

A. MATITSCH.  
PILLOW LACE MAKING MACHINE.  
APPLICATION FILED DEC. 21, 1912.

1,107,335.

Patented Aug. 18, 1914.

4 SHEETS—SHEET 1.

Fig. 1

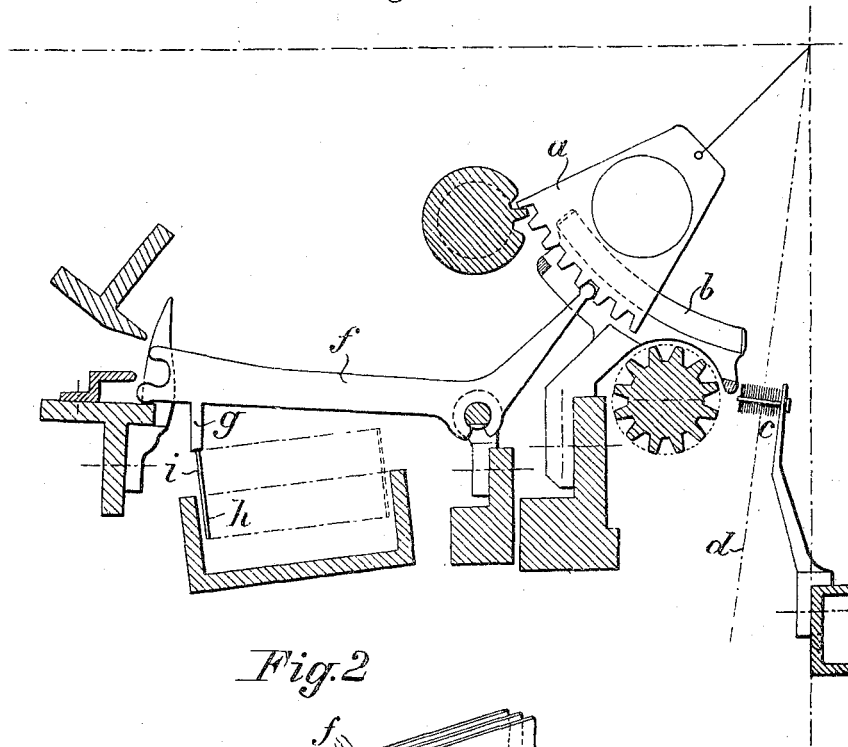
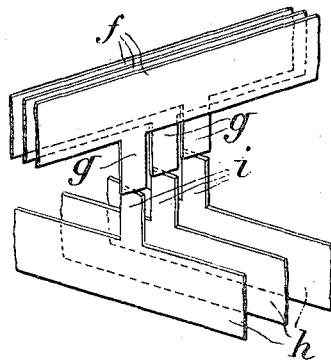
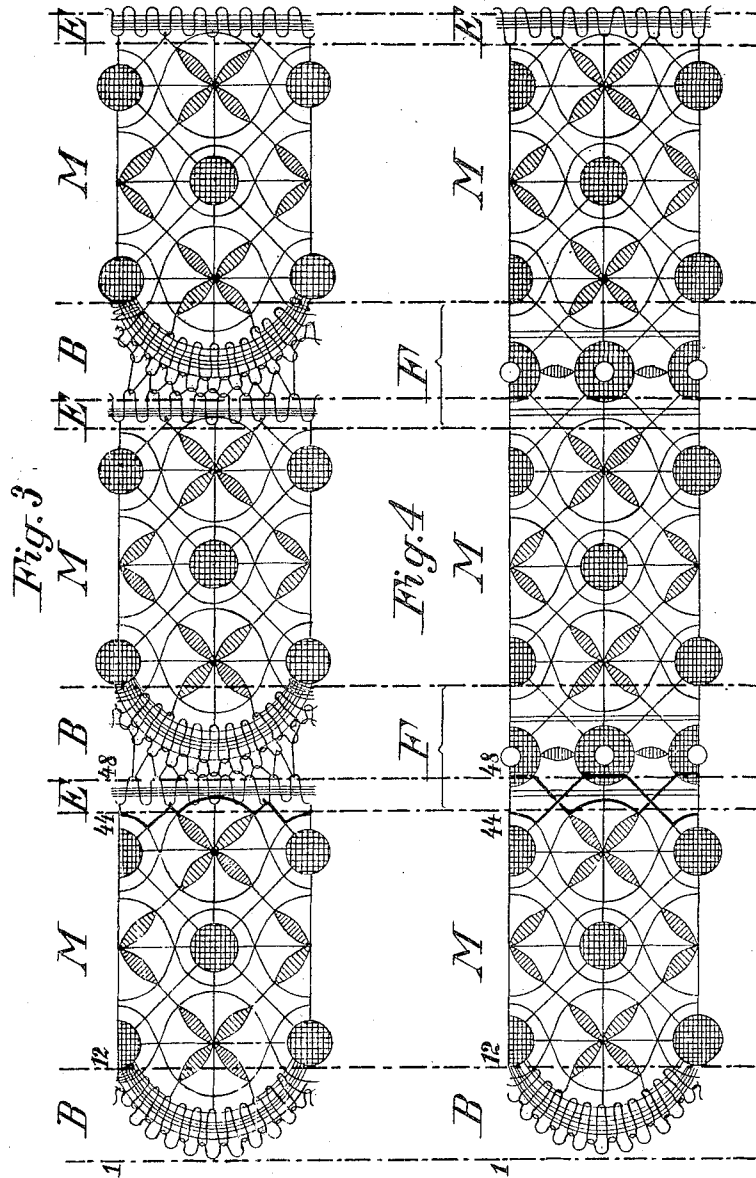


Fig. 2



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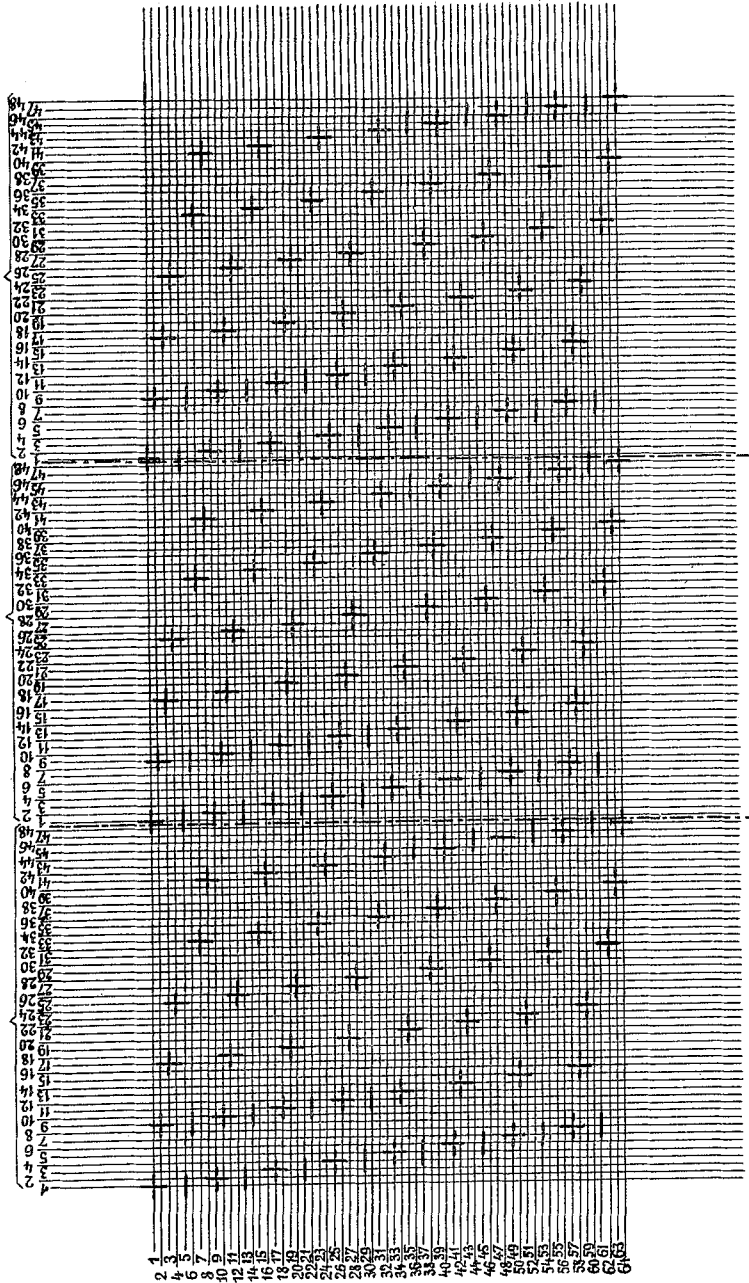
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4 SHEETS-SHEET 3.

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Fig. 5



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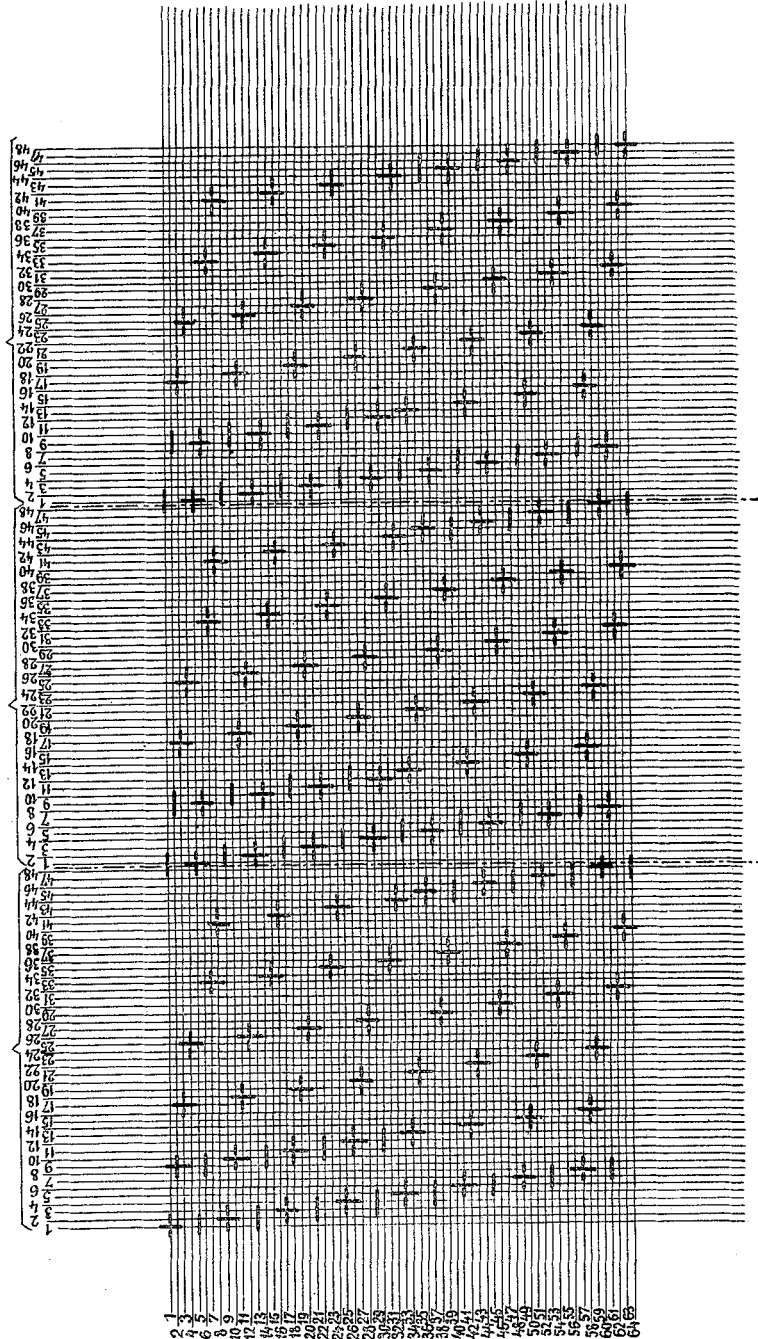
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 PILLOW LACE MAKING MACHINE.  
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4 SHEETS-SHEET 4.

*Fig. 6*



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# UNITED STATES PATENT OFFICE.

AUGUST MATITSCH, OF NOTTINGHAM, ENGLAND, ASSIGNOR TO THE FIRM OF  
M. FABER & CO., OF VIENNA, AUSTRIA-HUNGARY.

## PILLOW-LACE-MAKING MACHINE.

1,107,335.

Specification of Letters Patent.

Patented Aug. 18, 1914.

Application filed December 21, 1912. Serial No. 737,987.

*To all whom it may concern:*

Be it known that I, AUGUST MATITSCH, subject of the Emperor of Austria-Hungary, residing at Nottingham, England, have invented certain new and useful Improvements in or Relating to Pillow-Lace-Making Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The object of this invention is to provide apparatus or mechanisms whereby wide lace or lace stuff can be manufactured on pillow lace making machines built on the well known "Matitsch" system.

With machines built on the "Matitsch" system for the production of pillow lace it is possible, as is well known, to simultaneously manufacture a large number of strips of lace having the same borders as each other, the same middle portions and the same selvages, the selvage of one strip being connected to the border of the adjacent strip by one or more flying threads. In these machines the selection of the bobbin carriages is effected by pivoted pickers which are actuated by means of so-called lifting-bars so that the pickers control the motion of the bobbin carriages from one comb into the other or the holding back of the bobbin carriages in one of the outer combs. The lifting bars and the pickers are provided for this purpose with suitably arranged projections which cooperate at the right periods of time. The operation of the lifting bars which is effected by means of jacquard mechanisms causes the projections of the lifting bars corresponding to the pattern to be brought into the paths of the projections of the corresponding pickers. This can be clearly understood upon reference to the drawings in which:

Figure 1 illustrates the front part of a pillow lace machine in vertical transverse section. Fig. 2 is a perspective view illustrating the relation of the lifting bars to the picker shanks. Fig. 3 illustrates portions of three strips showing the selvage-border connection of adjacent strips. Fig. 4 illustrates a strip of lace of multiple width made in accordance with my invention. Fig. 5 is

a diagrammatic plan view showing the relation of pickers and lifting bars for making a plurality of strips of lace, and Fig. 6 is a like view showing the relation of the substitute pickers and lifting bars.

Referring more particularly to Fig. 1 of the accompanying illustrative drawings which shows the front part of such a machine in vertical transverse section, *a* indicates one of the bobbin carriages, *b* the front comb for guiding the bobbin carriages, *c* the top bars for the warp threads *d* if there be any, *f* the picker with its downwardly extending projection *g* corresponding to the bobbin carriage *a*, *h* the lifting bar together with its upwardly extending projection *i* corresponding to the picker *f*. The pickers which operate the bobbin carriages lie in the same way as the carriages, parallel to the plane of the drawing one behind the other at distances apart determined by the division of the combs, and their downward projections *g* are staggered relatively to each other. The lifting bars lie parallel alongside each other longitudinally of the machine and their projections *i* are likewise arranged in staggered order relatively to each other. Fig. 2 shows in perspective a number of lifting bars *h* and pickers *f* so as to give a better view of the cooperation of the projections *i* and *g* of these parts of the machine. In machines so constructed it has hitherto not been possible in all cases where warp threads are employed to make strips of lace beyond a certain width for if wider it would be impossible for the workman to draw the warp threads *d* into the top bars *c* an operation which has to be performed by hand. The reason for this is that the workman has to get at the top bars with his fingers and as the width of the strips of lace depends upon the number of the lifting bars necessary for their production the result would be that were a number of lifting bars beyond a certain maximum limit to be employed they would take up such a width in their entirety that the workman's fingers, which have to be extended under them toward the middle of the machine, could no longer reach the top bars. It has therefore not been possible hitherto to exceed a certain width of the strips of lace and it is still less possible to produce lace material which extends the whole width of the machine.

In every piece of lace the following parts

can be more or less sharply differentiated from each other, namely the border B, see Fig. 3, the middle portion M and the selvage E.

5 Where there is no repetition of the same figures or patterns in a piece of lace as many lifting bars are required in each set for its production as there are comb slots required in the machine for the manufacture  
10 of the lace.

In wide lace, as shown in Fig. 4 it happens very frequently that the same figure or pattern is repeated in the same arrangement two, three or more times. These repeated  
15 figures or patterns can only be obtained when the lifting bars and the pickers operated by them and which correspond to one of the figures or patterns receive exactly the same movements as the lifting bars and  
20 pickers of the others of the same figures or patterns. The fact that the lifting bars have to be moved in the same manner in similar figures or patterns renders it possible, when these same figures or patterns are  
25 suitably distributed in the piece of lace, to control by the lifting bars which are used for the control of the pickers of one of these figures or patterns, the pickers of the other similar figures or patterns also. If for ex-  
30 ample in a piece of lace a figure or pattern suitably arranged in the middle part be repeated threetimes then, if each of these figures or patterns has thirty two comb slots for ex-  
35 ample, and therefore requires thirty two lifting bars for its production, only thirty two lifting bars will be required for all three figures or patterns instead of three times thirty two, namely ninety six lifting bars.

40 Fig. 3 shows three similar strips of lace worked alongside each other and Fig. 4 shows a piece of lace which is as wide as the three similar lace strips together. Upon a comparison of the two figures it will be  
45 seen that in both, the border, the selvage and the part M are alike, also that the part M in Fig. 4 is repeated three times and at exactly the same point at which it is located in the machine in the adjacent three narrow  
50 strip pieces of lace. It will also be seen from the comparison that where in the first strip the selvage and in the second strip the border is situated there is substituted for them in the wide lace a substitutional figure  
55 or pattern F which combines with the two parts M to form a harmonious whole. It will also be seen that the substitutional figure or pattern in the wide lace takes the place of the selvage of the second narrow strip and the border of the third narrow strip. The  
60 wide lace has therefore been produced from the narrow strip lace by the retention in it of the same figure or pattern for the border and selvage and the threefold repetition of  
65 the middle part M of the narrow strip while

between these repeated middle portions there has been interposed a similar substitutional figure or pattern F which is of the same width as the omitted selvage E and the omitted border B of the abutting strips. 70  
The narrow or strip lace from which the wide lace has been produced by the interposition of the substitutional figure or patterns and the repetition of the middle portions, is called the principal lace in relation 75  
to the lace so made and the wide lace is termed the widened lace of the principal lace. It is obvious that by retaining the same operation it is possible to produce a piece of lace which is four times, five times 80  
and so on wider than the principal lace instead of a piece of lace consisting of four, five, and so on principal lace strips. When a principal lace strip is widened in such manner by any desired multiple, only so 85  
many additional or substitutional lifting bars need be added for the production of this widened lace to the lifting bars for the principal lace as are necessary in the principal lace for the border and selvage there- 90  
of, because all the substitutional figures or patterns are the same and all other parts are the same as in the principal figure or pattern. In addition to the increase in the number of lifting bars it will be necessary to 95  
exchange, in the machine for the widened lace, the pickers in each place where a substitutional figure or pattern takes place of the selvage and border. This is necessary because the downward projection of a 100  
picker cannot be brought into coöperation with the upward projection of two lifting bars occupying different positions. The exchanged pickers the downward projections of which coöperate with the upward pro- 105  
jections of the substitutional lifting bars are called substitutional pickers. The substitutional lifting bars are inserted originally and once for all since it is taken for granted that all laces which are to be worked 110  
as widened laces on a given machine are to be considered as having the same width of border and the same width of selvage. Fig. 3 shows by way of example three strips of lace as they can be hitherto produced, each 115  
with a border and a selvage alongside each other and connected together without the top bars being inaccessible to the hands. Fig. 4 shows on the other hand widened lace or lace stuff the parts M of which have exactly the same pattern as the middle part M 120  
of the three strips of lace but between only one border and one selvage and in which in place of the omitted border and the omitted selvage in the second and third strips a substitutional figure or pattern F has been inserted the production of which is to be rendered possible by apparatus constructed and arranged according to this invention. 125

As will be seen each substitutional figure 130

or pattern F in Fig. 4 corresponds to a border and the selvage connected thereto of the strips of lace shown in Fig. 3 and it is therefore the object of this invention to re-  
 5 place in the production of the widened lace or lace stuff the first mentioned parts (border and selvage) by any substitutional figure  
 10 or pattern which suits the main pattern. For this purpose the pickers which produce the border and selvage are replaced where  
 15 a substitutional figure or pattern is to take the place of said border and selvage by others, namely the substitutional pickers which have their upward projections in a  
 20 different position to the first mentioned pickers and consequently cooperate with lifting bars (substitutional lifting bars) which for this purpose are placed in a different  
 25 position in the machine and have their upward projections in the same position as the lifting bars for the border and the selvage. These substitutional lifting bars must be inserted  
 30 in suitable distribution between the existing lifting bars and always so that the upward projections of the substitutional lifting bars can only cooperate with the downward  
 35 projections of the substitutional pickers which are inserted in the machine in the proper place in exchange for the pickers for the border and selvage.

The union of the edges of the middle lengths of the lace with the substitutional figures or patterns lying between them is effected by the substitutional lifting bars  
 35 and substitutional pickers in such a manner that a harmonious transition between all these parts is secured and that they shall produce in their entirety the impression of homogeneously produced lace.

Fig. 5 diagrammatically shows in plan the arrangement and cooperation of the pickers and lifting bars when only principal laces (narrow strips of lace) are produced like those shown in Fig. 3. Fig. 6 in  
 45 like manner shows the cooperation of the lifting bars and pickers when using substitutional lifting bars and substitutional pickers for the production of widened lace shown in Fig. 4. In both figures the horizontal thin  
 50 lines denote the lifting bars, the vertical thin lines the pickers, and the short thick strokes the corresponding cooperating projections.

It is assumed that the principal lace selected as an example requires 48 comb slots in the machine and that consequently 48 lifting bars are necessary for each component of principal lace. Furthermore it is assumed that of these 48 lifting bars 12 are  
 60 required for the border and 4 for the selvage. If therefore 16 lifting bars are necessary for the selvage and border in the principal lace, it will be necessary, in order to widen the lace in the manner described, to  
 65 select a substitutional figure or pattern which

likewise requires 16 lifting bars for its production as this figure or pattern has to take the place of the border and the selvage. On the above assumption the machine will there-  
 70 fore have to be fitted with 64 lifting bars 48 of which together with the corresponding pickers have to form the border, the middle of the lace and the selvage, while the remaining 16 serve for the production of the  
 75 substitutional figures or patterns. Whereas otherwise 144 lifting bars are necessary for a piece of lace with 144 comb slots, 64 are sufficient for the widened lace, and this number suffices for any desired widening,  
 80 that is to say even were the widened lace to occupy 10 times 48 comb slots instead of 3 times 48 comb slots.

In Fig. 5 the substitutional lifting bars are numbered 5, 6, 13, 14, 21, 22, 29, 30, 36, 37, 44, 45, 52, 53, 60, 61, and a consideration of  
 85 Fig. 5 will show that these substitutional lifting bars cannot cooperate when principal laces are produced because there are no picker projections above them.

Fig. 6 shows that the before mentioned  
 90 lifting bars denoted by numbers are employed in those parts of the widened lace or of the lace stuff which are filled up by the parts which act as the substitute for the borders and selvages, because in those parts the  
 95 ordinary pickers 1 to 12 and 45 to 48 are replaced by the similarly numbered substitutional pickers and the projections of the latter are situated above the projections of the substitutional lifting bars. The substitutional  
 100 pickers are situated in the selvage of the first and second strips of lace and in the border of the second and third strips of lace.

In order when producing principal lace to pass to wide laces or lace stuff or vice  
 105 versa, it is only necessary in a machine so constructed to exchange the corresponding pickers which can be done in a short time so that a change in the width of the lace can  
 110 always be easily carried out.

#### Claims:

1. In a pillow-lace machine having pickers and cooperating lifting bars arranged for simultaneously making a plurality of connected strips of pillow lace, each having a  
 115 border, a middle portion and a selvage, the selvage of one strip being adjacent the border of the next adjacent strip, substitute pickers and substitute lifting bars substantially equal in number to those required for  
 120 the production of said adjacent selvage and border for producing an intermediate connecting design and thereby produce a strip of lace of multiple width.

2. In a pillow-lace machine having combs,  
 125 pickers, and cooperating lifting bars arranged for simultaneously making a plurality of connected strips of pillow-lace, each having a border, a middle portion and a selvage, the selvage of one strip being adjacent  
 130

the border of the next adjacent strip, substitute pickers and cooperating substitute lifting bars equal in number to those forming said adjacent selvage and border, said substitute pickers replacing the adjacent border and selvage forming pickers in the same comb slots and cooperating with the substitute lifting bars to form a connecting pattern having the same number of stitches as are required to produce said adjacent selvage and border, thereby producing a strip of lace of multiple width.

3. In a pillow-lace machine having pickers and cooperating lifting bars arranged for simultaneously making a plurality of connected strips of lace, each strip having

two outer portions constituting respectively a border and a selvage, there being an outer portion of one strip adjacent the outer portion of the next strip, substitute pickers and substitute lifting bars substantially equal in number to those required for the production of said adjacent portions for producing an intermediate connecting design to produce a strip of lace of multiple width.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

AUGUST MATITSCH.

Witnesses:

MARJORY ROLLIN,  
THOS. H. COOK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents Washington, D. C."