **93** and being in addition resilient in their thickness, of the type known as "Belleville washers." These annuli secured on the wheel **93** by securing screws **94**, **95** and **96** may be first of all mounted on the type wheels, which are thereafter fitted on to the shaft as illustrated in FIGURES 10 and 11 and turned about the shaft **100** by means of keys engaged in the grooves **104** and **105**, or by any other appropriate means for bringing the positioning annuli from a position A to a position B adjacent the final locking position of the wheel on the support shaft. In this movement, the positioning members are engaged in the positioning grooves, whereafter the wheels, which have been angularly positioned on the shaft with precision, are locked thereon, each by means of a locking screw **106** engaged in a screwthread **107** and pushing a locking dog **108** against the shaft. The second method of carrying out the invention appears to be more particularly adapted for the mounting of separate contiguous wheels on a common shaft. In this case, the type wheels are formed with positioning slots and the positioning members engageable in these grooves are fast with the shaft.

In the example illustrated in FIGURES 12 and 13, a shaft **110** is formed with longitudinal flutes **111**, **112** and **113**, in each of which there are engaged combs **114**, **115** and **116** provided with teeth **120**, **121**, **122** . . . . At each end of the drum shaft, each comb is centered on the latter at its ends by means of annuli **129** (one at each end) maintained in position by nuts **126** and **127**. The wheel **130** (FIGURE 13) is formed, like each wheel mounted on this shaft, with a circular groove **131** and with recesses **132**, **133** and **134** for the engagement of the teeth **120**, **121**, **122** . . . of the combs in the grooves in the wheels. In the sectional view (FIGURE 13), the teeth **121**, **122**, **123**, **124** and **125** are shown engaged in the positioning grooves in the wheels **141**, **142**, **143** . . . , while the first teeth **120** of the combs **114**, **115** and **116** are not engaged in the groove **131** in the wheel **130**, which has not been turned about the shaft. After engagement of the positioning teeth in the groove, each wheel may be held fast on the shaft by means of a locking screw **150** which pushes on a piston **151** engaged in a block **152** disposed in the groove in the wheel and which bears against the shaft. Of course, the combs may be replaced by steel pins fitted in blind holes in the shaft to obtain a similar result.

I claim:

1. In a printing machine, a type drum comprising a rotative cylindrical shaft adapted to support a plurality of type wheels each consisting of a disc which is pro-

vided on its periphery with one or more rows of characters and is centered on the external diameter of the shaft, the latter being formed with a plurality of circular grooves spaced apart to determine the spacing of the wheels and characterised in that each of said wheels is provided on one face with a plurality of positioning members fixed to the wheel, each extending into the interior of the bore of the wheel and partly engaged in one of said grooves, each wheel also being provided on its periphery with marking means (25, 26) for marking the angular positions and with locking means (27, 28) for locking said wheel on said shaft in a predetermined angular position, and in that the said shaft (100) is formed with a plurality of longitudinal flutes (101, 102, 103) by means of which any of said type wheels having its positioning members fixed thereon can be brought into proximity to an associated one of said grooves.

2. A type drum according to claim 1, wherein each of the said positioning members comprises a flat annulus fixed by a screw (56, 57, 58), the thickness of which annulus is such as to enable it to be engaged in any of said grooves in said shaft.

3. A type drum according to claim 1, wherein each of said positioning members consists of an oblique annulus (65) adapted to be locked by one screw (56, 57, 58), the said annulus being so machined that its minimum thickness (F1) is smaller than the width of said grooves and that its maximum thickness (F2) is at least equal to said width, so that said annuli, after having been engaged in one of said grooves, are each turned about their axis, to wedge in said groove, thus locking the associated wheel on said shaft.

4. A type drum according to claim 1, wherein each of said positioning members consists of a plate (80) adapted to be locked by a screw (82), the said plate having a thickness smaller than the width of any of said grooves and having a portion (84) engaged in one of said grooves (89), this portion being previously so bent that it is wedged between the two faces of said groove when said plate is locked by said screw.

5. A type drum according to claim 1, wherein each of said positioning members (90, 91, 92) consists of a resilient conical annulus gripped on one face of an associated one of said wheels (93) by a screw (94, 95, 96) and brought by gripping to a thickness adapted to permit the engagement of said positioning members in one of said grooves.

6. A type drum according to claim 1, wherein each of said wheels comprises a flange on which the positioning members are secured and a type-bearing ring adapted to provide a cavity (64) serving to receive the said positioning members and their securing means associated with said wheel or with a neighbouring wheel.

7. In a printing machine, a type drum comprising a rotative cylindrical shaft adapted to support a plurality of type wheels each consisting of a disc which is provided on its periphery with one or more rows of characters and is centered on the external diameter of the shaft, the latter being formed with a plurality of circular grooves spaced apart to determine the spacing of the wheels, and characterised in that each of said wheels is provided on one face with a plurality of positioning members secured to the wheel, each extending into the interior of the bore of the wheel and partly engaged in one of said grooves (42), each wheel also being provided on its periphery with marking means (25, 26) for marking the angular positions and with locking means (27, 28) for locking said wheel on said shaft in a predetermined angular position.

8. A type drum according to claim 7, wherein each of the said positioning members consists of a flat annulus fixed by a screw (56, 57, 58), the thickness of which annulus is such as to enable it to be engaged in any of said grooves in said shaft.

9. A type drum according to claim 7, wherein each of said positioning members consists of an oblique annulus (65) adapted to be locked by one screw (56, 57, 58), the said annulus being so machined that its minimum thickness (F1) is smaller than the width of said grooves and that its maximum thickness (F2) is at least equal to said width, so that said annuli, after having been mounted on one of said wheels and engaged in one of said grooves, are each turned about their axis to wedge in said groove, thus locking the associated wheel on said shaft.

10. A type drum according to claim 7, wherein each of said positioning members consists of a plate (80) adapted to be locked by a screw (82), the said plate having a thickness which is smaller than the width of any of said grooves and having a portion (84) which is engaged in one of said grooves (89), this portion being previously bent in such manner that it is wedged between the two faces of said groove when said plate is locked by said screw.

11. A type drum according to claim 7, wherein each of said wheels comprises a flange on which the positioning members are secured, and a type-bearing ring adapted to provide a cavity (64) serving to receive the said positioning members and their securing means associated with said wheel or with a neighbouring wheel.

12. In a printing machine, a type drum comprising a rotative cylindrical shaft adapted to support a plurality of type wheels each consisting of a disc which is provided on its periphery with one or more rows of characters and is centered on the external diameter of the shaft, the latter being formed with a plurality of circular grooves spaced apart to determine the spacing of the wheels, and characterised in that each of said wheels is provided on one face with a plurality of positioning members secured to the wheel, each extending into the interior of the bore of the wheel and partly engaged in one of said grooves each wheel being in addition provided on its periphery with marking means (25, 26) for marking the angular positions.

13. A type drum according to claim 12, wherein each of said positioning members consists of an oblique annulus (65) adapted to be locked by one screw (56, 57, 58), the said annulus being so machined that its minimum thickness (F1) is smaller than the width of said grooves and that its maximum thickness (F2) is at least equal to said width, so that said annuli, after having been mounted on one of said wheels and engaged in one of said grooves, are each turned about their axis to wedge in said groove, thus locking the associated wheel on said shaft.

14. A type drum according to claim 12, wherein each of said positioning members consists of a plate (80) adapted to be locked by one screw (82), the said plate having a thickness smaller than the width of any of said grooves and having a portion (84) engaged in a groove (89), which portion is previously bent in such manner that it is wedged between the two faces of said groove when said plate is locked by the screw.

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