The present invention relates to sewing machines constructed and arranged to connect carpet material disposed in a loose preliminary fashion upon a floor surface as a step in laying the carpet permanently over a large area and more particularly to an apparatus capable of movement along the abutting edges of carpet strips progressively to fasten the edges together. Although the machine hereinafter illustrated is arranged to sew carpet edges in abutting relation to each other certain features of the invention are not so limited but include a construction of fastening machine other than a sewing machine arranged to operate upon the edges of strips of flexible material other than carpet strips disposed in overlapping relationship as in the construction of canvas covers or other large areas of sheet material.

The usual method of laying and sewing carpets is to provide strips cut with the proper lengths and with designs to match, sufficient in number to cover the floor to be carpeted. When large areas are being carpeted these strips have heretofore been sewn together wholly by hand along their meeting edges with a workman in sitting position between separated portions of the edges, the bulk of the carpet being too massive for convenient transportation in a single unitized piece. As the sewing progresses the workman inches himself along while holding the edges raised from the floor sufficiently to allow manipulation of a needle at the underside of the carpet. At best the work is a tedious laborious process, requiring special skill and onerous muscular effort on the part of the workman. To avoid the trouble and expense of hand sewing, resort is sometimes made to the use of adhesive tape for attaching carpet edges together. The use of adhesive tape sufficiently heavy to fasten the carpet together, however, may cause the edges to bulge or to form unsightly ridges or may not be durable. At best all the operations of such processes are manual and are subject to irregularities. Also, for acceptable results expert and experienced workmanship are required.

To reduce as much as possible a reliance on manual operations, carpet strips have heretofore been sewn together by a machine having a guide rail to which the carpet edges are clamped and along which a frame carrying the sewing mechanisms moves. Guide rail machines, besides being of heavy cumbersome construction, require clamping the carpet edges in registering relation so that a flat position cannot be maintained on a floor surface. After sewing the carpet edges in registering relation they are opened out to bring them into flat abutting relation. The movement of carpet strips in this way requires special handling and subjects the stitches and carpet to excessive strains before it is laid on the floor surface.

The objects of the present invention are to reduce to a minimum all manual operations in laying carpets, handling of the carpet material being avoided other than laying strips upon a floor surface in approximate positions at which they are to rest and to provide a machine which will be subject to accurate control by an inexperienced operator while attaching the edges of an adjacent pair of flexible strips of material together securely in abutting relation, the production of visible irregularities being avoided and a strip being inserted comparing favorably in uniformity of appearance with the highest quality of hand sewn work. Other objects of the invention are to simplify and improve sewing and fastening machines of the type which are movable over stationary work pieces to secure the work pieces together and to provide a machine by which carpets and other heavy material of large area may be sewn together conveniently and securely in the positions in which they are to lie permanently.

In the illustrated embodiment of the invention an ambulant fastening machine is arranged to traverse freely in a progressive manner along a supporting surface between two strips of carpet or other flexible sheet material disposed with their edges in abutting relation and with their tread surfaces up, said machine having a shallow base shaped for raising the edges from the supporting surface to enable the base to pass between them and a complete set of fastening and feeding devices mounted wholly in said base to apply fastenings to the supporting surface and to the raised portions of the sheet material. As hereinafter described the fastening devices are actuated by mechanisms projecting from the base which preferably is wedge shaped and has a trailing end of tapering thickness, within which are mounted connections spaced from the point of application of the fastenings in line with the edges of the sheet material. In the illustrated form of this feature a narrow column is provided along the mid-section of the base surrounding the connections and forms a mounting for the actuating mechanisms.

The invention includes certain novel constructions, combinations, and arrangement of parts hereinafter described and claimed, as for example, novel means for drawing the strips edge-wise toward each other at the point of fastening operations, a trough formation in the base within which the fastening devices operate and other features, the advantages of which will be apparent to those skilled in the art from the following description taken in connection with the accompanying drawings which illustrate a specific embodiment of the several features of the invention.

Referring to the drawings,
Fig. 1a is a perspective view of a carpet sewing machine embodying the features of the present invention, showing the manner of its use;

Fig. 1 is a view in left side elevation of the machine, control handle parts having been broken and foreshortened for convenience of illustration;

Fig. 2 is a plan view on an enlarged scale of the machine illustrated in Fig. 1a with parts broken away and shown in section;

Fig. 3 is a view in front elevation of the machine of Figs. 1 and 2;

Fig. 3a is a fragmentary view of a cam employed in the machine;

Fig. 4 is a sectional plan view of the base of the machine;

Fig. 5 is a partial lengthwise section of the tapering trailing end of the base of the machine;

Fig. 6 is a detail view on an enlarged scale taken along the line VI—VI of Fig. 5;

Fig. 7 is a detail view taken along the line VII—VII of Fig. 5;

Fig. 8 is a view in side elevation of the parts illustrated in Fig. 7;

Fig. 9 is a sectional view of the base taken along the line IX—IX of Fig. 5;

Fig. 10 is a sectional detail view of a driven carpet feed roll taken along the line X—X of Fig. 9;

Fig. 11 is a similar view taken from the right side of the parts shown in Fig. 10;

Fig. 12 is a detail sectional view of the presser foot actuating mechanism of the machine taken along the line XII—XII of Fig. 1;

Figs. 13 and 14 are detail views illustrating a manner of stitch formation in the machine, Fig. 13 showing the step of tightening the loop of the thread and Fig. 14 the step of tightening the needle thread;

Fig. 15 is an end view of a seam inserted by the machine including a tape reinforcement applied during sewing;

Fig. 16 is a sectional view on an enlarged scale taken along the line XVI—XVI of Fig. 5;

Fig. 17 is a similar view on a further enlarged scale taken along the line XVII—XVII of Fig. 1 as seen from a plane passing through the sewing point;

Fig. 18 is a similar view taken along the line XVIII—XVIII of Fig. 5, and

Fig. 19 is a plan view of an enlarged scale of the tapered trailing end of the base of the machine with the cover for the stitch forming devices removed.

The illustrated machine is intended primarily for fastening operations upon adjacent strips of carpet material presented tread side up to eliminate most of the hand sewing or other handling work in laying carpets, with close and accurate control afforded to an operator both in applying fastenings in the form of a continuous thread seam and in pulling the edges of the carpet strips edgewise together in a progressive manner during the sewing operation. For this purpose the machine is constructed in a readily ambulant form to allow easy traversal in any direction along a supporting floor surface with the seam concealed at the supporting surface side of the material. Thus, after finishing the sewing operation, no further adjustments or onerous effort are required to bring the completed carpet into the desired position along the floor surface.

In preparing for a sewing operation, strips of carpet are laid with their edges in approximate abutting relation over the entire floor area to be carpeted. The machine is motor driven and subject to manual propulsion through a pair of control handles 2 and 4 which permit the operator to assume an upright position from which he can observe closely the sewing operations on the edges of a pair of abutting carpet strips. The handles 2 and 4 rise from a flat bottomed base 6 on which the mechanisms for the machine are mounted. With the illustrated machine the carpet strips will be matched for alinement of designs as in hand sewing and the machine will be inserted between the edges of the strips as closely as possible to the strip ends, the machine facing away from the ends. The base both raises and separates the edges prior to the point of operation and then they are brought positively into abutting relation at the point of sewing operation.

To enable the edges of abutting carpet strips to be raised by the machine without disturbing the positions of the strips along the floor surface, indicated at 6, on which the strips lie, according to a feature of the present invention, the base 6 for the machine is of relatively shallow wedge shape at its front advancing end and convex with a bulging turtle-back form along its mid-section from which it rises a narrower supporting column 10 centered upon the base and extending lengthwise thereof in line with the point of operation of the sewing devices. The column does not extend the full length of the base and the edges of the carpet being operated on are along the sides of the column. The width of the column transversely of the carpet strip edges is made sufficiently small to fit between the separated edges of the strips as they are raised from the floor surface by the base without deflecting them excessively or requiring edgewise movement of the carpet strips along the floor surface to bring them thereafter into edge abutting relation. With such dimensions the base and column pass between the separated edges as the stitch forming devices operate at a point spaced along the carpet edges from the column in line with the direction of progress along the carpet edges. The trailing end of the base contains within it all the elements of a complete set of stitch forming devices necessary to form a seam at the supporting floor surface side of the carpet strips and has a tapering thickness projecting to the rear of the column to enable the carpet strips to be brought downwardly together into line with the stitch forming devices at the point of operation thereof, and finally against the floor surface without the formation of bulges or extreme curved surfaces in the carpet material as the base moves between the material and the floor surface. The base 6 slides along the floor surface at its trailing end and its weight is supported by anti-friction casters 11 at its leading end (see Fig. 1).

For assistance in propelling the edges of the carpet strips in the novel machine it is fed relatively to the abutting carpet edges by power from the motor drive during sewing, the carpet edges being drawn into and along the sides of a V-shaped 12 (see Figs. 2, 4, 16 and 17) formed in the trailing end of the base 6 beyond, and also aligned with the column 10. The stitch forming devices operate to insert a two-thread chain stitch seam while the carpet edges are clamped within the V of the trough. To line up the abutting edges accurately within the trough the base carries a block 14 (see Figs. 5, 16 and 18) to which is attached a plate 15 forming a portion of the trough from the upper surface of which projects a vertical centering fin. The column, being located in advance of the sewing
point, also assists in lining up the carpet edges with the trough 12. The stitches are inserted blind with the chain of the seam exposed at the underside of the trough 12, and the single thread exposed along the underside of the other strip. During operation of the stitch forming device the carpet edges are held clamped within the trough by a presser foot 18 consisting of a pointed block screwed to a yoke 20, riveted to the ends of a pair of parallel arms 22, each of which is pivotally mounted at their rearward ends about a pin 24 passing horizontally through the column.

Cooperating with the presser foot 18 in clamping the abutting carpet edges immovably against each other close to the sewing point, to feed the edges after each stitch is inserted and to assist in drawing the edges toward each other and away from the column 16 into firm engagement with the centering fin on the plate 18, the base is provided along the sides of the trough 12 in advance of the sewing point with a pair of angular oppositely disposed guideways 26 within the plate 18 and the shell of the base for receiving a pair of roughened carpet engaging feed slides 28 having their forward ends approaching closely to the sewing point. The angularly disposed guideways cooperate with the feed slides 28 in converging paths toward the sewing point, producing a drawing action on the carpet edges toward each other as they are fed.

Cooperating with the roughened portions of the feed slides to feed the carpet edges are a pair of yieldingly mounted feed feet 30 in the form of blocks secured to the lower ends of a hairpin-shaped spring 32 having a sleeve 34 clamped by a bolt 36 between the central portions of its arms. The sleeve 34 is loosely received on openings at the rearward ends of a pair of reversely bent arms 38 (see Figs. 1 and 2), the forward ends of which are rotatable on the pin 24. The upper end of the hairpin spring 32 is pivotally connected with the enlarged headed end of a horizontal spring actuated rod 40, the spring 42 on which is compressed between the head of the rod and a plate 44 having ears at its lower end riveted to the arms 38 and an opening at its upper end to receive the rod 40. To limit the expansion of the spring 42 and to hold the feed feet 30 in fixed position while disengaged from the carpet edges, the rod 40 has at its rearward end a pair of check nuts 46 cooperating with the plate 44. The arrangement is such that when the feed feet are pressed against carpet edges engaging the feed slides 28 they will swing yieldingly with the carpet edges and when disengaged from the carpet edges they will be returned to their starting positions. The yielding action of the hairpin spring 32 allows the presser feet to move individually toward each other as the carpet edges engaged by the inclined slides 28 move together. The presser and feed feet 18, 30 are alternately brought into clamping engagement with the carpet edges and are arranged to be moved out of engagement with the edges for removal or reinsertion of work by connections hereinafter to be described.

In operating the machine it is moved progressively along the floor surface on which the carpet strips are laid, partly by the feeding devices in the machine and partly by forward pressure on the control handles 2 and 4. In case the carpet strips are not accurately located with relation to each other or the machine is not centered properly between them a supplementary pulling action may be applied or the pulling means rendered inoperative selectively to assist the feed of the strips by downward pressure on the manual control handles 2 and 4. The handles extend upwardly at an angle of approximately 30° to the floor surface and are provided with fixture arms 48 pivotally mounted at their forward ends on a shaft 50 extending transversely of the machine clear of the end of the feed slide and feed feet, little or no effort on the part of the operator being required to maintain steady progress. When one or both of the carpet strips, however, have been somewhat displaced from accurate abutting relation it may be necessary to depress either of the handles and bring the pressing rolls against the carpet strips,
drawing them transversely of the direction of feed toward each other so that when they reach the feed slides, proper feeding movement is insured.

The mechanism for actuating the driven pulling rolls 62 comprises a ratchet wheel 68 secured to one end of each roll, a driving pawl 68 engaging each ratchet wheel and spring-pressed detent 70 pivotally mounted at 72 on downwardly extending lugs on the base 6. Each pawl 68 is pivotally mounted on a bolt 74 secured to an arm 76 rotate loosely on the shaft 64 of each driven roll 62. Each bolt 74 has projecting from one end a spherical head surrounded by a socket at one end of a link 78. The other end of each link 78 is similarly connected by means of a socket surrounding the ball headed end of a bolt 80 secured to an arm 82 extending downwardly from a horizontal rock shaft 84 rotatable in the base 6 carrying both arms 82. Rocking movement of the shaft 84 imparts a swinging movement to the arms 76, causing the pawls 68 to rotate the ratchet wheels 68, each bolt 74 carrying a spring 86 acting to keep the pawl in engagement with its ratchet wheel. During return idle movement of each pawl 68 the detents 70 prevent reverse rotation of the ratchet wheels, thus insuring continuous step-by-step rotation of the driven rolls 62.

As best shown in Fig. 17, the stitch forming devices of the machine include a curved eye-pointed needle 88 secured to a segmental arm 90 projecting from an inclined hollow shaft 92 rotatably mounted in the base with its needle supporting end directed downwardly toward the tapering and trailing end of the base. The needle shaft 92 is so mounted that the needle oscillates across the trough 12 close to the presser foot 18, thus insuring that the carpet edges will be intersected by the needle and clamped close to the sewing point. In the construction illustrated, the inclination of the needle shaft 92 is the same as the inclination of the tapered shell of the base within the trough 12 so that full advantage is taken of the space within the base for accommodation of the actuating connections for the needle.

Cooperating with the needle is a straight reciprocating thread carrying loop 94 secured to a block 96 pinned to a rod 98 slidingly mounted within the hollow needle shaft 92. The looper rod extends through the shaft 92 and at its opposite end carries a short rack bar 99 (see Fig. 5) meshing with segmental teeth on one arm of a bell crank lever 102 fulcrumed on a cross shaft 104 having its ends fixed within the column 10. When the needle is at the end of its extreme work penetrating stroke a loop of looper thread is passed through the loop carried by the needle and the looper is moved into the range of a thread arm 106 secured to a shaft 108 rotatably mounted in the base in parallel relation to the inclined needle shaft 92 at one side thereof. The hook of the thread arm 106 is arranged to engage one side of the loop of looper thread so that during the next penetrating stroke of the needle the loop of looper thread will be held in the needle path as illustrated in Fig. 14. After the needle has completed its work penetrating stroke the looper again enters a new loop of thread presented to it, as in Figs. 13 and 7, to initiate the formation of the succeeding stitch. To prevent rotation of the looper shaft the block 96 is slotted at its outer end and surrounds the thread finger shaft 108.

Referring to Fig. 15, in the illustrated form of the chain portion thereof, indicated at 110, is laid along or at the floor engaging surface of one carpet strip 112 and the single thread portion of the seam, indicated at 114, is laid along or at the floor engaging surface of the abutting strip 116. This is the result of the needle entering and emerging from the floor engaging surfaces of both strips 112 and 116 and forming the thickness of the pile of the strips. This type of seam will, therefore, close up the pile between carpet strips so sewn to form a continuous exposed surface.

To prevent bulging at either side of the abutting edges on the carpet strips, reinforcement is applied to the floor engaging surface of the seam. The reinforcement consists of a tape 118 led from above the strips, through the space between the separated edges of the strips and beneath the edges of the carpet strips in advance of the sewing point. This tape is composed of thin woven fabric and preferably is provided with a latent or pressure sensitive adhesive.

To lead reinforcing tape beneath the strip edges it is conducted through properly arranged guides 120, best shown in Figs. 4 and 5, from a supply reel 122 mounted at the side of the machine on pedestals 124 extending from the column 10 (see Fig. 1). The supply reel 122 is laid in a flat position within a shallow hollow pan 126 secured to the pedestals and the tape is led through a slot in the side of the pan and through an angularly disposed guide 128 riveted to the pan at one side of the slot. With the use of a reinforcing tape in the seam a secure fastening is obtained on the fabric portion of the carpet, both above it to prevent separation of the carpet pile and below it to prevent bulging of the carpet along the sides of the seam. It is particularly advantageous to use a reinforcing tape where relatively heavy tensions are applied to the sewing thread, the tape acting to hold the seam in flattened condition.

The re-enforcing tape 118 is led beneath the centering fin and the feed slides. For this purpose the base of the pan is slotted at 129 (see Figs. 4 and 5) and the block 14 is grooved along its upper surface to receive the tape. The plate 16 fits over and closes the groove on the block 16 to form a cover for the tape. The tape 16 emerges from the groove in the block beyond the trailing ends of the feed slides 28 where it rises to the level of the trough 12 (see Fig. 19).

For tensioning the threads they are led from a suitable source of supply through tension devices 130 and 132 (see Figs. 17 and 19). Both the tension devices consist of a pair of spring pressed disks mounted upon reversely bent metal strapes 134 secured within the base 6. The supply threads are conducted to the tension devices 130 and 132 through a pair of parallel tubes 135 extending from the trailing end of the base to the leading end thereof and upwardly through a supply bracket 138 into the central openings of a pair of hollow spindles 140 secured to the bracket 138. The bracket 138 is bolted to the leading end of the base 6 and is formed with a pair of circular platforms on which are supported tubular thread supply cops 142 surrounded by sleeves 144 fixed to the thread spindles 140 and connected to the thread leading from the outer surfaces of the cops through the hollow spindles and the conducting tubes 136.

The mechanisms for actuating the stitch forming, work clamping and feeding devices project from the base and are mounted at the upper end of the column 10 with their connections running more or less vertically into the base at a location.
between the ends of the base 6, the connections being surrounded by the column 10 which is located in the path of operation of the stitch forming device. There is rotatably mounted in the column about an axis inclined somewhat from the horizontal and parallel to the needle shaft 92 a cam shaft 146. The cam shaft has secured thereon a pair of slotted cans 148 and a pair of open cans 140. A cam shaft 144 is driven through a set of reduction gears 152 from an electrical motor 154 mounted at the top of the column 10. Thus, all of the power applying and actuating mechanisms are mounted on the column above the level of the carpet edges at a position where the operation of the mechanisms may be observed readily and adjusted conveniently by the machine operator.

The mechanism for alternately actuating the presser and feed feet downwardly with yielding pressures into engagement with the carpet strips includes the cans 150. The rearmost of these cans has engaging its periphery a follower roll 156 carried by a plate-like bell crank 158 (see Fig. 12) rotatable on a fulcrum shaft 160 secured in the upper portion of the column 10. The bell crank has a horizontal arm to which is pivotally connected a looper rod 159 having a slotted enlargement (see Fig. 6) to one side of which is fixed a rack bar 202 meshing with a pinion 204 fixed to the needle shaft 92. The slotted enlargement is of sufficient size to admit the needle shaft and is of a length to cause proper rotation of the needle shaft when the link 200 is reciprocated.

The mechanism for actuating the looper acts to reciprocate the rod 96 through the rack bar 106, the toothed bell crank lever 102 for which has connected at either side a tension spring 206 to insure proper mesh between the teeth thereon. The connections for this mechanism include a link 208 pivotally connected at its lower end with the bell crank lever and at its upper end with a bell crank lever 210 carrying a follower roll 212. The follower roll 212 engages a slot in the foremost cam 148.

The thread arm actuating mechanism comprises the shaft 108 to which the thread arm is secured, a D-shaped arm 214 (Figs. 7 and 8) secured to the forward end of the shaft in such angular relation that it will revolve through the opening in the arm, and a link 216 pivotally connected at its lower end to the arm 214 and reversely bent to avoid contact with the looper rod 96. The upper end of the link 216 is pivotally connected to the horizontal arm of a bell crank 218 having a follower roll 220 engaging a slot in the rearward cam 148.

To actuate the driven pulling rolls 62 mechanism is provided including the shaft 84 on the central part of which is fixed an arm 222 having pivotally connected to it the lower end of a link 224, the upper end of which is connected to a bell crank 226. The outline of the bell crank 226 is indicated in Fig. 3 and is illustrative of the shapes of the other bell cranks on the fulcrum shaft 160 including the bell cranks 156 and 218. The bell crank 226 carries a follower roll 228 engaging a slot in the forward cam 148.

To actuate the feed slides 28 they are formed with toothed enlargements along their under-surfaces, the teeth of which mesh with teeth on interrupted pinions 230 meshing in turn with those on the upper surface of a sliding bar 232 retained within a guide way 234 (see Fig. 9) on the lower shell wall of the base. The sliding bar 232 at its forward end has secured to it a toothed block 236 (see Fig. 5) meshing with gear teeth cut in the hub of the arm 222. The pinions 230 act to reverse the movement of the sliding bar 232 and to cause both the pulling rolls and the feed slides to act in feeding the carpet strips at the same time during each sewing cycle.

To enable edge portions of carpet strips to be released or inserted in the machine with their edges in abutting relation at the sewing point in preparation for a sewing operation, the feed and presser-feet are raised manually together. This is accomplished by means acting on the bell cranks 156 and 176 which are formed along their central portions with openings 238 (Fig. 12) through which pass the eccentric portion of an eccentric shaft 240 at the rearward end of which is a hand lever 242. The eccentric shaft 240 is rotatably mounted in a bearing formed at the upper end of the column 10 and is retained within the bearing by a set screw 244 entering a neck in the shaft (see Fig. 2). When the eccentric shaft is in the position of Fig. 12 the presser and feed
feet operate in the usual manner to clamp the carpet strips. When the lever 242 is rotated 180° the bell cranks 158 and 159 are both rocked simultaneously in a clockwise direction.

After a seam is completed the presser and feed feet operate manually to engage with the carpet strips to release them and the final loop of looper thread is severed within its sight to prevent unraveling of the seam upon removal of the carpet strips from the machine. For this purpose the machine is provided with a treadl cutter cooperating with the thread arm 196. When the thread arm is given a manual supplemental movement the thread is carried against a stationary knife blade 246 (see Fig. 17) mounted inside the upper wall of the base 6. To give the thread arm its supplemental thread cutting movement the thread arm actuating slot in the rear cam 148 is formed with an enlarged portion 247 of a width greater than that of the cam roll 220. The bell crank 218 is provided with an upstanding handle 248 (see Fig. 3) to enable the thread arm to be moved manually when the cam shaft is in a position with the roll engaging the enlarged portion 247 of the cam slot. The enlarged portion of the slot is located in the cam that the looper and thread arm will be in proper cooperative relation to insure the desired result when the cam follower arm is given its supplemental movement. Accordingly, when the handle 248 is moved outwards the thread will be carried against the cutting edge of the knife 246. The sewn carpet strips are then removed from the machine, withdrawing with them a length of new thread which may be regarded as a stitch or set of stitches, provision being made for their edges disposed in overlapping relation, the plate 16 is removed and a substitute inserted having no centering fin. The strips may then be sewn with the needle passing through each edge twice.

The nature and scope of the invention having been indicated and a particular embodiment having been described what is claimed is:

1. An ambulant machine for fastening together the edge portions of flexible sheet material disposed on a supporting surface, said machine being arranged to traverse said surface in a progressive manner comprising a sliding carriage for raising the edge portions of the material operated upon from the supporting surface engaging side thereof, in combination with a complete set of fastening devices mounted wholly within said base, constructed and arranged to apply fastenings to the raised portions of sheet material concealed at the supporting surface engaging side thereof.

2. An ambulant machine for fastening together the edge portions of flexible sheet material disposed on a supporting surface, said machine having a shallow base, wedge shaped at its advancing end to raise the edge portions of the sheet material from the supporting surface, with a trailing end of tapering thickness, in combination with fastening and feeding devices in the tapering end of the base constructed and arranged to apply fastenings to the raised portions of the sheet material and to feed the material relatively to the machine as the fastenings are inserted, and actuating mechanisms for the fastening and feeding devices projecting from the base and having connections spaced from the point of application of the fastening devices in line with the edge portions of the sheet material at the point where the fastening devices operate.

3. An ambulant machine for fastening together the edge portions of flexible sheet material dis-
posed on a supporting surface, said machine having a shallow base, wedge shaped at its advancing end to raise the edge portions of the sheet material from the supporting surface, with a trailing end of tapering thickness, in combination with fastening and feeding devices in the tapering end of the base constructed and arranged to insert fastenings within the raised portions of the sheet material and to feed the material relatively to the machine as the fastenings are inserted, actuating mechanisms for the fastening and feeding devices projecting from the base and having connections spaced from the point of application of the fastening devices in line with the edge portions of the sheet material at the point where the fastening devices operate, and a narrow column along the mid-section of the base surrounding the connections and providing a mounting for the actuating mechanisms.

4. An ambulant machine for fastening together the edge portions of flexible sheet material disposed on a supporting surface, said machine having a shallow base, wedge shaped at its advancing end to raise the edge portions of the sheet material from the supporting surface, with a trailing end of tapering thickness, in combination with fastening and feeding devices in the tapering end of the base constructed and arranged to insert fastenings within the raised portions of the sheet material and to feed the material relatively to the machine as the fastenings are inserted, and actuating mechanisms for the fastening and feeding devices projecting from the base and having connections spaced from the point of application of the fastening devices in line with the edge portions of the sheet material at the point where the fastening devices operate, said feeding devices acting in advance of the point of operation of the fastening devices to draw the strips of material edgewise toward each other at the point of operation of the fastening devices.

5. A machine for fastening together strips of flexible sheet material disposed with edges in abutting relation upon a supporting surface, said machine having fastening devices and mechanisms for actuating the fastening devices in a progressive manner along the edges of the strips, in combination with a shallow base within which said devices are mounted, said base being wedge shaped at its advancing end for raising the edges of the strips from the floor surface with a tapering thickness along its trailing end having a trough within which the stitch forming devices operate, a pair of carpet feeding members mounted in the trough of the base and angularly disposed guideways for the carpet engaging members for guiding the movements of said members in converging paths to feed the carpet edges with a drawing action toward each other along the trough.

6. A machine for fastening together strips of carpet disposed with edges in abutting relation upon a floor surface, said machine having stitch forming devices acting in a progressive manner along the edges of said strips, in combination with a shallow base within which said devices are mounted, said base being wedge shaped at its advancing end for raising the edges of the strips from the floor surface with a tapering thickness along its trailing end having a trough within which the stitch forming devices operate, and separate carpet engaging members guided along converging paths in the base at the sides of the trough to feed the edges against each other along the trough.

7. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, said machine having stitch forming devices acting in a progressive manner along the edges of said strips, in combination with a shallow base within which said devices are mounted, said base being wedge shaped at its advancing end for raising the edges of the strips from the floor surface with a tapering thickness along its trailing end having a trough within which the stitch forming devices operate, and separate carpet engaging members guided along converging paths in the base at the sides of the trough to feed the edges against each other along the trough.

8. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, said machine having stitch forming devices acting in a progressive manner along the edges of the strips, in combination with a shallow base within which said devices are mounted, said base being wedge shaped at its advancing end for raising the edges of the strips from the floor surface with a tapering thickness along its trailing end having a trough within which the stitch forming devices operate, a pair of carpet feeding members mounted in the trough of the base and angularly disposed guideways for the carpet engaging members for guiding the movements of said members in converging paths to feed the carpet edges with a drawing action toward each other along the trough.

9. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, said machine having stitch forming devices acting in a progressive manner along the carpet edges, in combination with a hollow base within which said devices are mounted, said base being wedge shaped along its advancing end for raising the edges of the strips from the floor surface with a tapering trailing end having a trough within which the stitch forming devices operate, a pair of carpet feeding members, angularly disposed guideways in the trough of the base for guiding the movements of said members in paths converging toward each other, and a pair of individually movable feet cooperating with the carpet engaging members arranged to move toward each other with said members for feeding the edges of the carpet with a drawing action toward each other along the trough.

10. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having stitch forming devices including a curved needle and mechanisms for actuating the stitch forming devices in a progressive manner along the edges of the strips, in combination with a hollow base formed with a trough across which the needle oscillates, means acting close to the sewing point to clamp the edges of the carpet strips within the trough, and a narrow column on which the actuating mechanisms for the stitch forming devices are mounted, rising from the base in line with the trough and in advance of the point of needle operation to enable formation of a continuous seam by movement of the column between the carpet edges as the needle operates.

11. A machine for sewing together strips of carpet disposed with edges in abutting relation
upon a floor surface, having stitch forming devices including a curved needle and mechanisms for actuating the stitch forming devices in a progressive manner along the edges of the strips, in combination with a hollow base formed with a trough, aligned with the direction of progress of the strips across which the needle oscillates, means acting close to the sewing point to clamp the edges of the carpet strips within the trough, a narrow column on which the actuating mechanisms are mounted, aligned with the trough and the point of needle operation, and devices for feeding the carpet edges away from the column.

12. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having stitch forming devices including a curved needle and mechanisms for actuating the stitch forming devices, in combination with a hollow base formed with a trough across which the needle oscillates, means acting close to the sewing point to clamp the edges of the carpet strips within the trough, a narrow column on which the actuating mechanisms are mounted, aligned with the trough, devices for feeding the carpet edges relatively to the base, comprising a pair of carpet engaging members mounted for movement in paths converging toward each other along the sides of the trough, a narrow column on which the actuating mechanisms are mounted, aligned with the trough, devices for feeding the carpet edges relatively to the base, comprising a pair of carpet engaging members mounted for movement in paths converging toward each other along the sides of the trough, a narrow column on which the actuating mechanisms are mounted, aligned with the trough, devices for feeding the carpet edges relatively to the base, comprising a pair of carpet engaging members movable in the direction of feed, feed for clamping the carpet strips against said members and pulling rolls acting on the carpet in advance of the point engaged by said members to assist in the feed of the carpet strips.

13. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having stitch forming devices including a curved needle and mechanisms for actuating the stitch forming devices, in combination with a hollow base formed with a trough across which the needle oscillates, means acting close to the sewing point to clamp the edges of the carpet strips within the trough, a narrow column on which the actuating mechanisms are mounted, aligned with the trough, devices for feeding the carpet edges relatively to the base, comprising a pair of carpet engaging members mounted for movement in paths converging toward each other along the sides of the trough, a narrow column on which the actuating mechanisms are mounted, aligned with the trough, devices for feeding the carpet edges relatively to the base, comprising a pair of carpet engaging members movable in the direction of feed, feed for clamping the carpet strips against said members and pulling rolls acting on the carpet in advance of the point engaged by said members to assist in the feed of the carpet strips.

14. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having stitch forming devices including a curved needle and mechanisms for actuating the stitch forming devices, in combination with a hollow base formed with a trough across which the needle oscillates, means acting close to the sewing point to clamp the edges of the carpet strips within the trough, a narrow column on which the actuating mechanisms are mounted, aligned with the trough, devices for feeding the carpet edges relatively to the base, comprising a pair of carpet engaging members mounted for movement in paths converging toward each other along the sides of the trough, a narrow column on which the actuating mechanisms are mounted, aligned with the trough, devices for feeding the carpet edges relatively to the base, comprising a pair of carpet engaging members movable in the direction of feed, feed for clamping the carpet strips against said members and pulling rolls acting on the carpet in advance of the point engaged by said members to assist in the feed of the carpet strips.
nisms are mounted, aligned with the trough, devices for feeding the carpet edges relatively to the base comprising pulling rolls acting on the carpet in advance of the point engaged by said members to feed the carpet strips, manually controlled and mounting shafts for the rolls disposed at an angle to each other to cause the rolls to draw the edges of the carpet strips toward each other as well as in the direction of feed.

20. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having stitch forming devices including a curved needle and mechanisms for actuating the stitch forming devices, in combination with a hollow base formed with a trough across which the needle oscillates, means acting close to the sewing point to clamp the edges of the carpet strips within the trough, a narrow column on which the actuating mechanisms are mounted, aligned with the trough, devices for feeding the carpet edges relatively to the base comprising pulling rolls acting on the carpet in advance of the point engaged by said members to feed the carpet strips, manually controlled and separately movable handles for guiding the movements of the machine between the carpet edges, and mounting shafts for the rolls operatively connected to the handles to enable the rolls to be rendered inoperative selectively.

21. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having stitch forming devices including a curved needle and mechanisms for actuating the stitch forming devices, in combination with a hollow base formed with a trough across which the needle oscillates, means acting close to the sewing point to clamp the edges of the carpet strips within the trough, a narrow column on which the actuating mechanisms are mounted, aligned with the trough, devices for feeding the carpet edges relatively to the base comprising pulling rolls acting on the carpet in advance of the point engaged by said members to feed the carpet strips, a handle for guiding the movements of the machine between the carpet strip edges, a horizontal shaft extending transversely to the direction of feed of the machine on which the handle is mounted, and a mounting shaft for one of the rolls on the handle to enable said roll to be rendered selectively operative or inoperative.

22. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having stitch forming devices including a needle and mechanisms for actuating the stitch forming devices, in combination with a hollow base formed with a trough at one end intersected by the needle, a narrow column on which the actuating mechanisms are mounted aligned with the trough, devices for feeding the carpet relatively to the base toward the trough comprising two pairs of pulling rolls, one pair at each side of the base, a handle at each side of the base on which one of each pair of pulling rolls is rotatably mounted and a shaft extending transversely to the direction of feed of the machine on which the handles are mounted to enable the rolls at either side of the base selectively to be engaged with a carpet strip.

17

18

in combination with a movable shallow base within which all of said devices are mounted to enable fastenings to be inserted from the supporting surface engaging side of the material, a roll engaging a strip of material at one side of the base for drawing the edge of that strip toward the edge of the other strip and mechanism for actuating the roll to pull the machine along the strips in the direction of progress of the fastening devices.

24. A machine for fastening together strips of flexible sheet material disposed upon a supporting surface, having fastening devices acting progressively along the edges of the strips, in combination with a movable shallow base on said surface within which all of said devices are mounted to enable fastenings to be inserted from the supporting surface side of the material, rolls at either side of the base and mechanism for actuating the rolls to draw the edges of the material into abutting relation with each other and to pull the machine along in the direction of progress of the fastening devices.

25. A machine for fastening together strips of flexible sheet material disposed upon a supporting surface, having fastening devices acting along the edges of the strips, in combination with a shallow base within which said devices are mounted to enable fastenings to be inserted from the supporting surface side of the material, pulling rolls at either side of the base to draw the edges of the material toward each other, and handles for engaging or disengaging the rolls selectively from the strips.

26. A machine for fastening together strips of flexible sheet material disposed upon a supporting surface, having fastening devices acting along the edges of the strips, in combination with a shallow base within which said devices are mounted to enable fastenings to be inserted from the supporting surface side of the material, a pulling roll engaging a strip of material at each side of the base for drawing the edge of one strip toward the edge of the other strip, handles for engaging or disengaging the rolls selectively from the strip, and a mounting for the rolls on the handles comprising arcurate guideways and slides on the guideways to change the angles at which the rolls act.

27. A machine for fastening together strips of flexible sheet material disposed upon a supporting surface, having fastening devices acting along the edges of the strips, in combination with a shallow base within which said devices are mounted to enable fastenings to be inserted from the supporting surface side of said material, and a pair of pulling rolls, one within the base and the other above the base at one side thereof for drawing one strip toward the other, one of said rolls being driven and formed with axial corrugations and the other of said rolls acting to expel the material against the driven roll and being formed with circumferential corrugations to give direction to the pulling action, and means for adjusting the angle of the pressing roll with relation to the driven roll.

28. A machine for fastening together strips of flexible sheet material disposed upon a supporting surface, having fastening devices acting along the edges of the strips, in combination with a shallow base within which said devices are mounted to enable fastenings to be inserted from the supporting surface side of said material, a pair of pulling rolls, one within the base and the other above the base at one side thereof for draw-
ing one strip toward the other, one of said rolls being driven and formed with axial corrugations and the other of said rolls acting to press the material against the driven roll and being formed with circumferential corrugations to give direction to the pulling action, and means for adjusting the angle of the pressing roll with relation to the driven roll comprising an arcuate guideway and a slide on the guideway for rotatably supporting the pressing roll.

29. A machine for fastening flexible material, having fastening devices, in combination with a base for the fastening devices and a pair of pulling rolls for feeding the material past the fastening devices and for drawing the material in a direction transverse to the feed, one of said rolls being driven and formed with axial corrugations and the other of said rolls acting to press the material against the driven roll and being formed with circumferential corrugations to give direction to the pulling action, and means for adjusting the angular relation of the pressing roll with respect to the driven roll.

30. A machine for fastening together strips of flexible sheet material disposed upon a supporting surface, having fastening devices acting along the edges of the strips, in combination with a shallow base within which said devices are mounted to enable fastenings to be inserted from the supporting surface side of material, a pair of pulling rolls, one within the base and the other above the base at one side thereof for drawing one strip toward the other and a through roll within the base for driving the roll therein.

32. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having stitch forming devices including a curved needle and mechanisms for actuating the stitch forming devices, in combination with a hollow base formed with a trough across which the needle oscillates, means acting close to the sewing point to clamp the edges of the carpet strips within the trough, a narrow column on which the actuating mechanisms are mounted, allied with the trough, devices for feeding the carpet edges relatively to the base comprising pulling rolls acting on the carpet in advance of the point engaged by said members to feed the carpet strips, control handles pivotally mounted at the sides of the base for selectively rendering the pulling rolls inoperative and a tie rod to connect the levers to hold them from separating movement.

33. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having one eye-pointed needle and other stitch forming devices, in combination with a hollow base formed with a trough across which the needle moves to penetrate and emerge from the floor surface sides of the carpet strips, and a thread cutter within the base for severing the thread to prevent unraveling of the seam upon removal of the carpet strips.

34. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having an eye-pointed needle, a thread carrying looper and other stitch forming devices for inserting a chain stitch seam, in combination with a hollow base formed with a trough across which the needlle moves to penetrate and emerge from the floor surface sides of the strips and a thread cutter in the base for severing the looper thread after being passed through a loop of needle threads to prevent unraveling of the seam inserted when the carpet strips are removed from the machine.

35. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having an eye-pointed needle and other stitch forming devices for inserting a chain stitch seam, in combination with a hollow base formed with a trough across which the needle moves to penetrate and emerge from the floor surface sides of the carpet strips, and a thread cutter disposed in the base for actuating means for severing the thread, to prevent unraveling of the seam upon removal of the carpet strips.

36. A machine for sewing together strips of carpet with edges in abutting relation upon a floor surface, having stitch forming devices, in combination with a hollow base formed with a trough to receive the edges of the carpet strips during sewing, and means acting close to the point of sewing operations to clamp the edges of the carpet strips within the trough, comprising presser and clamping feet operating alternately against the carpet, and manually operable means to raise said feet simultaneously to release the carpet strips from the machine.

37. A machine for sewing together strips of carpet with edges in abutting relation upon a floor surface, having stitch forming devices, in combination with a hollow base formed with a trough to receive the edges of the carpet strips during sewing, and means acting close to the point of sewing operations to clamp the edges of the carpet strips within the trough, comprising presser and clamping feet operating alternately against the carpet, an eccentric member for raising said feet simultaneously to release the carpet strips from the machine, and a manually operable lever for rotating said member.

38. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having a needle and other stitch forming devices acting in a progressive manner along the edges of the strips, in combination with a hollow base formed with a trough in line with the direction of progress of the stitch forming devices for feeding the needle moves and a detachable cover for the stitch forming devices at the trailing end of the base to provide access to the base for rethreading.

39. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having a tie rod for connecting and power driven mechanisms for actuating the fastening devices, in combination with a base formed to receive the edges of the strips during fastening, handles for guiding the base along the floor surface, having a strip of cloth handle operable to control the power driven mechanism.

40. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having fastening devices,
mechanisms for actuating the fastening devices, and an electrical motor for driving said mechanisms, in combination with a base formed to raise the edges of the strips during fastening, handles for guiding the base along the floor surface, a movable grip on one of the handles and a rheostat for controlling the speed of the motor connected to said handle grip.

41. A machine for fastening together strips of flexible sheet material disposed with edges in abutting relation upon a supporting surface, having fastening devices acting in a progressive manner along the edges of said strips, in combination with a supporting surface engaging base within which said devices are mounted shaped with a wedge shaped advancing end for raising the edges of the strips from the supporting surface and a trailing end of tapering thickness in which the fastening devices are mounted to enable fastenings to be inserted from the supporting surface side of the strip material, and mechanism for actuating the fastening devices including a shaft in the base inclined downwardly toward the supporting surface at the tapering end of the base.

42. A machine for fastening together strips of flexible sheet material disposed with edges in abutting relation upon a supporting surface, having a curved needle and other stitch forming devices acting in a progressive manner along the edges of said strips, in combination with a supporting surface engaging base within which said devices are mounted shaped with a wedge shaped advancing end for raising the edges of the strips from the supporting surface and a trailing end in which the fastening devices are located to enable the needle to act upon the edges of the strips passing over the base, mechanisms for actuating the stitch forming devices including a needle supporting shaft in the base inclined downwardly toward the supporting surface at the trailing end of the base to enable a formation of a tapering thickness at said trailing end of the base.

43. A machine for sewing together strips of flexible sheet material disposed upon a supporting surface, having a curved needle, a looper and other stitch forming devices acting in a progressive manner along the edges of said strips, in combination with a supporting surface engaging base within which said devices are mounted shaped with a wedge shaped base having a shallow construction of tapering thickness toward one end within which end the stitch forming devices are mounted and a wedge shape at the other end for raising the edges of the strips from the supporting surface and to enable the needle to act upon the edges of the strips moving over the base as they are brought toward each other after being raised, and mechanisms for actuating the stitch forming devices including a hollow needle supporting shaft in the base inclined downwardly toward the tapering end thereof and a shaft within the needle shaft for actuating the looper.

44. A machine for fastening together the edges of flexible sheet material strips disposed upon a supporting surface, having fastening devices, in combination with a base within which said devices are mounted for raising the edges of the strips progressively from the supporting surface to enable fastenings to be inserted from the supporting surface sides of the strips, and a pair of handles for guiding the machine projecting from the trailing end of the machine at either side of the point of fastening operations to enable an operator to observe the fastening operations while guiding the machine.

45. A machine for sewing together strips of carpet disposed with edges in abutting relation upon a floor surface, having stitch forming devices, in combination with a hollow base within which said devices are mounted, shaped with a turtle back for raising and separating the edges of the strips from each other and from the floor surface and with a trough within which the stitch forming devices operate to fasten the edges together, and guides for directing a reinforcing tape from above the strips between their separated edges and beneath the edges at the point of operation of the stitch forming devices.

46. A freely ambulant sewing machine having upwardly extending handle means, in combination with a movable base with power driven sewing and feeding devices constructed and arranged for assisting the propulsion of the machine over a floor surface, a complete set of said sewing devices being contained within the base to enable strips of carpet material disposed in abutting relation with their tread sides up to be sewn together with a concealed seam directly on said surface.

47. A freely ambulant fastening machine having upwardly extending handle means, in combination with power driven fastening and feeding devices constructed and arranged for assisting the propulsion of the machine over a floor surface, all said fastening devices being contained within the base to enable strips of carpet material disposed in abutting relation on said surface with their tread sides up to be fastened together with a concealed fastening.

48. A machine for fastening together strips of material disposed with edges in abutting relation upon a supporting surface having fastening and feeding devices, in combination with a hollow base within which said devices are mounted, shaped with a turtle back for raising and separating the edges of the strips from each other and from the supporting surface and with a trough within which the fastening devices operate on the edges of the material, and guides for directing a reinforcing tape from above the strips between their separate edges and beneath the edges at the point of operation of the fastening devices.

MERWIN F. ASHLEY.
EDWARD W. FEARING.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>738,054</td>
<td>McNeill et al.</td>
<td>Sept. 1, 1903</td>
</tr>
<tr>
<td>1,347,503</td>
<td>Gatchell</td>
<td>July 27, 1920</td>
</tr>
<tr>
<td>1,399,406</td>
<td>Scott</td>
<td>Dec. 6, 1921</td>
</tr>
<tr>
<td>1,685,915</td>
<td>Baynard</td>
<td>Feb. 14, 1928</td>
</tr>
<tr>
<td>1,714,021</td>
<td>Gury</td>
<td>May 21, 1929</td>
</tr>
<tr>
<td>1,825,642</td>
<td>Maier et al.</td>
<td>Sept. 29, 1931</td>
</tr>
<tr>
<td>2,228,643</td>
<td>Weiss</td>
<td>July 3, 1943</td>
</tr>
<tr>
<td>2,407,907</td>
<td>Scott</td>
<td>Sept. 17, 1946</td>
</tr>
</tbody>
</table>

FOREIGN PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Country</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>20,699</td>
<td>Great Britain</td>
<td>of 1907</td>
</tr>
</tbody>
</table>