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Richter

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[54] **APPARATUS FOR THE ELECTRO-MECHANICAL PRODUCTION OF PRINTING MATRICES ON VARIABLE SCALE OF REPRODUCTION**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** ..... **178/6.6 B**

[51] **Int. Cl.** **H04n 1/22**

[58] **Field of Search** ..... 178/6.6 B; 74/191, 74/242.4, 30

[56] **References Cited**

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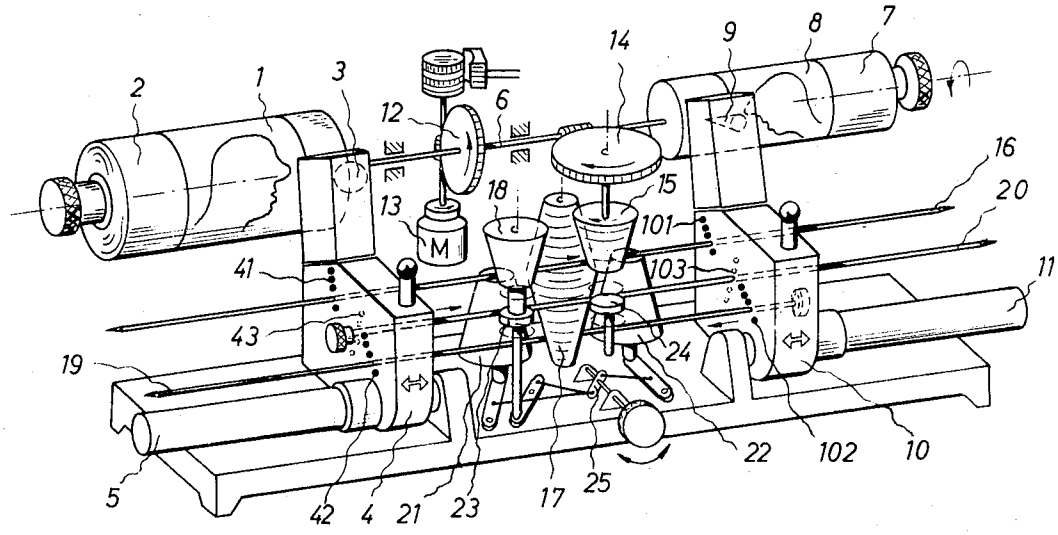
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[57] **ABSTRACT**

In an apparatus for producing printing matrices wherein a scanning means scans a picture or image and an engraving device produces a picture, a reduction gear introduced between the image carrier drive and the feed or displacement of the engraving device, the reduction gear having a translating ratio which is variable so that either a longer or smaller scale reproduction can be produced.

7 Claims, 3 Drawing Figures



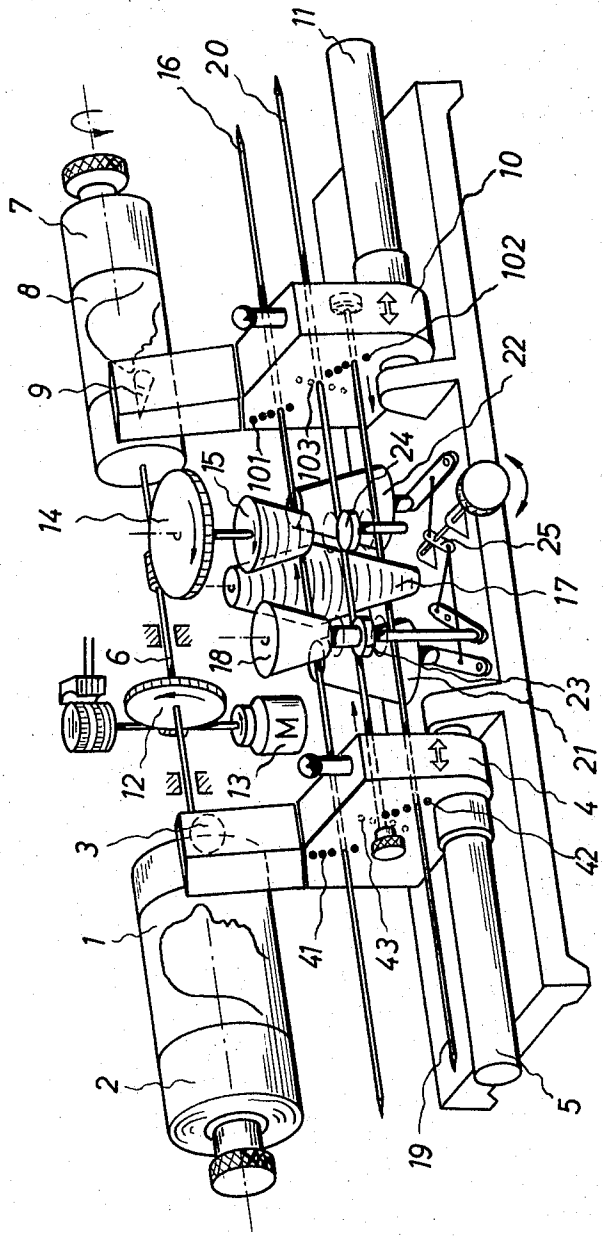


Fig. 1

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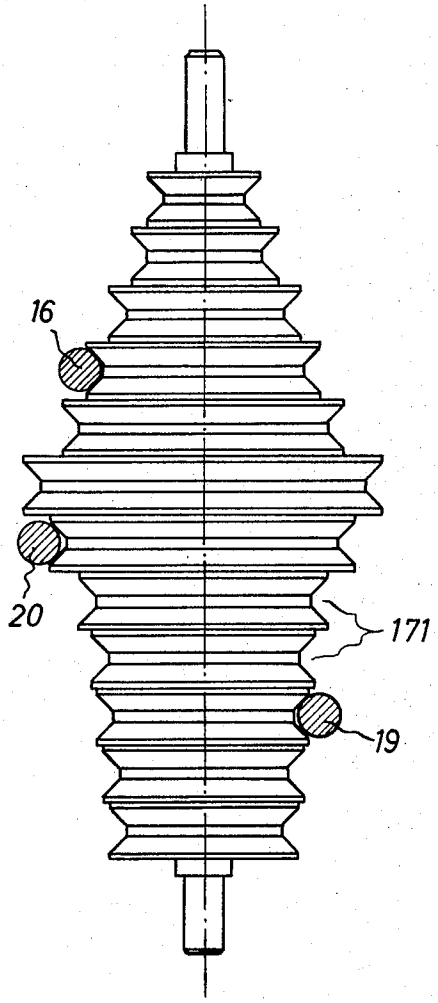


Fig. 2

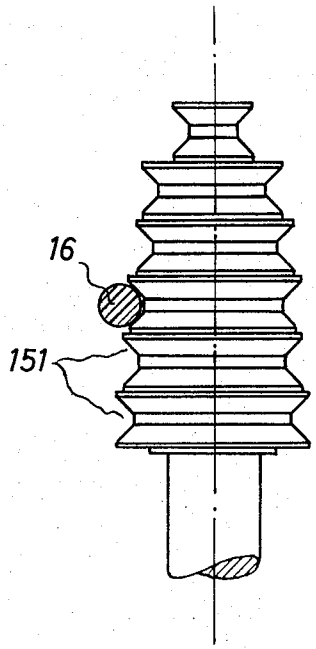


Fig. 3

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APPARATUS FOR THE ELECTRO-MECHANICAL PRODUCTION OF PRINTING MATRICES ON VARIABLE SCALE OF REPRODUCTION

FIELD OF THE INVENTION

The present invention relates to an arrangement for the electro-mechanical manufacturing of printing matrices from pictures with a variable reproduction scale and raster or scanning screen in which the photo-electric scanning means controls an engraving means and in which a carrier is provided for the picture and for the printing matrix along with a feed arrangement for the scanning and engraving means and a drive for the picture and printing matrix carriers.

BACKGROUND OF THE INVENTION

In devices of the above described type it is known to couple the feed arrangement for the scanning and engraving means with each other in such a manner that the relationship of the feed of the scanning and engraving means corresponds to the desired reporduction scale, to the desired raster or scanning screen, or both. A change in the scale of the reproduction between the image and the printing matrix made therefrom can be attained by the provision of a gear with the help of which the speed of the picture carrier and of the matrix carrier in the scanning and in the engraving directions can be relatively changed in accordance with the desired reproduction scale.

The disadvantage of this arrangement lies in that during a change of the reproduction scale the raster or scanning scale should also be changed so that the feed of the engraving means could be adjusted to this newly selected reproduction scale. This becomes disadvantageous especially when printing matrices are frequently produced within a certain set of reproduction scale values or within a certain set of scanning scale values.

SUMMARY OF THE INVENTION

It is an object of the present invention to eliminate the above described disadvantages of the known arrangements and to provide a novel arrangement for the electro-mechanical production of printing matrices with which it becomes possible that the reproduction scale and the raster or scanning scale could be selected within a set of reproduction and scanning scale values without the necessity to make corresponding changes in the parameters of the other set if one set is changed.

According to the present invention the feed arrangement is coupled to the output of a drive gear arrangement the input of which is fed by the drive of the image and printing matrix carriers, the translating ratio of such gear arrangement between its input and output being variable within a set of values which values are correlated with the desired reproduction and scanning scales.

According to a preferred embodiment of the present invention for the variation of the translating ratio the gear is provided with at least one cone-shaped gear or wheel which is in positive force coupling with a bar means which is adjustable in the axial direction and which is selectively movable along the surface of the gear or wheel.

The above-mentioned bar means can be forced by means of another wheel or gear, which can be in the form of a roller, into its operating position, that is, to engagement with the above-mentioned cone shaped gear means.

The invention further provides that the cone-shaped wheel or wheels or gears are provided on their outer surface with ring-like recesses or grooves lying adjacent to each other in the axial direction of the gear for receiving the above-mentioned bar means therein and having each a radius which is correlated with the desired translating ratio of the gear drive arrangement.

It is especially advantageous that the invention preferably provides a double cone-shape gear which is common to the input and to the output of the gear arrangement. From this double-cone-shaped gear at its input side a friction bar is driven and such gear, acting as a common driving gear for both inputs and outputs, drives both bar means, that is, it drives a friction bar means at its input and a friction bar means at its output with which the number of revolutions of the output can be adjusted. This bar means according to the present invention functions as the drive for the feed arrangement for the scanning and engraving means and, in the case, where the gears are made as friction gears, the bars are made as friction bars, whereas in the case where the wheels are made as multi-stage cog wheels, the bars are made as pinion-rack bars.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will become more readily apparent from the following description of a preferred embodiment thereof shown, by way of example, in the accompanying drawings, in which;

FIG. 1 illustrates a preferred embodiment of the present invention in a perspective view;

FIG. 2 illustrates the reduction gear made in the form of a double cone; and

FIG. 3 illustrates a cone-shaped gear.

DESCRIPTION OF THE PREFERRED EMBODIMENT

It is noted that similar parts in the figure are identified by similar reference characters.

With reference to FIG. 1 it is seen that a picture or image 1 is mounted or spanned on a drum 2 and is photoelectrically scanned by means of a scanning device 3 is mounted on a carriage 4 which in turn is slidably mounted on a tube 5. The drum 2 is coupled by means of a shaft 6 with a second drum 7 which serves as the receptor or carrier for a printing matrix 8 which is produced by means of an engraving device 9. The engraving device 9 is in turn mounted on a second carriage 10 which is slidably arranged again on a tube 11. The drums 2 and 7 are driven by a motor 13 over a worm gear 12. On the shaft 6 there is a further worm gear 14 provided over which through a translating gear the feed arrangements for the scanning and engraving devices are driven. The input of the drive or translating gear arrangement 17 comprises a cone-shaped wheel or gear 15 which by means of a friction bar 16 drives the gear 17 formed as a double cone. In order that the friction bar 16 be in positive force coupling with the gears 15 and 17, a pressure roller 18 is provided. In order to change the input translating ratio of the drive gear arrangement 17, on the carriage 4 and 10 a set of bores 41 and 101 are provided which in their angular disposition correspond to the outer surface of the cone-shaped gears 15 and 17 and the relative distance between the respective bores of which corresponds to the

points of force application of the friction bar to the above-mentioned cone-shaped gear surfaces. The friction bar **16** is freely guided in these bores, that is, it does not become arrested by them. The gear **17** drives on its lower cone-shaped half two further friction bars **19** and **20** which are inserted within a set of bores **42,102** for the bar **19** and **43, 103** for the bar **20.** Such bores are formed in the carriages **4** and **10.** The bar **19** is fixed on the carriage **4** so that the motion transmitted to it from the gear **17** is directly transmitted to the carriage **4.** The same is true for the bar **20** which serves as a drive for the bar **20** which serves as a drive for the carriage **10.** In order that here also a good positive force locking could be attained between the friction bars **19** and **20** and the lower half of the gear **17,** pressure rollers **21** and **22** are provided for the bar **19** and pressure rollers **23** and **24** are provided for the bar **20.** The rollers **18, 21,23** and **24** are by means of a lever arrangement **25** having an over dead-center latching, can be lifted away from the bars **16, 19** and **20** whereupon an easy change of the bar positions, that is, their reinsertion into different bores can be had.

FIG. **2** illustrates the gear **17** formed as a double cone, and as can be seen, it is provided on its surface with a plurality of ring-like grooves **171** into which the friction bars **16, 19** and **20** enter. In order to attain a different translating ratio the grooves **171** have different radii. The position of the bars **16, 19** and **20** is illustrated in correspondence with FIG. **1.**

FIG. **3** illustrates a cone-shaped gear or wheel, such as the gear **15** which is similar also as the gears **21** and **22.** The illustrated gear **15** has on its outer surface ring-like grooves **151** into which the friction bar **16** enters. The distance between the grooves **151** corresponds to the distance between the grooves **171** illustrated in FIG. **2** and also corresponds to the distance between the bores **41** and **101** into which the bar **16** becomes inserted. By the selection of various diameters for the individual grooves **171** a set of values is obtainable within which the translating ratio of the drive gear arrangement **17** can be varied.

By constructing the drive gear arrangement with, for example, five stages of adjustments for the bar **16** which serves for changing the scanning scale, and by providing six adjustment stages for the bar **20** which determines the scale of the reproduction, and at a fixed position of the bar **19,** there will be 30 possibilities of scale adjustments for the entire arrangement. In the event there are provided three more additional insertion possibilities for the bar **19,** then there will be further scale adjustment possibilities within the so called module set, that is, there will be ninety scale adjustment possibilities available.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

Having thus described the invention, what I claim as new and desire to be secured by Letters Patent, is as follows:

1. An arrangement for the electro-mechanical production of a printing matrix having a variable reproduction scale and scanning screen or raster scale, comprising scanning means; engraving means controlled by said scanning means; means for carrying the picture image thereon; means for carrying the matrix; feed means for said scanning means and engraving means; drive means for said picture image carrying means and said matrix carrying means; a gear drive means comprising input means having a variable translating ratio and a pair of output means; each having a variable translating ratio; means coupling said feed means to the output means of said gear drive means; said input means of said gear drive means having a translation ratio which is variable within predetermined sets of magnitudes representing different reproduction sizes.

2. The arrangement as claimed in claim **1,** wherein said input means comprises a first input cone-shaped gear means; a second cone-shaped gear means having an input cone and an output cone; a bar means frictionally connected to said cone-shaped gear means for following said cone-shaped gear means; a wheel means provided to force said bar means against the first and second cone-shaped gear means and, means for axially adjusting said bar means.

3. The arrangement as claimed in claim **2,** wherein said wheel means is a third cone-shaped gear means.

4. The arrangement as claimed in claim **2,** wherein said wheel means is a roller means.

5. The arrangement as claimed in claim **2,** wherein said means coupling the feed means to the output means of said gear drive means comprises second and third bar means frictionally connected to the output cone of said second cone-shaped gear means for following said output cone; the second and third bar means being connected to said feed means; wheel means provided for forcing said bar means against the output cone of said second cone-shaped gear means and, means for axially adjusting said bar means.

6. The arrangement as claimed in claim **5,** wherein said wheel means are cone-shaped gear means.

7. The arrangement as claimed in claim **5,** wherein said wheel means are roller means.

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