F. MARSCHALEK.

EMBROIDERY MACHINE.

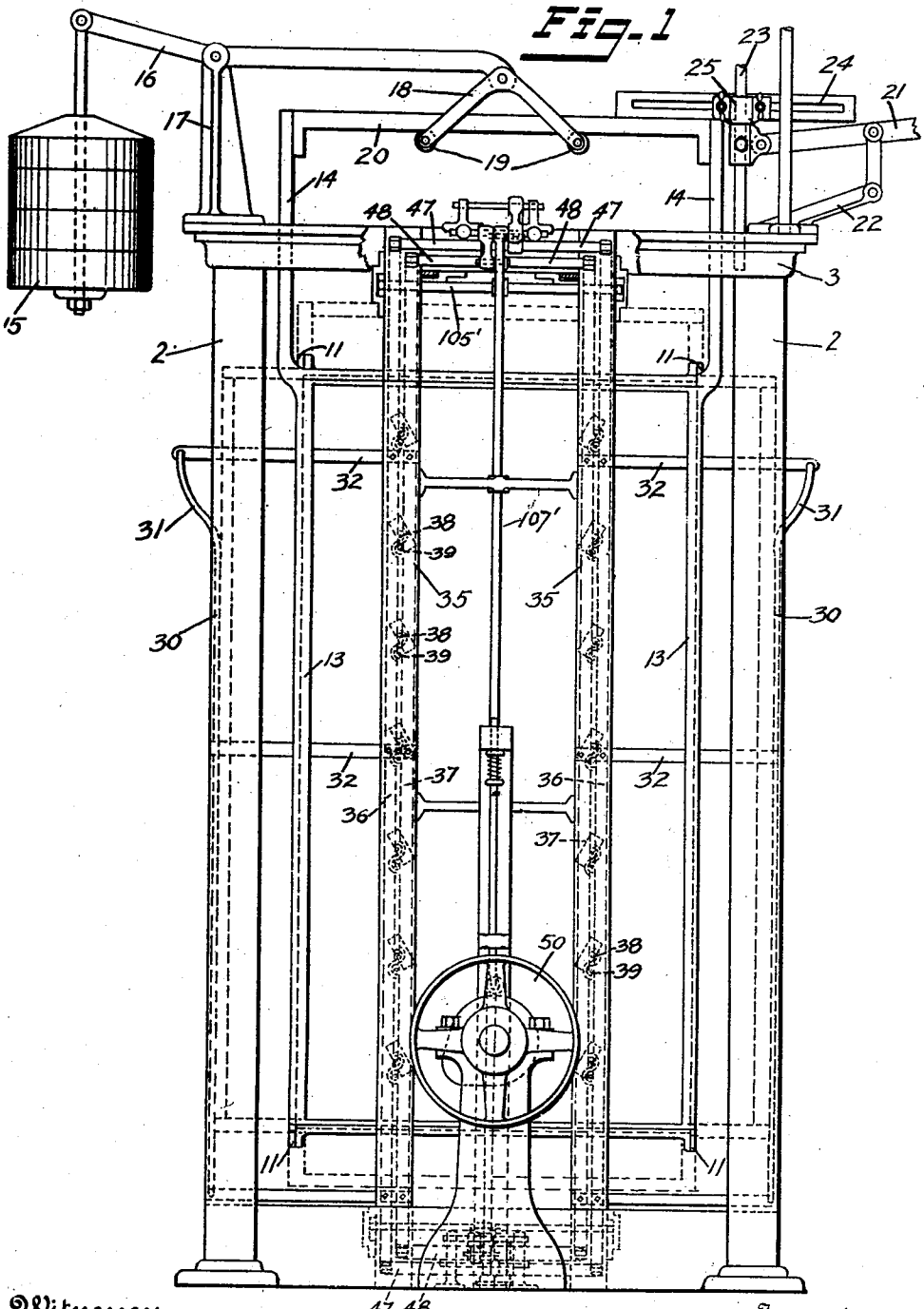
APPLICATION FILED APR. 22, 1914.

1,154,872.

Patented Sept. 28, 1915

4 SHEETS—SHEET 1.

Fig. 1



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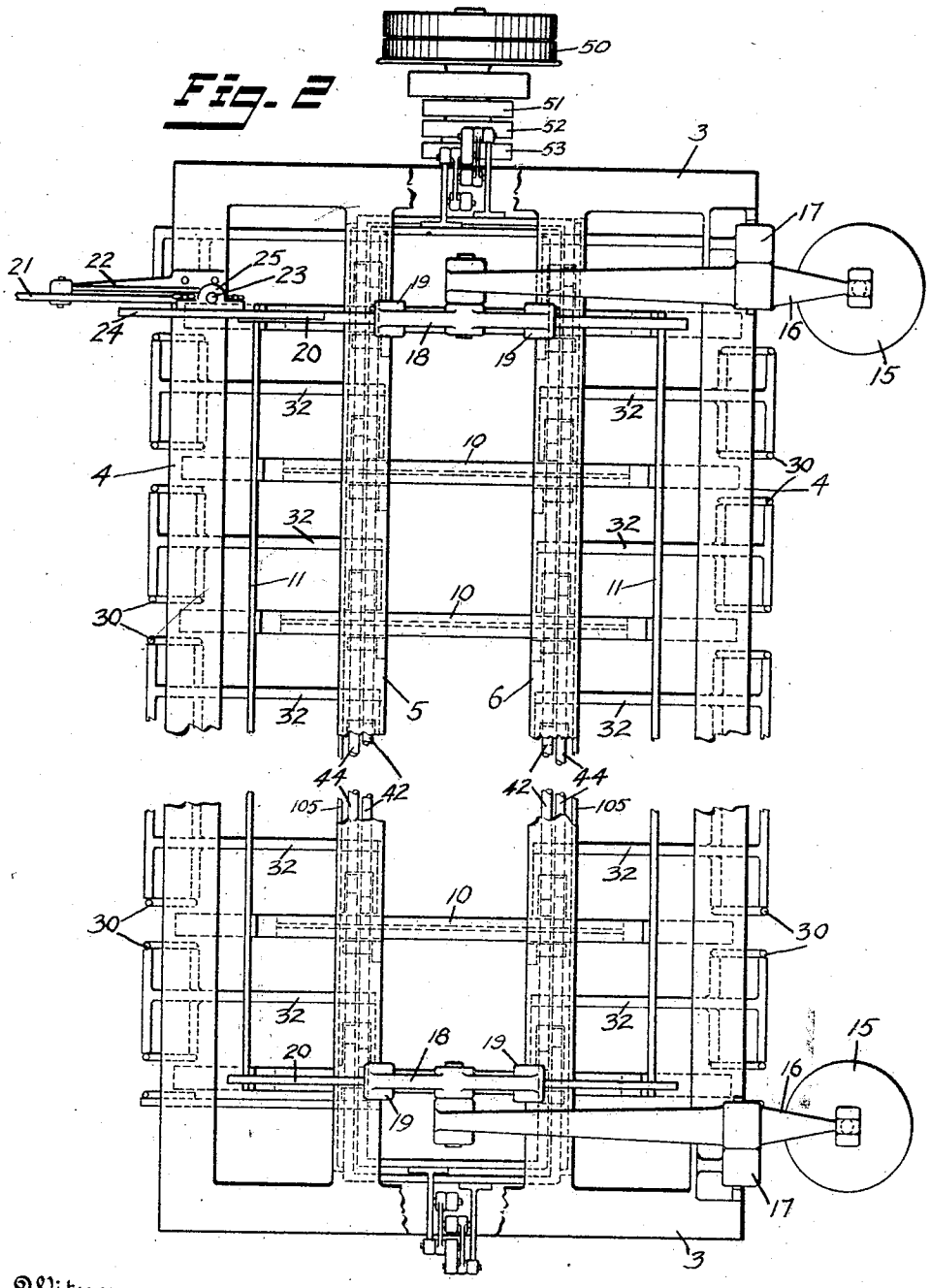
4 SHEETS—SHEET 2.

Fig. 2



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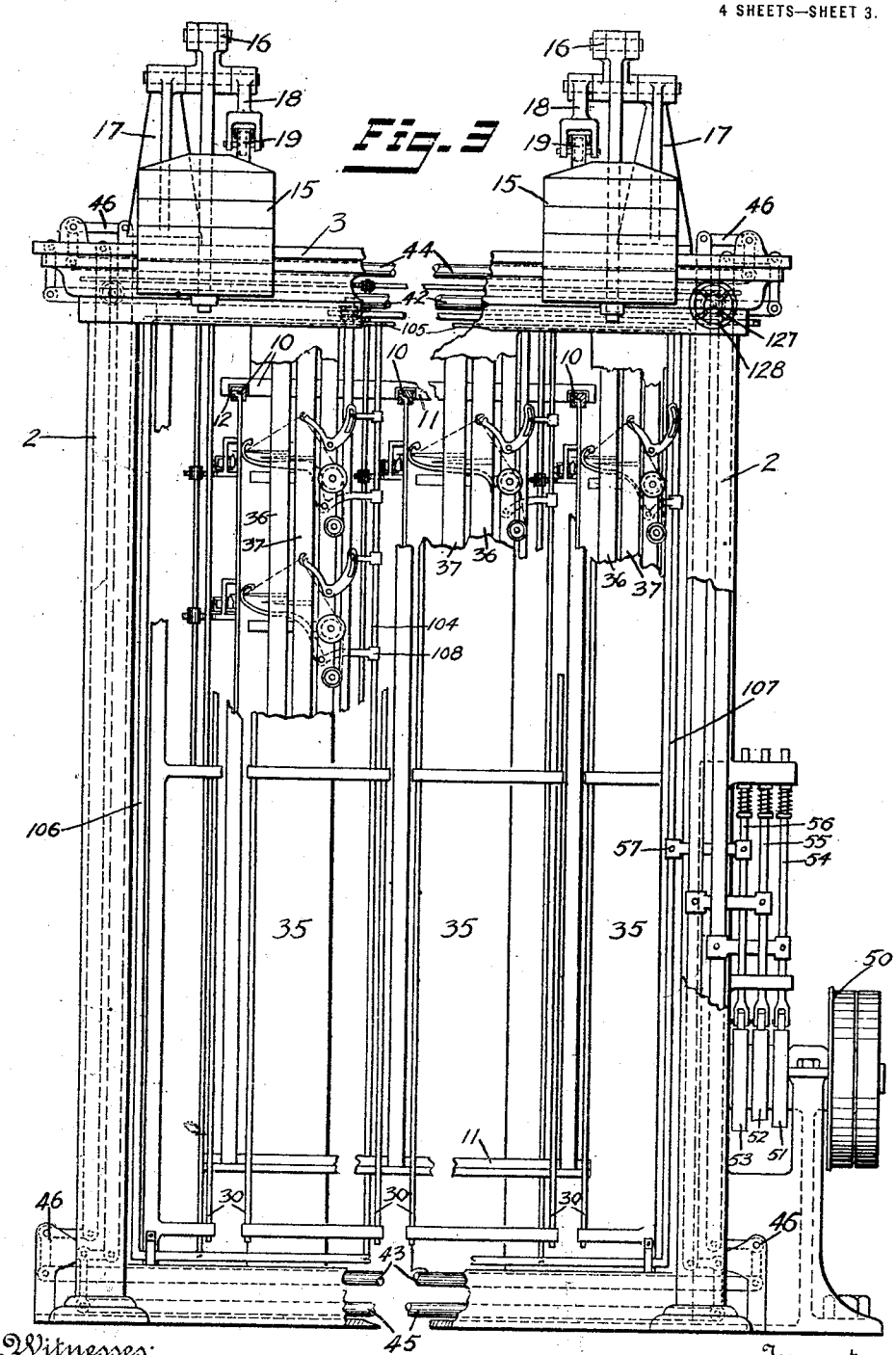
4 SHEETS—SHEET 3.

Fig. 3



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4 SHEETS—SHEET 4.

Fig. 4

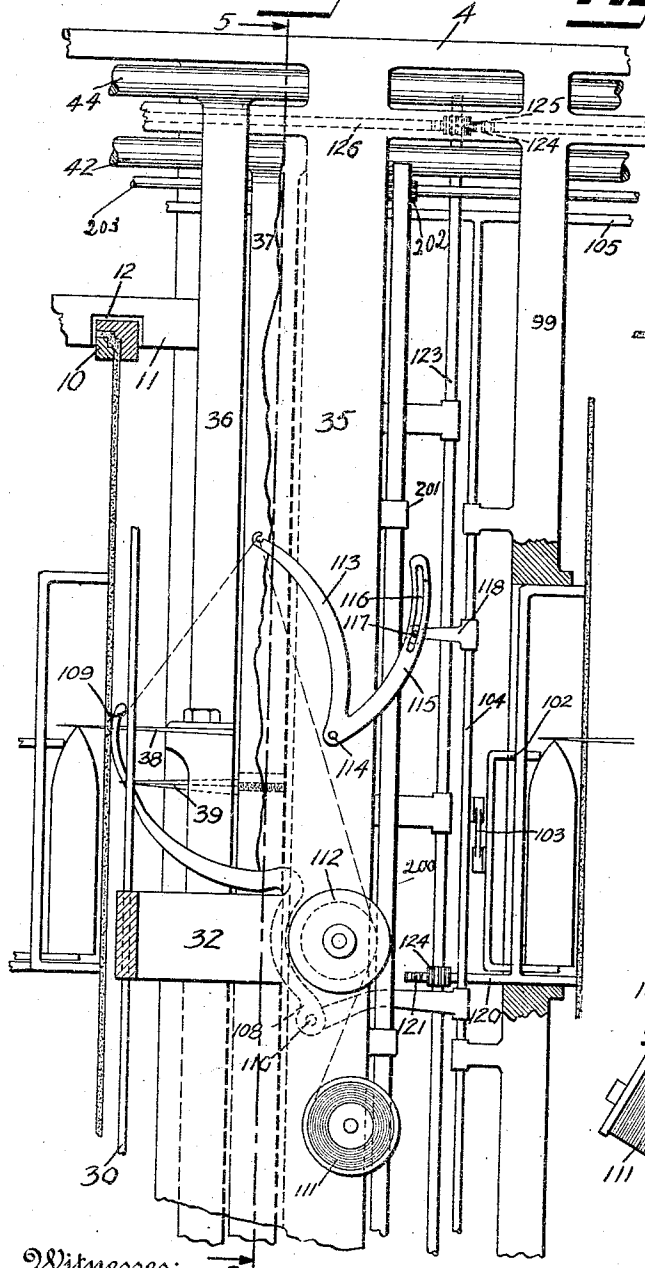


Fig. 6

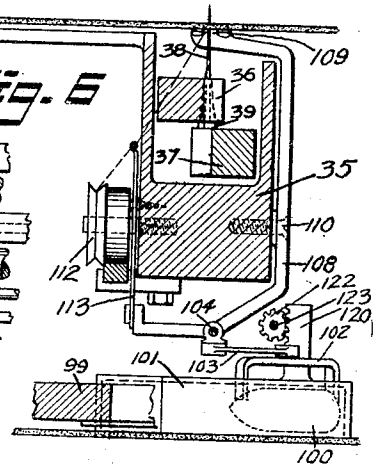
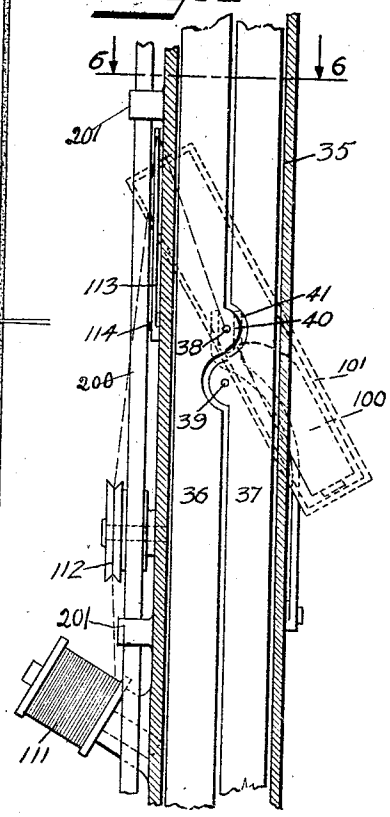


Fig. 5



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EMBROIDERY-MACHINE.

1,154,872. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed April 22, 1914. Serial No. 833,595.

To all whom it may concern:

Be it known that I, FRANK MARSCHALEK, a subject of the King of Hungary, residing at West New York, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Embroidery-Machines, of which the following is a specification.

This invention relates to embroidery machines, more particularly to that general class thereof known as Swiss embroidery machines, it being more especially adapted for use in the making of small articles, such as handkerchiefs, pillow cases, collars, etc., a number of which may be carried by the same frame and in which both halves of the work can be completed at the same time, so that a great many articles of the same kind may be made simultaneously. The machine is therefore not intended for use in the making of embroidery ten or twelve yards long as is the ordinary Swiss machine.

A further object of the invention is the provision of an improved machine of the character described in which a series of independently supported work frames and a series of needles and borers are so supported relatively to each other that one set of these elements may be shifted relatively to the other in transverse planes according to the pattern of the work, and in the present organization, which is an improvement in part upon my contemporaneously pending application, Serial No. 827,283, filed March 26, 1914, the work frames are shown movable simultaneously in transverse directions relatively to the path of movement of the needles and borers, whereas in said application referred to the needles and borers are movable in transverse directions relatively to the work frames.

A further object of the invention is the provision of an improved machine of the character described, in which a series of independently supported work frames and a series of vertically supported needles and borers are so supported relatively to each other that one set of these elements may be manually shifted relatively to each other in transverse planes according to the pattern of the work.

A further object of the invention is the provision of an improved machine of the character described, having a series of sets of needles and borers one in front of another throughout the length of the machine and supported vertically relatively to the work frames.

In the ordinary Swiss embroidery machines, the embroidery frame is usually twelve yards long and is moved up and down and endwise by means of a pantograph, while the needles and borers are supported horizontally or lengthwise of the frame and are simply shiftable into and out of the work. In the present improvement, however, the work frames are located transversely of the machine, one behind another, and may be of any desired size according to the work to be done, so that if the machine is twelve yards long it will accommodate a series of work frames one located behind another transversely of the machine whereby a large number of articles of similar character may be made at the same time, especially as a number thereof may be carried on each frame, and the needles and borers, instead of being supported lengthwise of the frame as in the ordinary Swiss machine, are supported vertically relatively to the frames, so that for each frame there may be a series of needles and a series of borers, and in the present improvement all of the frames so transversely supported may be shifted relatively to the needles and borers in transverse planes. In consequence, in the present organization, I am able to provide two needles and two borers for each piece of work, or if the work corresponds in size with the frame then a series of needles and a series of borers, one located above another, for each half of the work.

In the drawings accompanying and forming part of this specification, Figure 1 is an end view of this improved embroidery machine, certain of the dotted lines illustrating the limit of movement of the embroidery frames, that end of the machine being illustrated which carries the power-driven means for the needles, borers and shuttles, parts of the framework being shown broken away; Fig. 2 is a top plan view, partly broken away, of this improved machine; Fig. 3 is what may be considered a front view of the machine with a large part of the machine broken away; Fig. 4 is a detail enlarged view of a portion of the machine illustrating a needle and a borer carrying means and the shuttle mechanism, with the U-shaped upright frame member hereinafter referred to broken away; Fig. 5 is a detail sectional view taken in line 5—5, Fig. 4; and Fig. 6

is a cross-sectional view taken in line 6—6, Fig. 5.

Similar characters of reference indicate corresponding parts in the several figures of the drawings.

The framework of the machine in the present instance consists of four uprights or posts 2, one at each corner of the machine, tied together by transverse members 3 and lengthwise extending members 4 to form a rectangular framework. Across the top and bottom of this rectangular framework and extending lengthwise thereof is shown a pair of frame members 5 and 6, and connecting the parallel top and bottom frame members are uprights or posts 35 hereinafter described, shown spaced apart at predetermined intervals. These uprights have openings therethrough for the passage of the needle and borer shafts and the shuttle operating rods or bars hereinafter described. Supported on the main framework for transverse movements is a series of work frames 10, one located behind another, and therefore located transversely of the machine. Each of these frames 10 for carrying the goods or work to be embroidered may be of any suitable form. All of these frames have their top and bottom rails carried by suitably braced bars 11, the work frames being spaced a predetermined distance apart, and these bars 11 are provided with grooves or recesses 12, (see Fig. 4), for the reception of the upper and lower rails of the frames 10 and by means of which these frames may be readily slid into and out of place. These bars 11 at their opposite ends are tied together by a rectangular frame 13, and each of these rectangular frames is provided with an upward extension 14. Mounted on the top of the main frame, at each end, is a counterbalancing weight 15, the supporting lever 16 of which is pivoted to a bracket 17 and the inner end of this lever 16 is provided with a crotched arm 18 carrying a pair of rolls 19 supporting the crosswise extending bar 20 of the extension 14. Thus it will be observed that the rectangular frame 13 at each end of the machine, tied together by the bars 11 having the grooves or recesses 12 therein, form as it were a floating structure supported by the counterbalancing weights, one at each end, and that this floating structure carries the series of work frames, which may be slid into or out of position in the manner hereinbefore described. The dotted lines in Fig. 1 illustrate the amount of movement that this floating frame may have laterally and vertically, in other words in transverse directions. Secured to one of the extensions 14 of this floating frame is a pantograph mechanism, only a part of which is necessary to be shown, as a substantially similar mechanism is shown in my contemporaneously pending application Serial No. 827,283, filed March 26, 1914. The lever 21 of this pantograph mechanism is linked to a bracket 22 carried by the main framework, and the inner end of this lever 21 is adjustably secured on a movable rod 23, whereby the movement of the floating frame vertically may be determined. Fixedly secured to the bar 20 of the extension 14 is a slotted member 24, and carried by the rod 23 is a suitable clamping device 25 by means of which the rod and the slotted member 24 may be adjusted relatively to each other crosswise of the machine thereby to adjust the frames relatively to the pantograph, in other words shift the frames laterally as occasion may require for the proper use of the pantograph.

From the foregoing it will be observed that by the movements of the pantograph in the usual way the lever 21 thereof will raise or lower it or shift it sidewise.

For preventing interference with the work frames, that is the knocking or striking thereof by passing operators, suitable protectors are provided between each pair of frames, at each side thereof, these consisting simply of upright bars or rods 30, (see Figs. 1 and 2), outwardly bent, as at 31, and connected by inwardly extending members 32 to a part of the upright frames 35, (see Fig. 4). These protectors are bent outward at their upper ends, as at 31, to permit the proper lateral or sidewise movement of the work frames as occasion may require.

Connected to or integral with the top and bottom lengthwise extending frame members 5 and 6 are, as hereinbefore stated, a series of pairs of uprights or posts shown as U-shaped casings 35, (see Figs. 5 and 6), there being a pair of these in front of each work frame. In each of these hollow or U-shaped supports 35 is located a needle carrying bar 36 and a borer carrying bar 37, and to the needle carrying bar is secured a series of needles 38, one above another, and to the borer carrying bar is secured a series of borers 39, one above another, and these bars are simply shiftable toward and from the work frames thereby to insure the proper penetration of the needles and borers into the work at the desired time.

From the foregoing it will thus be seen that the needles are located one above another vertically of the work frames, as are also the borers, and that a needle and a borer bar is carried in each U-shaped casing, (see Fig. 6), which is open at one side to permit the proper forward and backward movement of the needles and borers. These needle and borer bars are provided at the points where the needles and borers are carried with projecting ears 40, (see Fig. 5), the ear of one bar extending into a curved recess 41 of the other, whereby the needle and borer of each pair may be located one

directly above the other. It will thus be seen that the needles and borers are carried by vertical bars extending vertically of the work frames.

For operating the needle and borer bars thereby to shift the needles and borers into and out of the work, suitable mechanism is provided, and for this purpose the upper and lower ends of all the borer and needle carrying bars are connected by shafts which extend through openings or bearings in the uprights 35 hereinbefore referred to, so that there are a pair of shafts 42 at the top and a pair of shafts 43 at the bottom connected to the borer bars, (see Figs. 3 and 4), and a pair of shafts 44 at the top and a pair of shafts 45 at the bottom connected with the needle bars, and these several shafts at the top and bottom of the main frame are in turn connected at the ends of the machine by bell-crank levers generally designated as 46 with connecting rods or levers 47 and 48, the levers 47 being connected with the needle bar operating shafts and the connecting bars 48 with the borer bar operating shafts.

At one end of the machine there is located suitable power-driven mechanism, comprising a fast and a loose pulley, designated generally as 50, and on the shaft thereof is a series of three eccentrics 51, 52 and 53, the last of which will be referred to hereinafter, it being for the purpose of operating the shuttle mechanism. Located above these eccentrics is a series of three spring-pressed rods or plungers 54, 55 and 56, the plungers 54 and 55 being suitably connected respectively with a connecting rod 47 and 48 hereinbefore referred to, while the rod 56 is connected in a similar way to the shuttle operating bar hereinafter referred to. By this mechanism it will be observed that on the raising and lowering, by means of the eccentrics, of the bars 47 and 48 the horizontally extending shafts 42, 43, 44 and 45 will, by means of the bell cranks 46, be shifted or reciprocated back and forth lengthwise of the machine, so that the needle and borer carrying bars will likewise be shifted in their U-shaped casings so that the needles and borers will penetrate and be drawn from the work.

From the foregoing it will thus be observed that on the operation of the pantograph manually all of the work frames may be raised and lowered or shifted sidewise or laterally; in other words, they may be shifted in transverse planes, while, by means of the power-driven mechanism, the needles and borers will be shifted into and out of the work.

Suitable shuttle mechanism is provided for each needle, and as they are all alike a description of one is sufficient. The shuttle 100 is carried in an inclined raceway 101 carried by an upright frame member 99 at the rear of its work frame, and the shuttle is shifted back and forth by a yoke or U-shaped member 102 connected by a crank 103 with a rod 104, and all of these rods of the shuttles are connected at their tops and bottoms by lengthwise extending rods 105, which pass through openings in the uprights 35 and 99 between the shafts 43 and 44, and these rods in turn are connected at their ends by cross rods 105′ connected to upright rods 106 and 107. A rod 107′ connects with one of the cross rods 105′, and this rod 107′ is connected by means of an arm 57 with the spring plunger 56 operated by the eccentric 53, whereby the shuttles will in this manner be moved back and forth.

Secured to each upright shuttle operating rod 104 is a work presser 108 forked at its end 109, (see Figs. 4 and 6), and which is pivotally supported on an upright 35, as at 110. This upright 35 also supports a thread carrying spool 111 and a suitable idler spool or tension 112 around which the thread is wound once, and from whence it passes to a thread puller 113, likewise pivotally supported, as at 114, on the upright 35, and which thread puller has a segmental arm 115 having a slot 116 into which projects a pin 117 carried by an arm 118 secured to the shuttle operating rod 104, whereby the thread puller is operated on the reciprocation of the rods 104 in the manner hereinbefore described. Projecting from each shuttle raceway is an arm 120 having a rack 121 in engagement with a pinion 122 carried by a rotating shaft 123, which shaft has another pinion 124 at its top in engagement with a rack segment 125 of a lengthwise extending bar 126. These bars 126 are in engagement with pinions, (not shown), carried by a crosswise shaft 127 located at the power end of the machine and on the end of which is a hand wheel 128 whereby these rods 126 will be shifted thereby to rotate all the rods 123 and thereby simultaneously shift all of the shuttle mechanisms away from the work frames to permit the insertion or withdrawal of the work frames.

It will be understood that the various details may be more or less changed without departing from the spirit and scope of this invention, the present embodiment of the machine illustrating one form of mechanism which may be used for carrying out the invention, and therefore applicant does not limit himself to the specific mechanisms herein shown or described for operating the several parts.

As hereinbefore stated, each thread passes around the idler spool 112, and for braking each thread a braking mechanism is provided, this consisting of a rod or bar 200, (see Figs. 4 and 5), suitably supported by bearings 201 carried by the rear of the upright frame member 35, and these brake

members are all operated simultaneously by rack and pinion mechanism 202, (see Fig. 4), the pinions being carried by bars 203, which are manipulated in some suitable manner when it is desired to increase or decrease the tension on the idler spools 112.

I claim as my invention:

1. In a machine of the class described, the combination with supporting means, of a series of work frames each of substantially the width of and arranged transversely of the length of the supporting means and carried thereby and located one behind another, needle and borer mechanism, means for shifting the needles and borers and the work relatively to each other so that such needles and borer will penetrate the work and means for shifting said work frames in transverse planes relatively to the path of movement of the needles and borers.

2. In a machine of the class described, the combination with supporting means having greater length than width, of a series of work frames carried thereby and located one behind another transversely of the supporting means, needle and borer mechanism, means for shifting the needles and borers and the work relatively to each other so that such needles and borers will penetrate the work, and means for simultaneously shifting all of said work frames in transverse planes relatively to the path of movement of the needles and borers.

3. In a machine of the class described, the combination with supporting means, of a plurality of detachable work frames each of substantially the width of and arranged transversely of the length of the supporting means and carried thereby and located one behind another, needle and borer mechanism, means for shifting the needles and borers into and out of the work, and means for simultaneously shifting all of said work frames in transverse planes relatively to the path of movement of the needles and borers.

4. In a machine of the class described, the combination with supporting means, of a plurality of work frames each of substantially the width of and arranged transversely of the length of the supporting means, needle and borer mechanism comprising a series of needles and a series of borers for said frame, the needles and borers being located respectively one above another, means for shifting the needles and borers into and out of the work, and means for shifting said work frame and said needles and borers relatively to each other in transverse planes.

5. In a machine of the class described, the combination with supporting means, of a plurality of work frames each of substantially the width of and arranged transversely of the length of the supporting means, and carried thereby, needle and borer mechanism comprising two series of needles and borers, the needles and borers of each series being located respectively one above another, means for shifting the needles and borers into and out of the work, and means for shifting said work frame and said needles and borers relatively to each other in transverse planes.

6. In a machine of the class described, the combination with supporting means, of a plurality of work frames each of substantially the width of and arranged transversely of the length of the supporting means and carried thereby and located one behind another, needle and borer mechanism comprising a plurality of needles and a plurality of borers for each of said frames, the needles and borers being located respectively one above another, means for shifting the needles and borers into and out of the work, and means for shifting said work frames and said needles and borers relatively to each other in transverse planes.

7. In a machine of the class described, the combination with a floating supporting means, of a plurality of work frames each of substantially the width of and arranged transversely of the length of the supporting means and carried thereby and located one behind another, needle and borer mechanism comprising a plurality of needles and a plurality of borers for each of said frames, the needles and borers being located respectively one above another, means for shifting the needles and borers into and out of the work, and means for shifting said floating supporting means in transverse planes relatively to the path of movement of the needles and borers.

8. In a machine of the class described, the combination with a floating supporting means, of a plurality of work frames each of substantially the width of and arranged transversely of the length of the supporting means and carried thereby and located one behind another, needle and borer mechanism comprising a plurality of needles and a plurality of borers for each of said frames, the needles and borers being located respectively one above another, power-driven means for shifting the needles and borers into and out of the work, and manually operative means for shifting said floating supporting means in transverse planes relatively to the path of movement of the needles and borers.

9. In a machine of the class described, the combination with a floating supporting frame, of a plurality of detachable work frames each of substantially the width of and arranged transversely of the length of the supporting means and carried thereby and located one behind another, needle and borer mechanism comprising two parallel sets of needles and borers, the needles and borers of each set being located respectively

one above another, means for shifting the needles and borers into and out of the work, and means for shifting said floating supporting frame in transverse planes relatively to the path of movement of the needles and borers.

10. In a machine of the class described, the combination with work supporting means, of a plurality of work frames each of substantially the width of and arranged transversely of the length of the supporting means, needle and borer mechanism therefor and comprising a vertically supported series of needles and borers, the needles and borers being located respectively one above another, and means for shifting said needles and borers into and out of the work.

11. In a machine of the class described, the combination, with work supporting means, of a series of work frames spaced apart one from another, each of substantially the width of and arranged transversely of the length of the supporting means and needle and borer mechanism comprising two vertically supported series of needles and borers, the needles and borers of each series being located respectively one above another, and means for shifting said needles and borers into and out of the work.

12. In a machine of the class described, the combination with supporting means, of a series of independent work supporting frames each of substantially the width of and arranged transversely of the length of the supporting means and located one behind another, a series of sets of needles and borers likewise located one behind another, means for shifting the needles and borers into and out of the work, and means for shifting all of said work frames simultaneously in transverse paths relatively to the needles and borers.

13. In a machine of the class described, the combination with supporting means, of a work frame carried thereby, a vertically located needle carrying bar and a vertically located borer carrying bar in front of said frame, and means for shifting said bars toward and from the frame.

14. In a machine of the class described, the combination with supporting means, of a work frame carried thereby, a vertically located needle carrying bar and a vertically located borer carrying bar in front of said frame, means for shifting said bars toward and from the frame, and means for shifting said bars and said frame relatively to each other in transverse paths.

15. In a machine of the class described, the combination with supporting means, of a work frame carried thereby, a vertically located needle carrying bar and a vertically located borer carrying bar in front of said frame, a plurality of needles carried by the needle bar and a plurality of borers carried by the borer bar and located respectively one above another, and means for shifting said bars toward and from the work frame.

16. In a machine of the class described, the combination with supporting means, of a work frame carried thereby, a vertically located needle carrying bar and a vertically located borer carrying bar in front of said frame, a plurality of needles carried by the needle bar and a plurality of borers carried by the borer bar and located respectively one above another, means for shifting said bars toward and from the work frame, and means for shifting said bars and said frame relatively to each other in transverse paths.

17. In a machine of the class described, the combination with supporting means, of a work frame carried thereby, a vertically located needle carrying bar and a vertically located borer carrying bar in front of said frame, means for shifting said bars toward and from the frame, and means for shifting said frame in transverse paths relatively to the paths of movement of the needles and borers.

18. In a machine of the class described, the combination with supporting means, of a work frame carried thereby, a vertically located needle carrying bar and a vertically located borer carrying bar in front of said frame, a plurality of needles carried by the needle bar and a plurality of borers carried by the borer bar and located respectively one above another, means for shifting said bars toward and from the work frame, and means for shifting said frame in transverse paths relatively to the paths of movement of the needles and borers.

19. In a machine of the class described, the combination with supporting means, of a work frame carried thereby, a pair of vertically located needle carrying bars and a pair of vertically located borer carrying bars in front of said frame, and means for shifting said bars toward and from the frame.

20. In a machine of the class described, the combination with supporting means, of a work frame carried thereby, a pair of vertically located needle carrying bars and a pair of vertically located borer carrying bars in front of said frame, means for shifting said bars toward and from the frame, and means for shifting said bars and said frame relatively to each other in transverse paths.

21. In a machine of the class described, the combination with supporting means, of a work frame carried thereby, a pair of vertically located needle carrying bars and a pair of vertically located borer carrying bars in front of said frame, a plurality of needles carried by each of said needle bars and a plurality of borers carried by each of said borer bars, the needles and borers being located respectively one above another, and

means for shifting said bars toward and from the work frame.

22. In a machine of the class described, the combination with supporting means, of a work frame carried thereby, a pair of vertically located needle carrying bars and a pair of vertically located borer carrying bars in front of said frame, a plurality of needles carried by each of said needle bars and a plurality of borers carried by each of said borer bars, the needles and borers being located respectively one above another, means for shifting said bars toward and from the work frame, and means for shifting said bars and said frame relatively to each other in transverse paths.

23. In a machine of the class described, the combination with supporting means, of a plurality of work frames carried thereby and located one behind another, a vertically located needle carrying bar and a vertically located borer carrying bar in front of each of said frames, and means for shifting each of said bars toward and from its frame.

24. In a machine of the class described, the combination with supporting means, of a plurality of work frames carried thereby and located one behind another, a vertically located needle carrying bar and a vertically located borer carrying bar in front of each of said frames, means for shifting each of said bars toward and from its frame, and means for shifting said bars and said frames relatively to each other in transverse paths.

25. In a machine of the class described, the combination with supporting means, of a plurality of work frames carried thereby and located one behind another, a vertically located needle carrying bar and a vertically located borer carrying bar in front of each of said frames, means for shifting each of said bars toward and from its frame, and means for shifting said work frames in transverse paths relatively to the path of movement of the needles and borers.

26. In a machine of the class described, the combination with supporting means, of a series of work frames carried thereby and located one behind another, a pair of vertically located needle carrying bars and a pair of vertically located borer carrying bars in front of each of said frames, and means for shifting each of said bars toward and from its frame.

27. In a machine of the class described, the combination with supporting means, of a series of work frames carried thereby and located one behind another, a pair of vertically located needle carrying bars and a pair of vertically located borer carrying bars in front of each of said frames, means for shifting each of said bars toward and from its frame, and means for shifting said bars and said frames relatively to each other in transverse paths.

28. In a machine of the class described, the combination with supporting means, of a series of work frames carried thereby and located one behind another, a pair of vertically located needle carrying bars and a pair of vertically located borer carrying bars in front of each of said frames, means for shifting each of said bars toward and from its frame, and means for shifting said frames in transverse paths relatively to the path of movement of the needles and borers.

29. In a machine of the class described, the combination with supporting means, of a work frame carried thereby, a vertically located needle carrying bar and a vertically located borer carrying bar in front of said frame, each having a projecting overlapping portion for carrying a working implement whereby said implements will be in alinement, and means for shifting said bars toward and from the frame.

30. In a machine of the class described, the combination with supporting means, of a work frame carried thereby, a vertically located needle carrying bar and a vertically located borer carrying bar in front of said frame, each having a series of projections, the projection of one bar overlapping a companion projection of the other bar, working implements carried by said projections whereby they are in vertical alinement, and means for shifting said bars toward and from the frame.

31. In a machine of the class described, the combination with floating supporting means, of a plurality of work frames carried thereby and located one behind another, means for shifting all of said work frames in transverse paths relatively to the path of movement of the needles and borers a vertically located needle carrying bar and a vertically located borer carrying bar in front of each of said frames, means connecting all of the borer bars, means connecting all of the needle bars, and means for shifting all of said borer bars and needle bars toward and from the frames.

32. In a machine of the class described, the combination with floating supporting means, of a plurality of work frames carried thereby and located one behind another, means for shifting all of said work frames in transverse paths relatively to the path of movement of the needles and borers a pair of vertically located needle carrying bars and a pair of vertically located borer carrying bars in front of each of said frames, means connecting all of the borer bars, means connecting all of the needle bars, and means for shifting all of said borer bars and needle bars toward and from the frames.

33. In a machine of the class described, the combination with floating supporting means, of a plurality of work frames carried thereby and located one behind another,

means for shifting all of said work frames in transverse paths relatively to the path of movement of the needles and borers a vertically located needle carrying bar and a vertically located borer carrying bar in front of each of said frames, a series of needles located one above another carried by each of said needle bars and a series of borers located one above another carried by each of said borer bars, the needles and borers being located in pairs and one in vertical alinement with the other, means connecting all of the borer bars, means connecting all of the needle bars, and means for shifting all of said borer bars and needle bars toward and from the frames.

34. In a machine of the class described, the combination with floating supporting means, of a plurality of work frames carried thereby and located one behind another, means for shifting all of said work frames in transverse paths relatively to the path of movement of the needles and borers a pair of vertically located needle carrying bars and a pair of vertically located borer carrying bars in front of each of said frames, a series of needles located one above another carried by each of said needle bars and a series of borers located one above another carried by each of said borer bars, the needles and borers being located in pairs and one in vertical alinement with the other, means connecting all of the borer bars, means connecting all of the needle bars, and means for shifting all of said borer bars and needle bars toward and from the frames.

35. In a machine of the class described, the combination with floating supporting means, of a plurality of work frames carried thereby and located one behind another, means for shifting all of said work frames in transverse paths relatively to the path of movement of the needles and borers a pair of vertically located needle carrying bars and a pair of vertically located borer carrying bars in front of each of said frames, means connecting all of the borer bars, means connecting all of the needle bars, means for shifting all of said borer bars and needle bars toward and from the frames, and a U-shaped casing for juxtaposed needle and borer bars.

36. In a machine of the class described, the combination with floating supporting means, of a plurality of work frames carried thereby and located one behind another, means for shifting all of said work frames in transverse paths relatively to the path of movement of the needles and borers a pair of vertically located needle carrying bars and a pair of vertically located borer carrying bars in front of each of said frames, a series of needles located one above another carried by each of said needle bars and a series of borers located one above another carried by each of said borer bars, the needles and borers being located in pairs and one in vertical alinement with the other, means connecting all of the borer bars, means connecting all of the needle bars, means for shifting all of said borer bars and needle bars toward and from the frames, and a U-shaped casing for juxtaposed needle and borer bars.

37. In a machine of the class described, the combination of framework, reciprocating shafts extending lengthwise and located adjacent to the top and bottom of said framework, means for reciprocating said shafts, upright needle and borer bars connected with said shafts for movement therewith and adapted to carry needles and borers, and a plurality of work supporting frames carried by said framework and located one behind another.

38. In a machine of the class described, the combination of framework, reciprocating shafts extending lengthwise and located adjacent to the top and bottom of said framework, means for reciprocating said shafts, upright needle and borer bars connected with said shafts for movement therewith and adapted to carry needles and borers, a plurality of work supporting frames carried by said framework and located one behind another, and means for shifting all of said work frames simultaneously in transverse paths relatively to the path of movement of the needles and borers.

39. In a machine of the class described, the combination of framework, reciprocating shafts extending lengthwise and located adjacent to the top and bottom of said framework, means for reciprocating said shafts, upright needle and borer bars connected with said shafts for movement therewith and adapted to carry needles and borers, a plurality of work supporting frames carried by said framework and located one behind another, and means for shifting all of said work frames simultaneously in transverse paths, each of said work frames having a plurality of borer carrying and a plurality of needle carrying bars in front thereof.

40. In a machine of the class described, the combination with supporting means, of a series of work supporting frames each of substantially the width of and arranged transversely of the length of the supporting means and carried thereby and located one behind another, a series of needles located one behind another, one or more for each of said frames, a series of borers also located one behind another, means for shifting the needles and borers into and out of the work, and means for shifting said frames in transverse paths relatively to the path of movement of the needles and borers.

41. In a machine of the class described,

the combination with supporting means, of a series of work supporting frames each of substantially the width of and arranged transversely of the length of the supporting means and carried thereby and located one behind another, a series of needles located one behind another, a series of borers also located one behind another, means for shifting the needles and borers into and out of the work, and means for shifting said frames in transverse paths relatively to the path of movement of the needles and borers the needles and borers for each frame comprising a plurality of pairs thereof located in sets one above another.

42. In a machine of the class described, the combination with supporting means, of a work supporting frame, needle and borer mechanism therefor, shuttle mechanism, means for operating said shuttle mechanism, and a work presser connected with the shuttle operating mechanism.

43. In a machine of the class described, the combination with supporting means, of a work supporting frame, needle and borer mechanism therefor, shuttle mechanism, means for operating said shuttle mechanism, and a thread puller connected with the shuttle operating mechanism.

44. In a machine of the class described, the combination with supporting means, of a work supporting frame, needle and borer mechanism therefor, shuttle mechanism, means for operating said shuttle mechanism, a work presser connected with the shuttle operating mechanism, and a thread puller also connected with the shuttle operating mechanism.

45. In a machine of the class described, the combination with supporting means, of a work supporting frame, needle and borer mechanism therefor, shuttle mechanism, means for shifting the shuttle mechanism away from the work frame, means for operating shuttle mechanism, a work presser connected with the shuttle operating means, and a thread puller also connected with the shuttle operating means.

46. In a machine of the class described, the combination with supporting means, of a work supporting frame, needle and borer mechanism therefor, shuttle mechanism comprising a raceway, a U-shaped member engaging the shuttle for shifting it, means for operating said U-shaped member,—means for shifting the shuttle mechanism away from the work frame, and a work presser connected with the shuttle operating mechanism.

47. In a machine of the class described, the combination with supporting means, of a work supporting frame, needle and borer mechanism therefor, shuttle mechanism comprising a raceway, a U-shaped member engaging the shuttle for shifting it, means for operating said U-shaped member,—means for shifting the shuttle mechanism away from the work frame, and a thread puller connected with the shuttle operating mechanism.

48. In a machine of the class described, the combination with supporting means, of a work supporting frame, needle and borer mechanism therefor, shuttle mechanism comprising a raceway, means for operating the shuttle therein and including a reciprocatory member, a work presser connected with said reciprocatory member, and a thread puller also connected with said reciprocatory member.

49. In a machine of the class described, the combination with supporting means, of a work supporting frame, needle and borer mechanism therefor, shuttle mechanism comprising a raceway, means for operating said shuttle within its raceway and comprising a vertical reciprocating shaft and means for reciprocating said shaft, and a work presser connected with said shaft.

50. In a machine of the class described, the combination with supporting means, of a work supporting frame, needle and borer mechanism therefor, shuttle mechanism comprising a raceway, means for operating said shuttle within its raceway and comprising a vertical reciprocating shaft and means for reciprocating said shaft, and a thread puller connected with said shaft.

51. In a machine of the class described, the combination with supporting means, of a work supporting frame, needle and borer mechanism therefor, shuttle mechanism comprising a raceway, means for operating said shuttle within its raceway and comprising a vertical reciprocating shaft and means for reciprocating said shaft, a work presser connected with said shaft, and a thread puller also connected with said shaft.

52. In a machine of the class described, the combination with supporting means, of a work supporting frame, needle and borer mechanism therefor, shuttle mechanism comprising a raceway, means for operating said shuttle within its raceway and comprising a vertical reciprocating shaft and means for reciprocating said shaft, a work presser connected with said shaft, a thread puller also connected with said shaft, and means for shifting the shuttle away from the work frame.

53. In a machine of the class described, the combination with supporting means, of a series of work supporting frames located one behind another each of substantially the width of and arranged transversely of the length of the supporting means, needle and borer mechanism for each of said frames, shuttle mechanism for each of said frames and likewise located one behind another, means for operating said shuttle mecha-

nisms, and means connected with all of the shuttle mechanisms for shifting them away from the work frames.

54. In a machine of the class described, the combination with framework, of a floating frame carried thereby, means for shifting said frame in transverse paths relatively to the path of movement of the needles and borers a series of work frames detachably carried by said floating frame and located one behind another, shuttle mechanism for each of said frames and likewise located one behind another, means for simultaneously shifting all of the shuttle mechanisms away from the frames thereby to permit the same to be removed from their floating supporting means, one or more vertically supported needle bars and one or more vertically supported borer bars for each of said frames, and means for shifting said bars toward and from the frames and each of said bars carrying a plurality of working implements located one above another.

55. In a machine of the class described, the combination with framework, of a floating frame carried thereby, means for shifting said frame in transverse paths relatively to the path of movement of the needles and borers a series of work frames detachably carried by said floating frame and located one behind another, shuttle mechanism for each of said frames and likewise located one behind another, means for simultaneously shifting all of the shuttle mechanisms away from the frames thereby to permit the same to be removed from their floating supporting means, one or more vertically supported needle bars and one or more vertically supported borer bars for each of said frames, means for shifting said bars toward and from the frames and each of said bars carrying a plurality of working implements located one above another, and work presser means and thread pulling means connected with each of said shuttle mechanisms.

56. In a machine of the class described, the combination with framework, of a series of independent work supporting means, each of substantially the width of and arranged transversely of the length of said framework, a series of sets of needle and borer means, mechanism for shifting the needle and borer means and the work supporting means relatively to each other so that the needle and borer means will penetrate the work, and means for shifting one of said means in transverse paths relatively to the other.

57. In a machine of the class described, the combination with framework having greater length than transverse width, of a series of independent work supporting means located transversely of the framework, a series of sets of needle and borer means, mechanism for shifting the needle and borer means and the work supporting means relatively to each other so that the needle and borer means will penetrate the work, and means for shifting one of said means in transverse paths relatively to the other.

58. In a machine of the class described, the combination with framework, of a series of detachable and independent work supporting means, each of substantially the width of and arranged transversely of the length of said framework and carried thereby, a series of sets of needle and borer means located one behind another, mechanism for shifting the needle and borer means into and out of the work, and means for shifting one of said means in transverse paths relatively to the other.

59. In a machine of the class described, the combination with framework, of a series of independently supported work supporting means located one behind another and each of substantially the width of and arranged transversely of the length of said framework, a series of sets of needle and borer means independently supported for each work supporting means, mechanism for shifting said needle and borer means into and out of the work, and means for shifting one of said means in transverse paths relatively to the other.

60. In a machine of the class described, the combination with supporting means, of a series of work supporting frames each of substantially the width of and arranged transversely of the length of said supporting means and carried thereby and located one behind another, a series of sets of needles and borers, each set comprising a plurality of needles and borers for each frame, and means for shifting the needles and borers into and out of the work.

61. In a machine of the class described, the combination with supporting means, of a plurality of work supporting frames, each of substantially the width of and arranged transversely of the length of said supporting means, needle and borer mechanism comprising a plurality of needles and a plurality of borers for each frame, and means for shifting the same into and out of the work whereby both halves of a piece of work can be completed at the same time.

Signed at New York, in the county of New York and State of New York, this 17th day of April, 1914.

FRANK MARSCHALEK.

Witnesses:
F. E. Boyce,
W. L. Bakelar.