Aug. 8, 1933. R. E. VICKERMAN 1,921,053

METHOD OF SETTING LOOM SPOOLS

Filed Nov. 14, 1931 3 Sheets-Sheet 1

Fig. 1.

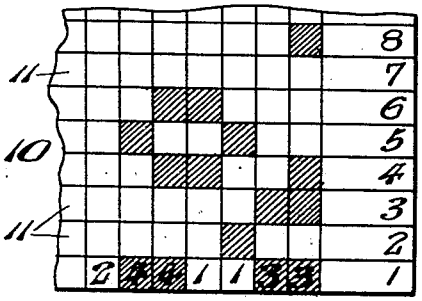


Fig. 2.

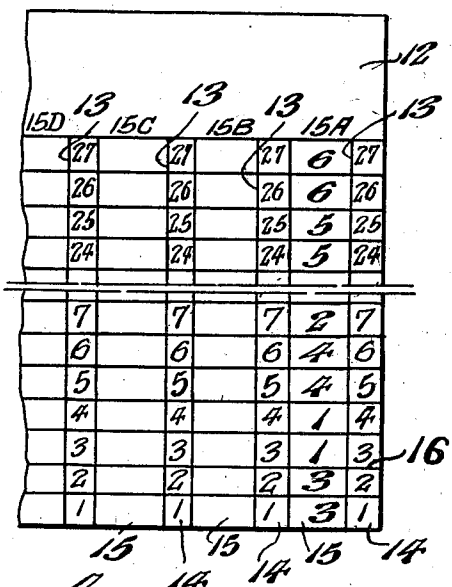


Fig. 3.

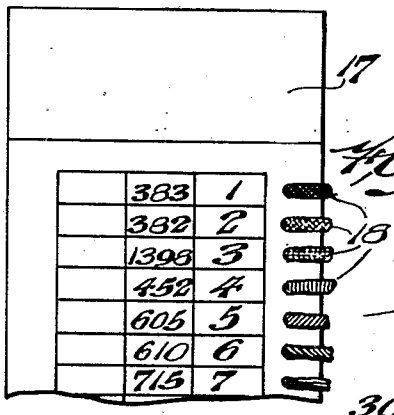
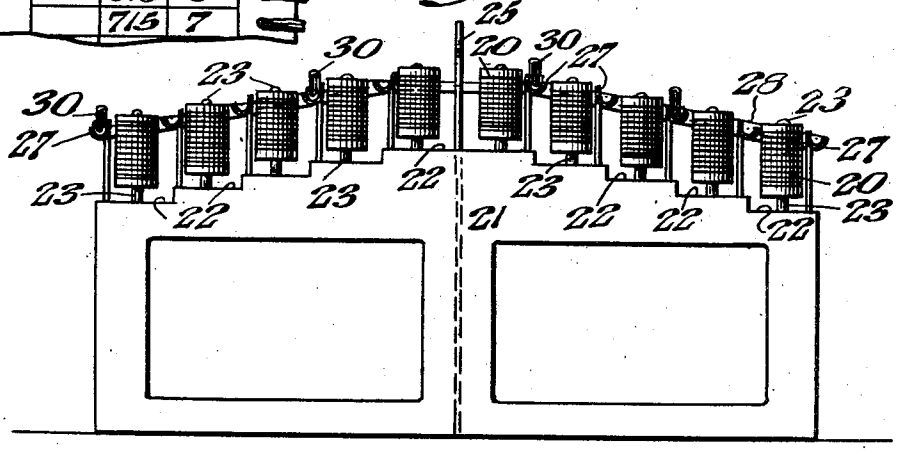


Fig. 4.



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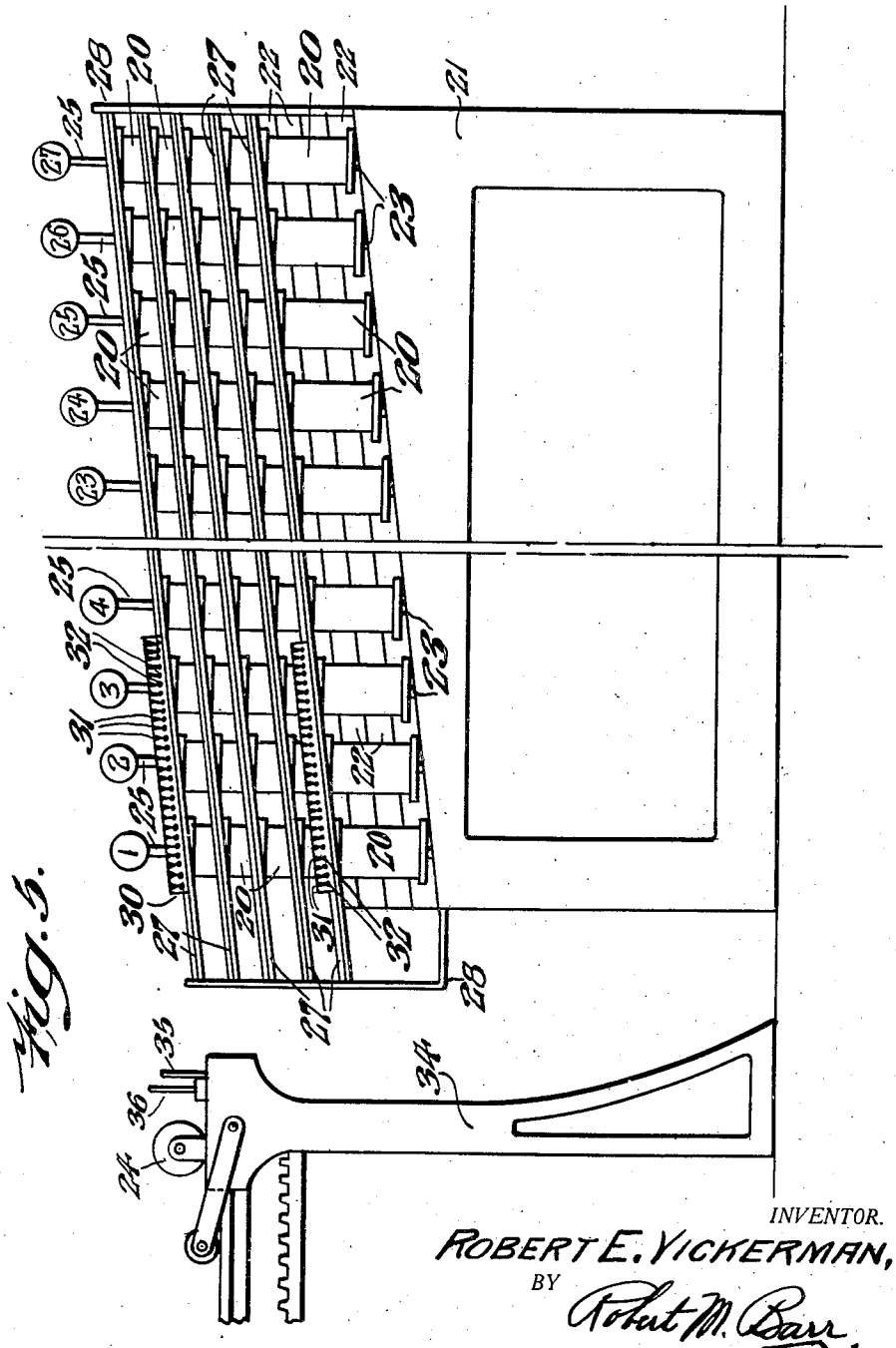


Fig. 5.

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Fig. 6.

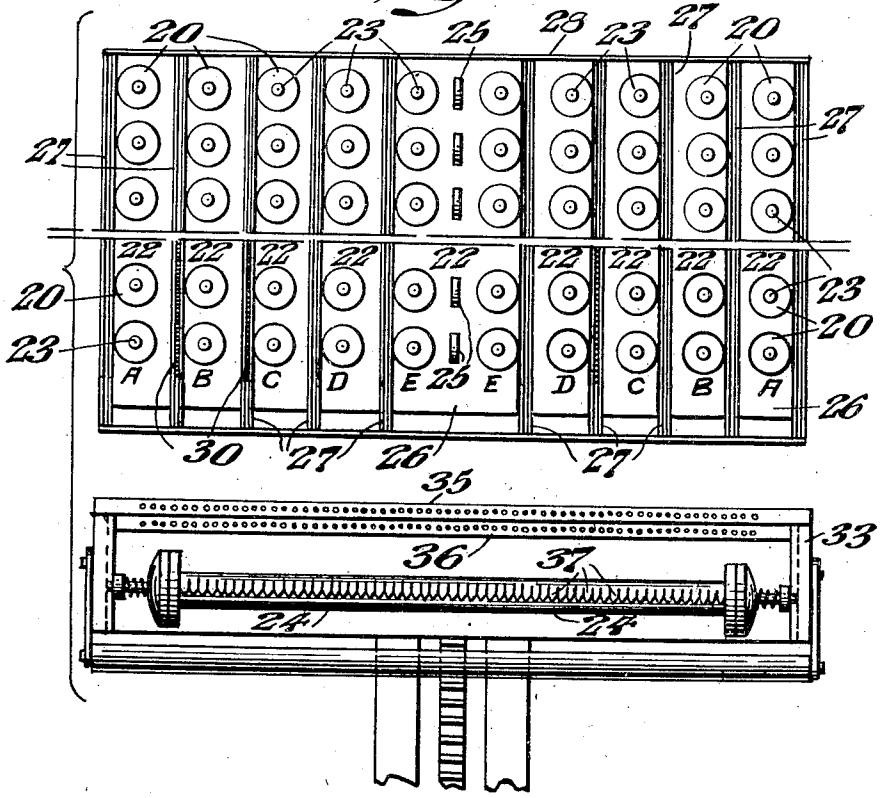


Fig. 7.

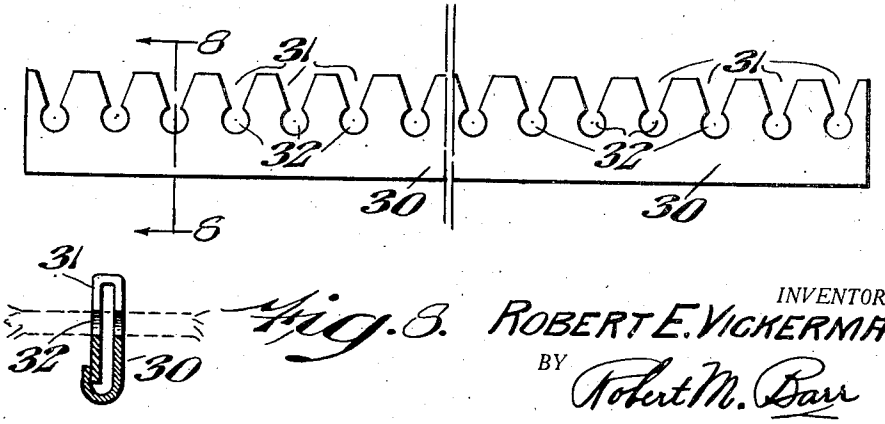


Fig. 8.

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Patented Aug. 8, 1933

1,921,053

UNITED STATES PATENT OFFICE

1,921,053

METHOD OF SETTING LOOM SPOOLS

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Application November 14, 1931
Serial No. 575,038

9 Claims. (Cl. 28—55.5)

The present invention relates to the setting of loom spools and more particularly to a method and apparatus for setting spools for use in looms of the Axminster type.

In the weaving of rugs, carpets, and other fabrics according to a pattern it has been and is the general practice to paint the desired design on special paper, thus showing the pattern to be reproduced by the weaving, and also serving as a pattern by which the various colored yarns can be properly associated so that in the weaving this particular pattern or design will be identically reproduced. To simplify and make possible the necessary relative arrangement of one colored strand with respect to another this painted design is subdivided into as many small squares as there are number of strands to be used in the rug or other fabric and each transverse row of these squares represents the color sequence for one yarn spool. Generally the design paper is twenty-seven inches in width while the squares in each roll are generally seven to the inch and each square represents a strand of yarn. The number of squares to the inch may vary according to the grade of fabric to be reproduced. Heretofore the setting of the yarn creels to deliver the colored strands to the spool in proper sequence has always been done by setters trained by years of experience to work directly from the painted design, row by row and square by square. In all setting machines as now and heretofore in use this design is supported upon a roll in a convenient position above the machine. This method of setting directly from the design is not only a slow and tedious procedure but one in which considerable responsibility rests upon the setter to match the colors and place each strand in its proper position in the reed for winding upon the spool. Furthermore but one design can be set at a time owing to the fact that it can be used with but one machine while the constant handling results in wear and tear which hinders production. Also the teaching of setters is tedious, requiring time, patience, and years of experience to make a good setter efficient, while in many instances months are lost in trying to teach a beginner who finally shows no aptitude for setting. In this latter instance all this time is lost as well as the time in making corrections due to mistakes of the novice.

Some of the objects of the present invention are to provide an improved method and apparatus for setting loom spools from prepared designs; to provide a method of setting which embodies a wide range of flexibility, reduces production costs of weaving, and practically eliminates the errors in setting; to provide a method of setting wherein several setting machines can be working on the same design at the same time; to provide a setting method wherein it is possible for untrained and unskilled labor to make a spool set-up without special training and with little likelihood of mistakes; to provide a method and an apparatus for setting loom spools wherein the production of the mill is increased; to provide a method of setting loom spools wherein the designs are not subject to wear and tear and are not used by the setters when making a set-up; to provide a method of setting loom spools wherein the setters are relieved of any judgment regarding the color to be used; and to provide other improvements as will hereinafter appear.

In the accompanying drawings Fig. 1 represents a plan of a portion of a design which is to be reproduced in fabric; Fig. 2 represents a portion of one form of setting card by which the method of the present invention is carried out; Fig. 3 represents a portion of a template for color selection; Fig. 4 represents a front elevation of one form of setting machine for carrying out the method of the present invention; Fig. 5 represents a side elevation of the same operatively located with respect to a winding machine; Fig. 6 represents a plan of the parts shown in Fig. 5; Fig. 7 represents a side elevation on a larger scale of one of the combs used in the setting operation; and Fig. 8 represents a section on line 8—8 of Fig. 6.

Referring to the drawings a portion of a design 10 is shown in Fig. 1 prepared in the usual manner as a complete color representation of that which is to be reproduced in a woven fabric. The design 10 is divided horizontally into a plurality of rows 11 identified along one marginal edge by a succession of identifying characters which in the preferred form are numbers beginning at the first row with "one" and continuing successively throughout the length of the design. Each of these transverse rows 11 corresponds to or represents one row of yarn tufts across the fabric to be woven, so it is obvious how important it is that the strands of yarn for each row be set exactly as indicated upon the prepared design. Thus in Fig. 1 the first two squares of row "1", reading from the right are both of the same color; the next two squares are of a different color; the next two squares are a repeat of the first two squares; and thus the row continues with colors varying in accordance with the design.

The present invention is in the steps subsequent to the production of the design and consists of the preparation of setting cards 12 which are vertically subdivided by lines 13 into columns 14 and 15 which are further subdivided by horizontal lines 16 so that the columns 14 consist of vertical rows of squares representing by numbers the squares of one row of the design, and the columns 15 consist of a vertical row of rectangles representing by suitable nomenclature the color of the yarns to be used. The number of the rectangles in a column 15 corresponds to the number of spools in a row in the setting frame bank and, of course, the number of spools in a row of the setting frame bank is determined by the width of the design and the number of squares in a row to the inch. Thus for a design twenty-seven inches wide and requiring a twenty-seven inch spool of seven squares to the inch, the setting bank will preferably have seven rows of spools with twenty-seven spools in each row. Therefore the card corresponding to any row of the twenty-seven inch design will consist of seven columns 15 arranged alternately with respect to the columns 14 and each twenty-seven rectangles in length. The squares forming the columns 14 will each be numbered from 1 to 27 consecutively, and the square numbered 1 will represent the first spool of each row of the spool bank. In using the card then the color numbers in the first column 15 will be used in succession to place the spools of corresponding yarn colors upon the first row of bank spools. The second column 15 indicates the spool arrangement for row 2 of the bank spools and so the setting continues from row to row clear to the other side of the machine, or in the preferred arrangement to the half-way point where the operator working from the opposite side of the machine in the same manner (from a card marked "left") will be met. For speed in setting it is preferable to have two setters working from opposite sides of the machine and each working from a part or one-half of a card. The insertion of the yarn color identifying means is preferably made from a color template 17 which is prepared directly from the design to translate the usually cumbersome multi-digit numbers of the yarn into single digit numbers for easily indicating on the design the true yarn color number. Thus as shown on the template 17 color "383" becomes "1"; color "382" becomes "2"; color "1398" becomes "3"; and so on, and these new numbers can be readily placed in the respective squares of the rows in the design. As illustrated row "1" begins with two squares of color "3"; then two squares of color "1"; two squares of color "4"; one square of color "2"; and so on across this row of the design. Since each design has to be numbered for yarn colors it is a simple matter to fill in the columns 15 of the card 12 so that each rectangle thereof corresponds to a definite square of a design row. This lay-out of the card is shown in Fig. 2 wherein column 15—A makes clear that squares "1" and "2" of design row "1" are to be color "3"; squares "3" and "4" of design row "1" are to be color "1"; squares "5" and "6" are to be color "4"; square "7" is to be color "2"; etc. Knowing these color numbers the setter can then refer to the color template for the yarn numbers and make selection of the proper yarn spools to be used in the order indicated on the card. Generally the color template 17 has samples of yarn 18 mounted respectively opposite the color numbers as a check against wrong selection of color.

For the purpose of this description only a portion of one card is illustrated as this suffices for a clear understanding of the invention, but in use each card has as many columns as there are rows on the spool bank, provided each card represents a full row but where two setters work from opposite sides of the same setting machine, each starting from the selvage edge and working towards the center of the machine, each card has one-half the number of rows on the spool bank. Thus the present invention comprehends the use of cards for both the right and left portions of the machine, and consequently two parts of each row of the design are set at the same time. In this setting operation the yarn spools 20 are set in rows in convenient arrangement for the withdrawal of the respective yarn strands and the placing of such strands in order as predetermined by the prepared setting cards.

In order to expeditiously arrange the yarn spools 20, a setting table 21 is provided having a top inclined upwardly from the front end and formed by two series of stepped creel bars 22 rising from opposite sides to meet in a common bar or surface at the highest elevation. Projecting upwardly from and extending longitudinally of these creel bars 22 are rows of spindles 23 to receive and rotatably support the yarn spools 20 so that the latter can pay-out the yarn during the winding of the loom spool 24. This spool 24 is mounted parallel to the front of the setting table or spool bank frame 21 so that the creel bars 22 are at right angles to the loom spool 24 and each carries a row of spools 20 which respectively correspond to a certain number of inches of the same row of the design. Thus for a design for a spool twenty-seven inches long each row of the spool bank will consist of twenty-seven spools, and seven rows will be necessary where the design calls for seven strands of yarn to the inch. Since the rows of spindles 23 correspond respectively to the rectangle of the columns 15, the transverse rows starting from the front of the bank are numbered from "1" to "27" or to whatever is the highest number of spools in a row. The lengthwise rows starting from the two outside rows or selvage edges are identified by letters of the alphabet starting with "A". Thus the spindle in row "1" and row "A" will correspond to rectangle "1" in column 15—A, and this identification follows for each spindle so that the setter can immediately locate and place each spool in its proper place in the spool bank, when reading from the setting card. Preferably the numbering for the transverse rows is arranged lengthwise and centrally of the spool bank by a row of indicating standards 25. The lengthwise lettering appears conveniently across the front edge of the machine as shown at 26.

For the purpose of quickly placing and holding the yarn ends of the respective spools in exact conformance with the design as called for by the cards, tracks 27 are mounted lengthwise of the spool bank, one track for each row of spools and each paralleling the row it is to be used with. End bars 28 hold the tracks 27 rigidly at a height to be easily reached by the setter, and support them adjacent the top of the spools and at substantially the same inclination as the bank top. Preferably the tracks 27 are U-shaped in section to form guides for combs 30 which are slidable in the respective tracks and are held thereby in such a position that the yarn ends can be readily pressed through the converging slots 31 leading to the respective holes 32 of the comb which re-

ceive and hold the yarn. The length of each comb 30 is short as compared to the length of the spool bank row with which it is used because twenty-seven spools on a basis of seven spools to the inch of design actually represent on the comb a length slightly less than four inches. Thus with a comb or combs 30 having a length in inches as compared to spool bank rows having a length in feet it will be apparent that the tracks 27 afford a convenient and necessary means of supporting the combs when moving from one spool to the next.

From Fig. 6 it will be seen that the supporting frame 33 for the loom spool 24 parallels the front of the spool bank and is movably mounted upon fixed pedestals or standards 34. The fixed standards 34 are also spanned by a reed 35 which parallels the movable reed 36 on the frame 33 so that as each comb 30 is filled with the yarn strands it is drawn forward, lifted from its tracks, brought over the top of the loom spool, and then turned parallel so that the yarn strands can be pressed into the reeds 35 and 36 and the yarn ends respectively attached to the teeth 37 of the spool body. The turning of the comb 30 is, of course, in the direction to bring the strand from number "1" spool into register with the number "1" space of the reeds as well as of the loom spool and hence the same relative arrangement of the strands as to color is preserved and the winding on of the strands upon the spool is in exact color accord with the row of the design which has been set-up.

In carrying out the method of the present invention the card or cards 12, which in the broad sense here used are diagrams prepared in accordance with a row or portion of a design, is or are given to the setter or setters at a setting machine or machines and all information necessary to place the yarn spools and to arrange the proper succession of yarn strands is taken directly from the card or cards without any reference to the prepared design. In all setting operations heretofore the setters work directly from the prepared design, but by the present invention the setters never see the design. The advantage of this is that the designs do not have to be handled and damaged by constant use and great flexibility of setting is obtained because now several setting machines can concurrently work in preparing loom spools to be used in weaving the same design. That is by distributing the cards among the setters for several machines different rows of the same design can be concurrently set. This has heretofore been impossible. By thus setting a plurality of spools at the same time there is a great saving of time in preparing the spools, and a consequent large increase in the weaving production. With a prepared diagram or card before the setter it is only necessary to follow the row number and the column color numbers to place the yarn spools according to the prepared arrangement upon the spool banks. As each yarn spool is placed upon its spool creel the end of its yarn strand is placed and anchored in the corresponding slot and hole of the comb 30 so that when the end of a lengthwise row of the spool bank has been reached all of the respective yarn strand ends of that row will be attached to and arranged in proper sequence in the comb 30. During this attaching of the yarn ends the comb 30 can be moved along its track 27 to facilitate the gathering together therein of all of the strand ends. Upon the completion of this operation the comb 30 is lifted from its track, drawn over the spool to be wound and turned parallel thereto so that the strand of yarn spool "1" will be opposite the first anchoring slot of the spool. This will naturally bring all of the strands into registering position with the rest of the slots and in the prepared succession as to color arrangement. All of the strands can now be pressed into the two spacing reeds 35 and 36 and also into the anchoring slots of the loom spool so that the comb can be removed and returned to its track when the set-up for the next spool is to be made.

In the preparation of the diagrams or cards from the original prepared design it will be evident that the card (or the right and left cards) for the first row must be prepared with every color number in the rectangles of the columns 15, but when the card (or the right and left cards) for the second row is prepared only those rectangles of the columns 15 need to be filled in with identifying data which call on the design for a change of color. The setter can thus tell at a glance which yarn spools on the bank are to remain the same as for the first row and which are to be taken out and replaced by others. In comparison with the old method of counting the squares directly from the prepared design to ascertain changes in the second row the saving of time by the new method is enormous. As soon as those yarn spools which are to be changed have been removed the substitute spools can be placed on the creels and the respective yarn strands therefrom brought forward and placed in the reed at the points indicated by the reed spaces left vacant by the removed strands. In this way the successive loom spools for the respective design rows can be set up and in the majority of instances only a very limited number of the card rectangles will carry indicating data. Naturally if there is a row of the design which has a change of color in every square from the first row then it will be necessary to have the entire column of the card filled in.

It will now be apparent that a novel and original method of setting yarn has been devised wherein the advantages and results heretofore enumerated are effectively obtained and in addition thereto the method has the advantage of permitting a very accurate estimate of the amount of yarn required for any particular pattern as well as the number of spools for such yarn. In estimating heretofore for the quantity of yarn required in a given pattern it has been impossible to gain from the design any more than a rough idea of the quantity of yarn to be ordered and hence by such a cut and try method there has been waste and loss due to inaccurate ordering of materials. Through the method of the present invention the data on the setting card furnishes a very accurate idea of the number of spools and yarn required for the particular pattern.

While only a single form of apparatus is shown in which this invention may be embodied, it is to be understood that the invention is not limited to any specific construction, but might be applied to various forms without departing from the spirit of the invention or the scope of the appended claims.

Having thus described my invention, I claim:

1. The method of setting yarn for winding on loom spools which consists in preparing a card representing by printed indicia the yarn strand arrangement of one row of an Axminster loom design, and manually setting yarn strands on a

loom spool in accordance with the indicia of said card.

2. The method of setting yarn for winding on loom spools which consists in preparing cards representing respectively by indicia different portions of a prepared design in terms of strand color and arrangement, distributing said cards among a plurality of yarn setters, and concurrently setting yarn on a plurality of loom spools in accordance with the indicia on said cards.

3. The method of setting yarn for winding on loom spools which consists in preparing cards representing respectively by indicia different rows of an Axminster loom design in terms of strand color and arrangement, distributing said cards among a plurality of yarn setters and concurrently setting yarn on a plurality of loom spools in accordance with the indicia on said cards.

4. The method of setting yarn for winding on loom spools which consists in preparing a card representing by indicia one row of squares of an Axminster loom design in terms of strand color and arrangement, setting rows of yarn spools in accordance with said card, fixing the ends of the yarn strands in succession according to the yarn spool arrangement, and transferring said ends in the same arrangement to a loom spool for winding thereon.

5. The method of setting yarn on a loom spool which consists in preparing a card divided into fields having indicia therein corresponding respectively to certain subdivisions of a prepared design and representing the color of different yarn spools and the arrangement of one yarn spool with respect to another, placing yarn spools on a setting bank in accordance with said card, and laying the yarn ends from said yarn spools on a loom spool in succession as indicated by said card.

6. The method of setting loom spools which consists in preparing a color and spool arrangement diagram of one loom spool row of a prepared colored design, setting yarn spools in accordance with the data on said diagram, preparing a second diagram with indications only thereon of all changes of color spool arrangement in the next row of the prepared design as compared to the first row of the prepared design, and setting yarn spools in accordance only with the changes indicated on said second diagram.

7. The method of setting loom spools which consists in preparing a color and arrangement diagram of one loom spool row of a prepared colored design, setting yarn spools in accordance with the data on said diagram, preparing a second diagram with indications only thereon of all changes of color spool arrangement in the next row of the prepared design as compared to the first row of the prepared design, removing set spools corresponding respectively to said changes, and setting other spools in the places of those removed.

8. The method of setting yarn for winding on loom spools which consists in attaching the strands of yarn from a plurality of yarn spools in predetermined order to a comb, transferring said comb with the attached strands to a winding machine, and removing the strands therefrom for winding on a loom spool while preserving the prearrangement of said strands.

9. The method of setting loom spools which consists in preparing a color and spool arrangement card representing one loom spool row of squares of a prepared design, preparing a second color and spool arrangement card representing another loom spool row of squares of the said design, setting yarn spools in accordance with the data on said first card, and setting yarn spools in accordance with the data on said second card.

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