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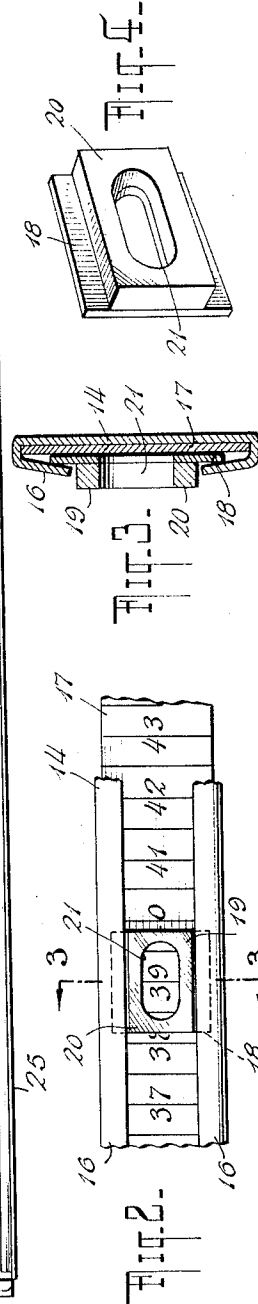
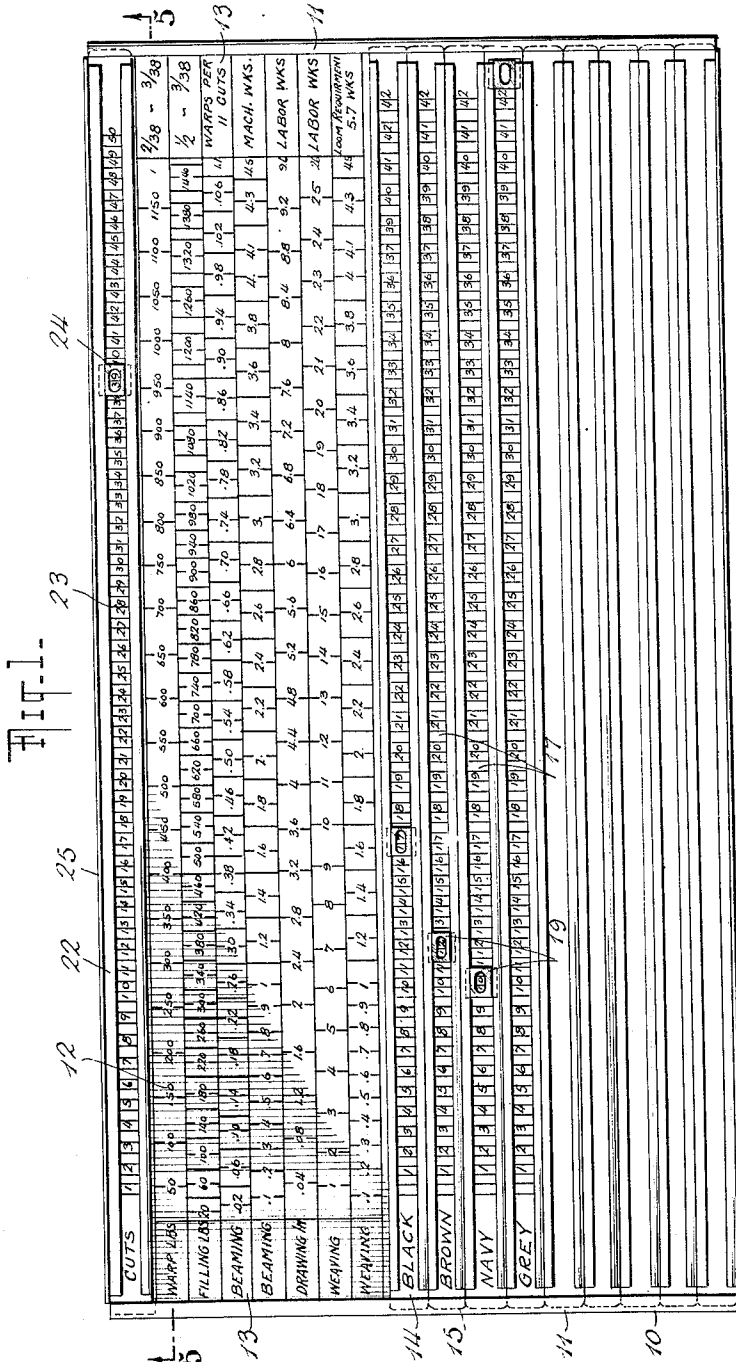
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INSTRUMENT FOR GRAPHIC CONTROL

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2 Sheets-Sheet 1



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INSTRUMENT FOR GRAPHIC CONTROL

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My invention relates to graphic indicators and has for one of its objects to simplify the construction of devices of this type and to enlarge the field of utility thereof. In particular, it is an object of the present invention to provide a graphic indicator which is so constructed that various indicia may be added thereto or removed therefrom without disturbing the remaining indicia thereon, and which is particularly adapted for use in connection with the operation and management of a plant or mill.

For the proper management of a plant of any kind, it is essential that certain facts and conditions be readily ascertainable by the person in charge of operation or of a branch thereof. For instance, it is generally highly desirable that a manager or foreman in the shop or mill be able, upon the receipt of an order, to determine as quickly as possible such factors as the amount of raw material required for the order, the time for the several operations necessary to convert the raw material into finished goods, the time that the machine or machines will be tied up, etc. Where a number of orders are being worked on simultaneously it is of advantage to be able to determine such factors both quickly and accurately. It is often also desirable to know in what stage of treatment or manufacture each order may be at any moment. Heretofore, such information could be obtained only by reference to stock or other books, or by inquiry in the several departments of the plant, both of which procedures were time-consuming and, particularly where calculations had to be performed, were not without danger of error. Even when such factors were determined, they could not, with the means made available by the prior art, be recorded in a convenient manner so as to be constantly before the manager of the plant in order that their relation to other factors and to the economy of the plant as a whole could be seen at a glance. This could not be done with stock and other books which required numerous entries and offered a complicated record by no means proof against mistakes, and whose separate and isolated entries it was difficult to co-

ordinate and mentally visualize to obtain a proper estimate of conditions in the plant. The means and methods heretofore employed for the control of production have generally been complicated and prohibitively expensive due to the great amount of clerical labor involved.

The present invention makes use of the well-known psychological principle that graphic representation furnishes a more lasting, coordinated, and accurate impression upon the mind of a reader than do a number of isolated entries or facts, and accordingly aims to provide a graphic indicator upon which the facts connected with a job or order can be easily and quickly entered and from which the desired information can be as easily and quickly read. In accordance with the present invention, the facts heretofore entered into a book, or obtained by calculation from data contained in a book, are represented graphically upon, or are readable directly from, a graphic indicator. In this way the multitudinous clerical operations and accompanying sources of error are eliminated and the desired information embodied in a very accessible and easily readable form.

My improved indicator comprises generally a frame adapted to receive flexible inserts or bars which can be easily inserted upon or removed from the frame without disturbing the other bars supported by the frame. These bars, and, if desired, also the frame, are provided with suitable indicia for representing and for calculating certain facts or values in the manner described more fully hereinbelow.

My invention will be described in connection with the control and operation of a textile plant, as embodied in a graphic calculator and a graphic locator, but it will be obvious that the same can be readily adapted for use in connection with plants of other kinds and for other purposes. The fundamental indicia for the graphic calculator are the standards of the material requirements and of the operations. The top line of each such calculator has an insert provided with an indicator or slide and with graduations for quantitative assignments, i. e. for the

total amount of material or the number of articles to be manufactured. Below this insert are the graphic divisions indicating the relations of the materials and production factors to the finished product required for a definite delivery date. The material requirements are indicated in pounds, and not only represent the actual material in the finished product but make allowance for waste, shrinkage and seconds. The production requirements are expressed as machine or labor hours for each operation. Below the material and production data are additional inserts indicating the color assignments, i. e. the operations in the dye-house. If desired, an auxiliary indicator may be placed behind the instrument to indicate the size assortments of the booked orders. In this manner the material and production requirements of the orders received are obtained for each delivery date.

My invention may also be embodied in the form of a graphic locator which is of particular advantage when it is desired to follow in detail the progress of production. Such instrument may consist of panels located in the office, each panel holding as many as 100 unit inserts and serving to indicate whether the operations on each order are completed on schedule.

In the accompanying drawings, forming part of this specification, are shown, by way of example, two embodiments of my invention. In said drawings—

Figure 1 is a front elevation of a graphic calculator, referred to hereinabove and constructed in accordance with my invention;

Figure 2 shows a section of a bar on an enlarged scale, the indicator being shown in position thereon;

Figure 3 is an enlarged sectional view taken along the line 3—3 of Figure 2;

Figure 4 shows the indicator in perspective;

Figure 5 is a slightly enlarged section taken along the line 5—5 of Figure 1 and illustrating the manner of inserting the flexible bars upon the supporting frame;

Figure 6 is a central vertical section through the device shown in Figure 1; and

Figure 7 illustrates a modification in the form of a graphic locator.

The graphic calculator shown in Figures 1 to 4 comprises a supporting frame 10, made preferably of sheet metal, and provided at its sides with inwardly turned flanges 11 extending parallel to and slightly spaced from the body of the frame. The frame is adapted to support a number of scales and charts with the aid of which certain desired information in connection with the operation of a plant or factory of any kind can readily be obtained at a glance without the necessity of consulting clerks, ledgers, reference books, etc., or of laborious calculation with which

is unavoidably associated the possibility of error. As stated hereinabove, my novel graphic calculator may be employed in connection with various types of plants, but the same will be described, by way of example, as adapted for use in a textile mill.

Upon the face of the frame 10 is mounted a chart 12 whose lateral edges extend beneath the flanges 11 and contact the latter so as to be frictionally held against displacement. The chart 12 is composed of a plurality of horizontal divisions, each division having a space 13 at one or both ends thereof for the reception of suitable indicia. In the form of the invention illustrated, these indicia relate to the amount of material required, such as the weight of warp and filling yarn and the size of the yarn; the several operations performed in the mill, such as beaming, drawing in, and weaving; and the amount of labor and machine time required for each operation. Each of the divisions includes a graduated scale which indicates the weights of material, labor and machine time, etc. required for increasing numbers of units of material.

Mounted upon the frame 10 below the scale 12 are a plurality of flexible bars 14 provided at their ends with tabs 15 which are adapted to slide beneath the flanges 11 and frictionally engage the same. Each of the flexible bars 14 is inwardly bent along its top and bottom edges, as shown in Figures 2 and 3, to provide retaining and guiding flanges 16 adapted to secure in position a graduated scale 17 and to engage the underlapping ends 18 of an indicator or slide 19. The latter is provided with a raised portion 20, adapted to serve as a finger-piece, and with a sight opening 21 through which the scale 17 can be read. The bar 14 is preferably made of sheet metal, though it may also be made of celluloid, vulcanized paper, or other flexible material; the scale 17 may be made of paper, celluloid, etc.

The bars 14 are adapted to receive, preferably at their left ends, indicia indicating a distinguishing characteristic, such as color, between different portions of the finished material, and the slides 19 are adapted to be moved along the scales 17 to a position corresponding to the number of units or cuts of finished material to be manufactured.

Mounted above the scale 12 is a bar 22 similar in construction to the bars 14 and similarly provided with a scale 23 and slide 24. The bar 22 is intended to indicate the total number of units or cuts to be manufactured, as explained more fully hereinbelow.

The frame 10 may be provided at its upper and lower edges with vertical flanges 25 designed to serve as stops to prevent accidental dropping of the bars from the frame. If desired, the chart 12, instead of being com-

posed of a single sheet, may be made up of a number of bars, each corresponding to one or more divisions on the chart.

My novel graphic calculator is operated as follows: As soon as the orders are forwarded to the employees responsible for this task, they are sorted according to delivery dates; for each such delivery group, item by item, the quantities on order with all details are registered upon the respective graphic calculator units representing the particular styles. This is accomplished by moving the slide 24 from one position to the next position to the right representing the additional quantities ordered. When all orders have been analyzed in this manner, the corresponding graphic divisions of the material and production requirements will automatically yield the total requirements of all the materials necessary for the completion of the orders and also the machine and labor requirements. The amounts of the finished product to be colored and the particular colors are indicated by the slides 19 on bars 14. In this way, at the end of each day, all delivery responsibilities contracted for during the day are recorded and their effect upon the future operation of the plant made readily ascertainable.

These new data may now be added to graphic control systems of the type described in my United States Patent No. 1,623,216, dated April 5, 1927, and arranged to show the relations of the available and contracted materials and the requirements, and also the production obligations. In this manner the facts essential for management become an animated picture which can be easily read and understood.

In the form of the invention shown in Figure 7, a frame 26, which may be similar in construction to the frame 10 of Figure 1, is employed to support a plurality of flexible bars 27. The uppermost of the bars is provided with suitable indicia, such as "Name," "Order No.," etc. Each of the remaining bars corresponds to an order or job and contains a paper strip or insert 28 upon which suitable entries are made below the headings on the uppermost bar. The bars are provided with slides 29 which are adapted to be moved from one heading to the next to indicate how far advanced is the work on any particular order. The bars 27 are preferably arranged in the order of scheduled completion dates and may be sub-arranged according to styles, sizes and colors. As shown, the strips 28 have for each operation a section in which the schedules of completion in each operation are recorded. When a process on a particular order has been completed, the processing record is returned to the office and from this record the graphic locator is corrected by moving the slide to the next operation on the order. The date of completion is then entered on the strip for the previous

operation. The manager or other executive thus has before him a picture of what is going on in the plant.

Figure 5 shows how the flexible bars are inserted into their frame. It will be noted that these bars can be removed or inserted without disturbing the other bars on the frame and can be flexed or bent to clear the retaining flanges 11.

While I have shown the bars arranged horizontally, it will be obvious that they may be arranged vertically, in which event the flanges 11 will be horizontal and the flanges 25 vertical. Other variations from the specific forms shown and described may be resorted to within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. A graphic indicator comprising a frame, retaining flanges at the sides of said frame, a plurality of flexible bars mounted upon said frame and engaging said retaining flanges, each of said bars having guiding flanges along its top and bottom edges, and a slide carried by certain of said bars and guided by said flanges.

2. A graphic indicator comprising a frame, a bar mounted upon said frame, retaining means on said frame for holding the bar against longitudinal displacement, said bar having a series of numbers thereon adapted to indicate the number of units of an article to be manufactured, a slide on said bar, one or more scales on said frame graduated to indicate the amounts or values of the elements entering into the manufacture of the successive numbers of units indicated on said bar, a plurality of bars associated with said first-mentioned bar and likewise mounted on said frame, indicia on said bars indicating ultimate treating or disposition of the manufactured units and including numerals corresponding to those on the first-mentioned bar, and slides on said bars adapted to indicate numerically the ultimate distribution of the number of units indicated by the slide on the first-mentioned bar.

3. A graphic indicator as set forth in claim 2, wherein all of said bars are flexible and bendable to clear said retaining means, whereby one or more of said bars may be removed from the frame or mounted thereon without disturbing the other bars on said frame.

4. A graphic indicator comprising a frame, a bar mounted on said frame and having headings thereon indicating identifying elements of a job or order and the successive operations involved in said job or order, a plurality of bars associated with said first-mentioned bar and likewise mounted on said frame, said bars being adapted to receive inserts having thereon such identifying elements in registry with the corresponding

headings on said first-mentioned bar, and slides on said plurality of bars adapted to be moved into registry with the headings indicating the successive operations, whereby the progress of each job or order is graphically exhibited.

5 5. A graphic indicator comprising a frame, retaining flanges at the sides of said frame, a plurality of flanged bars mounted upon said frame, data-bearing strips carried by said bars, and a slide carried by said bars and movable in definite relation to the data-bearing strips.

10 6. A graphic indicator comprising a frame, retaining flanges at the sides of said frame, a plurality of flanged bars mounted upon said frame, data-bearing strips removably mounted behind the flanges of said bars, and a slide having a sight opening therein and slidably mounted on each of said bars to selectively display the data on the data-bearing strips through said sight opening.

15 7. A graphic indicator comprising a frame, retaining flanges at the sides of said frame, a flanged bar mounted upon said frame, a data-bearing strip removably mounted behind the flanges of said bar, a slide carried by said bar, and side flanges on said slide for engagement behind the flanges on the bar, thereby to slidably mount the slide relative to the data-bearing strip.

In testimony whereof I have affixed my signature.

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