

Feb. 22, 1944.

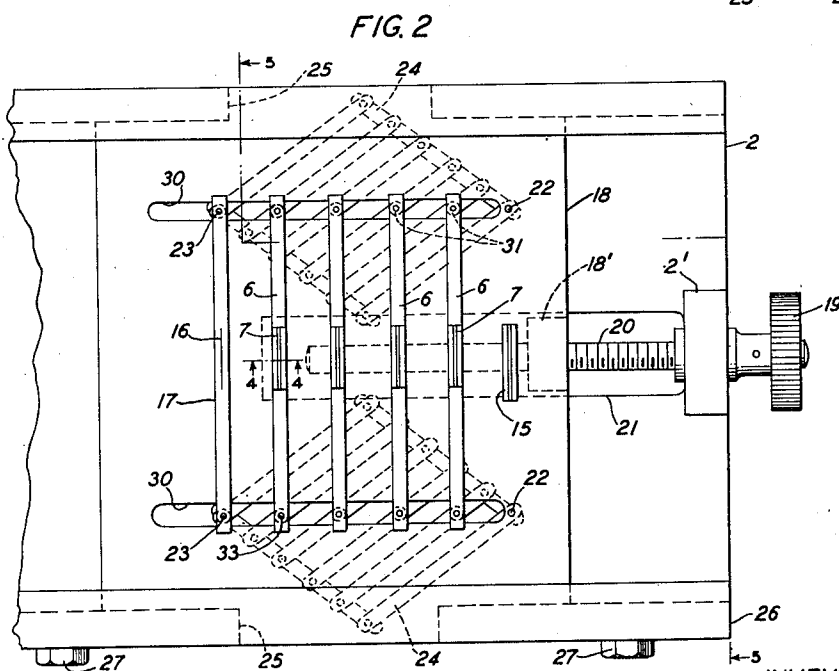
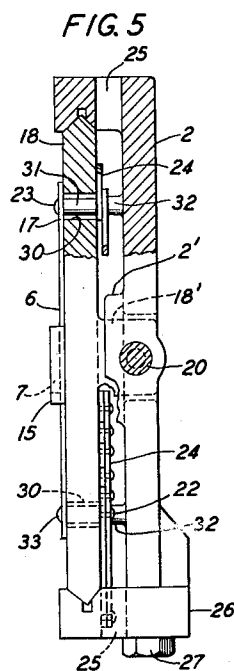
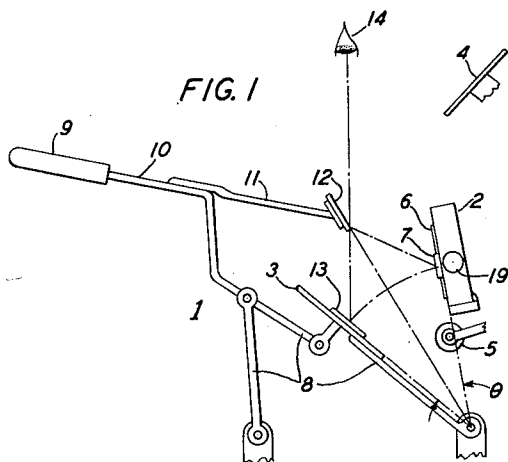
T. SLONCZEWSKI

2,342,560

PRINTER FOR INSTRUMENT SCALES

Filed Dec. 23, 1941

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 3

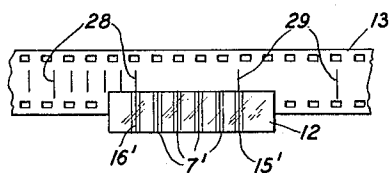


FIG. 4

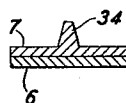
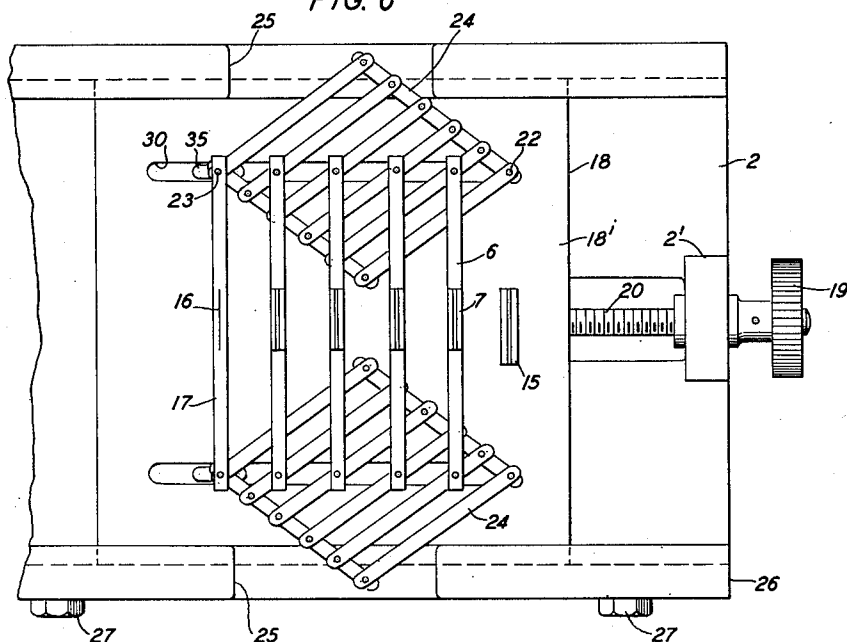


FIG. 6



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PRINTER FOR INSTRUMENT SCALES

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2 Claims. (Cl. 101—297)

This invention relates to an apparatus for printing instrument scales and more particularly to a means for printing the subdivisions on instrument scales subsequent to the manual calibration of a series of predetermined discrete points on the scales.

Manual calibration of instrument scales is usually accomplished by inscribing thereon a series of discrete calibration marks throughout the length of the scale. Subdivisions are thereafter printed between these discrete calibration marks by geometrically dividing the spaces between them into equal parts. Most indicating instruments are so designed that the adjacent spaces between these calibration marks do not differ greatly. Subdividing these spaces into equal parts, therefore, introduces no appreciable error and is entirely practicable.

It is the object of this invention to provide an apparatus for rapidly and accurately printing the subdivisions between the previously calibrated points on an instrument scale.

The foregoing object is achieved by this invention by providing a specially constructed printing press having a plurality of printing rules on its type bed corresponding to the subdivisions to be printed and an adjusting mechanism for simultaneously adjusting the distances between the rules by proportional amounts.

The invention may be better understood by referring to the accompanying drawings, in which:

Fig. 1 shows schematically the linkage mechanism of a manually operated printing press adapted for the practice of this invention;

Fig. 2 is a front view of the specially constructed type bed disclosing the mechanism for simultaneously adjusting the distances between the printing rules;

Fig. 3 shows how the printing rules may be aligned with the previously inscribed calibration indicia;

Fig. 4 shows a section through one of the printing rules;

Fig. 5 shows an end view and partial section through a portion of Fig. 2; and

Fig. 6 discloses an alternative form of type bed mechanism.

Referring now more particularly to Fig. 1 wherein a printing press mechanism 1 is shown in schematic form. The linkage as shown comprises essentially three movable links 8. A handle 9 is attached to one of these links for operating the press in a well-known manner. Cooperating with this linkage is a bed 2, a platen 3, an ink disc 4 and an ink roll 5. The mechanism for operating the press also moves ink roll 5 over type bed 2 and onto ink disc 4. As the mechanism for performing this function is common to all printing presses of this type, it is not shown in order to simplify the description. A reflector 12 is supported by a rod 11 secured to a portion 10 of the press linkage.

Type bed 2 has supported thereon a plurality of printing rules or bars 7 and 15, more particularly hereinafter described in connection with Fig. 2. These printing rules are adapted to print a series of lines on an instrument scale 13 held by platen 3. A detailed description of the operation of the printing press per se is entirely unnecessary as its operation is essentially identical with all hand-operated printing presses.

In order to practice this invention it is unnecessary to employ the particular type of linkage disclosed in Fig. 1 as any other type of printing press linkage commonly used with either hand-operated presses or with any of the well-known job presses may be used. The particular linkage here shown was chosen for illustrative purposes only.

The plane of reflector 12 is so positioned with respect to the plane of the platen 3 and the plane of bed 2 as to bisect the angle θ formed thereby. An observer's eye 14 may be placed above the press so as to view both the images of the printing rules 7 and 15 and the two adjacent calibration marks on the instrument scale 13. In this position the plane of the images of rules 7 and 15 will exactly coincide with the plane of the instrument scale 13 so as to avoid any possible difficulty with parallax. The use of the reflector in the manner just described insures accurate registration of the printing rules 7 and 15 with the previously inscribed indicia on the instrument scale 13.

Fig. 2 shows one form of specially constructed type bed for the practice of this invention. A plurality of short printing rules 7 and a longer one 15 are provided for printing the scale. The previously inscribed indicia made during calibration are usually made in pencil and require printing over with ink in order to insure permanence, legibility and uniformity in appearance. The longer printing rule 15, mounted integral with slide 18, is provided for this purpose. Slide 18 is adapted for accurate sliding motion in grooves provided in bed 2. The intervening subdivisions are printed by the short printing rules 7 of which four are shown in Fig. 2. Obviously a different number of printing rules 7 must be employed where the particular scale to be printed

requires a different number of subdivisions. Printing rules 7 are mounted on a plurality of parallel bars 6 which in turn are attached to two pantograph systems 24, 24. An additional bar 17 is mounted integral with bed plate 2 by means of pivots 23, 23. An index line 16 is inscribed on bar 17 for alignment purposes as will be more particularly described hereinafter in connection with Fig. 3. Pivot points 22 of the pantograph systems are attached to slide 18 in line with printing rule 15 and it will be understood that as slide 18 is slid laterally in bed 2 the two pantograph systems will be caused to expand and contract so as to simultaneously adjust the distances between the parallel bars 6 and 17 as well as between them and printing rule 15 by proportional amounts. Clearance spaces 25, 25 are provided in the bed to permit free motion of the two pantograph members as they are contracted. Accurate adjustment of the position of slide 18 with respect to bed 2 is provided by a knurled adjustment knob 19 supported by lateral and thrust bearings in a suitable lug 2' in bed 2. Knob 19 is mounted to a threaded shaft 20 which cooperates with a threaded hole in a lug 18' integral with slide 18. Clearance is provided for lug 18' in bed 2 by a longitudinal slot 21 formed in the back of the bed.

In practicing this invention the eye is placed directly over the reflector and scale to be printed as shown in Fig. 1. The scale 13 and the images of the printing rules 7 and 15 will then be seen simultaneously in the same plane as shown in Fig. 3. In this figure reflector 12 is shown superimposed over scale 13. Reference characters 7', 15' and 16' denote the images of their corresponding printing rules 7, 15 and the index line 16 inscribed on bar 17 as shown in Fig. 2. Since, as previously stated, these images are in exactly the same plane as the scale 13, they do not move with respect to the marks on scale 13 when the eye 14 is moved about over the press. The longer printed lines 28 on scale 13 were made by printing rule 15 during the preceding impressions of the press. The four intervening shorter marks were made by the four printing rules 7. Reference character 29 denotes two of the previously inscribed calibration marks made temporarily by pencil preparatory to the final printing in accordance with this invention. After the preceding impression by the printing press has been made the press is opened and scale 13 is slid along platen 3 until the last long printed mark 28 exactly coincides with the image 16' of index mark 16. It will be remembered that index mark 16 is always stationary with respect to bed 2. Knob 19 is then turned until the image 15' of printing rule 15 exactly coincides with the next previously inscribed calibration mark 29. Since movement of knob 19 does not displace the index mark 16, the coincidence of line 28 with respect to the image 16' is not disturbed. After this adjustment has been completed the four subdivision marks corresponding with printing rules 7 as well as the long line corresponding with printing rule 15 are simultaneously printed by simply operating the printing press. When the impression is com-

plete the press is opened and instrument scale 13 is moved over for the next impression and the operation is repeated as described above.

Fig. 4 shows a section through one of the type rules 7 and its supporting bar 6. A section through printing rule 15 would appear the same except that instead of being two pieces it would be one piece and attached to slide 18. It will be understood, of course, that the indicia are printed by the raised portion 34 of these rules.

Fig. 5 shows an end view and partial section of the mechanism shown in Fig. 2. Here it will be seen how slide 18 is precision mounted in bed plate 2. A pair of slots 30, 30 cut in slide 18 provides means for connecting pantograph mechanism 24, 24 to the plurality of bars 6 through a series of spacers 31, two of which have been shown dotted in Fig. 2. Pivot point 23 is additionally attached directly to bed plate 2 by means of a boss 32. Pivot points 22, 22 are attached directly to slide 18 from the underside, while the pivot points 33 for the four intervening bars are all attached to their corresponding pantograph link through one of the spacers 31.

Fig. 6 discloses an alternative form of mechanism for bed 2. In Fig. 2 the pantograph mechanisms 24, 24 were mounted between slide 18 and bed 2 whereas in Fig. 6 these pantograph mechanisms are mounted on top of slide 18. With this type of construction the spacers 31 are not needed but the short bosses 32 of Fig. 5 are extended through the slots 30 as indicated by reference character 35 in Fig. 6. This form of mechanism is operated in the same manner as the mechanism of Fig. 2 and the corresponding parts of the two figures have the same reference characters.

What is claimed is:

1. Means for printing subdivisions on instrument scales comprising a printing press including as parts thereof a platen and a type bed, a plurality of printing rules on the type bed corresponding to the subdivisions to be printed, a reflector positioned to form images of said printing rules in the plane of the platen when the press is open, and an adjusting mechanism for simultaneously adjusting the distances between all of said rules by proportional amounts.
2. Means for printing subdivisions on instrument scales comprising a printing press including as parts thereof a platen and a type bed each comprising substantially plane surfaces adapted to form a dihedral angle when the press is open, a plurality of printing rules on said type bed corresponding to the subdivisions to be printed, a plane surface reflector so positioned with respect to the type bed and platen as to bisect the angle formed by their planes when the press is opened whereby the images of said printing rules are caused to lie in the plane of the platen when the press is open, and an adjusting mechanism for simultaneously adjusting the distances between all of said rules by proportional amounts.

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