Jan. 7, 1969 R. G. GREULICH 3,420,198

NEEDLE BAR AND PRESSER BAR SUBASSEMBLY

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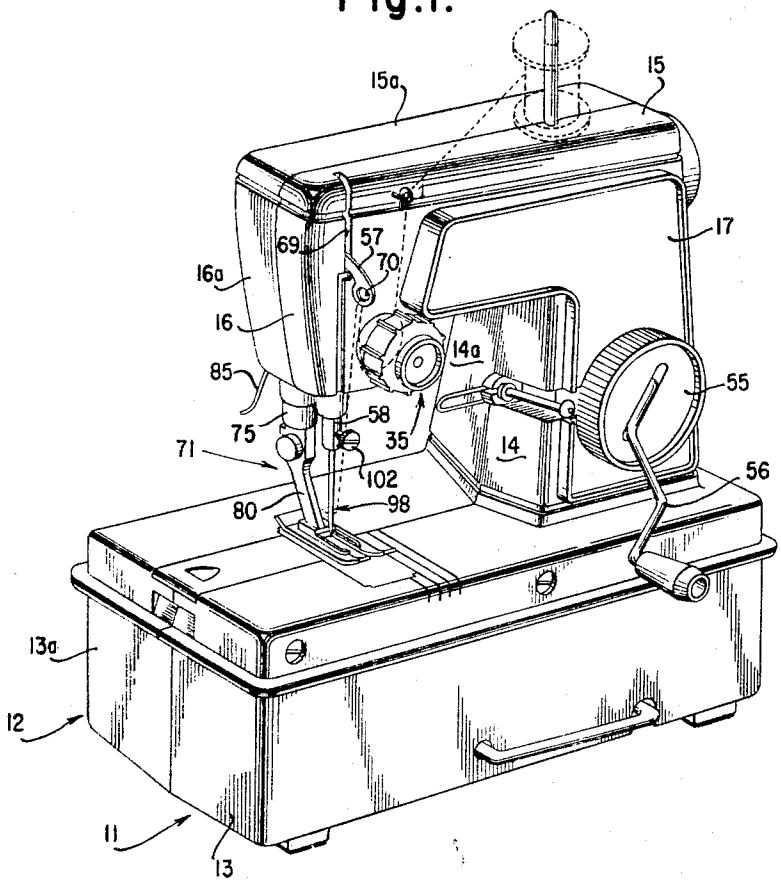
Fig. 1.



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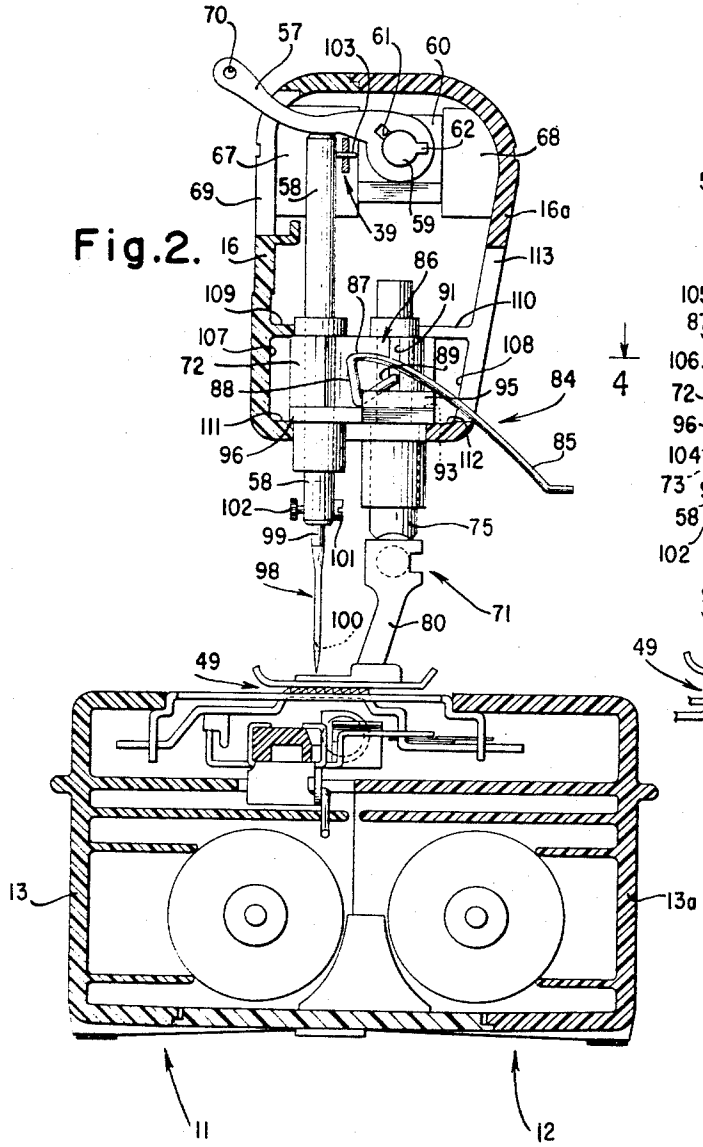

Fig.2.

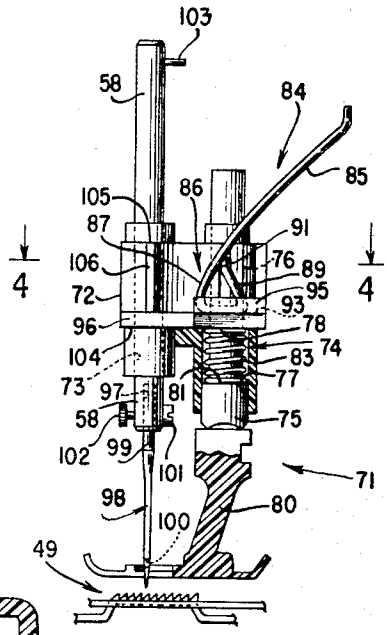

Fig.3.

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Fig.4.

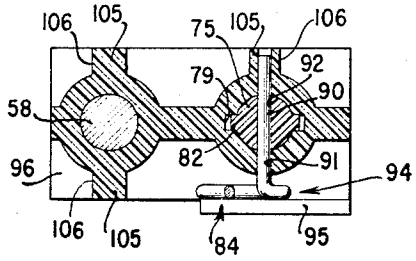

Fig.5.

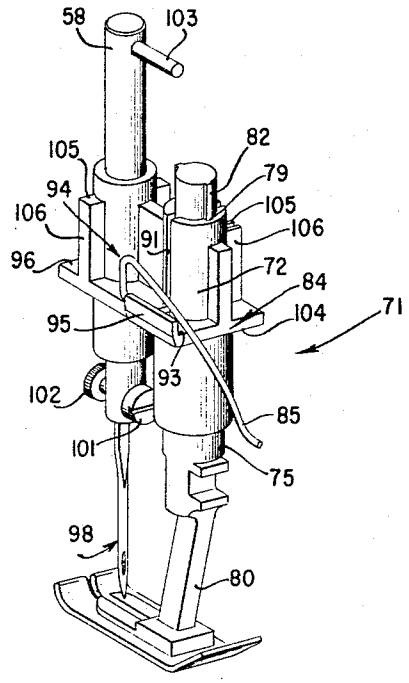

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Fig. 6.

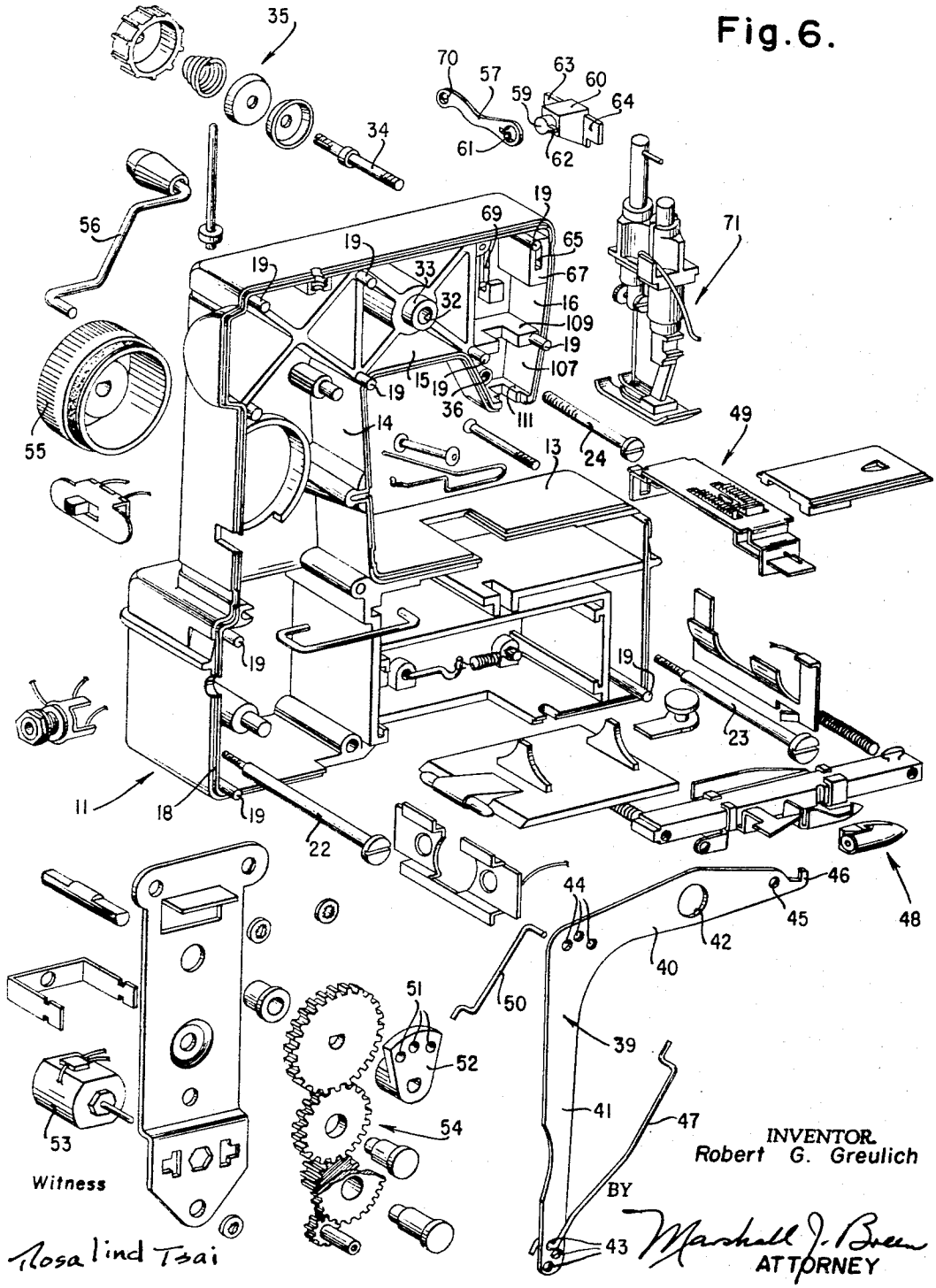

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Fig.8.

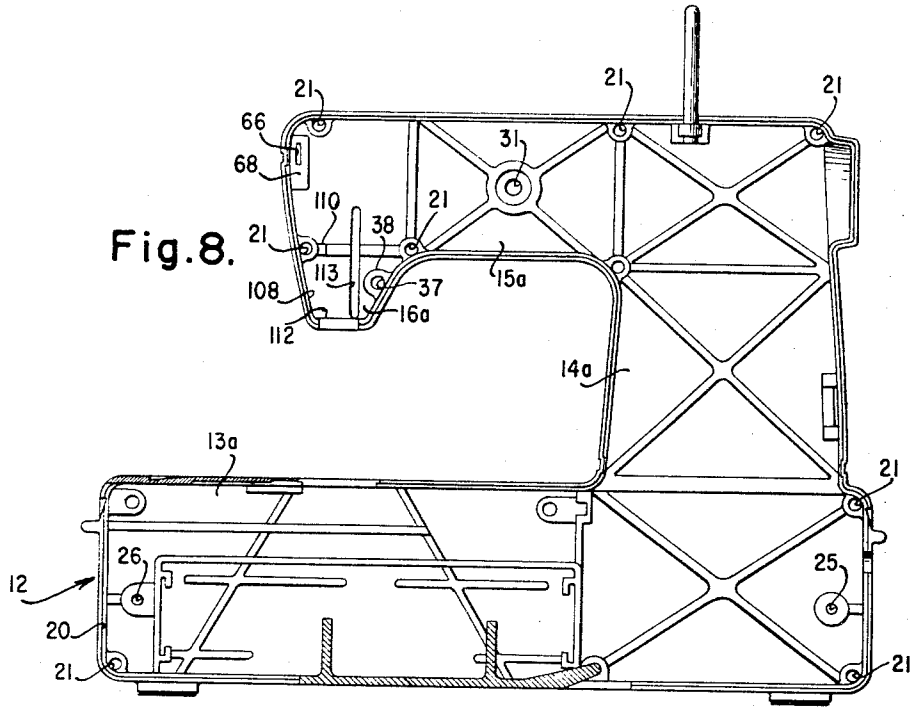
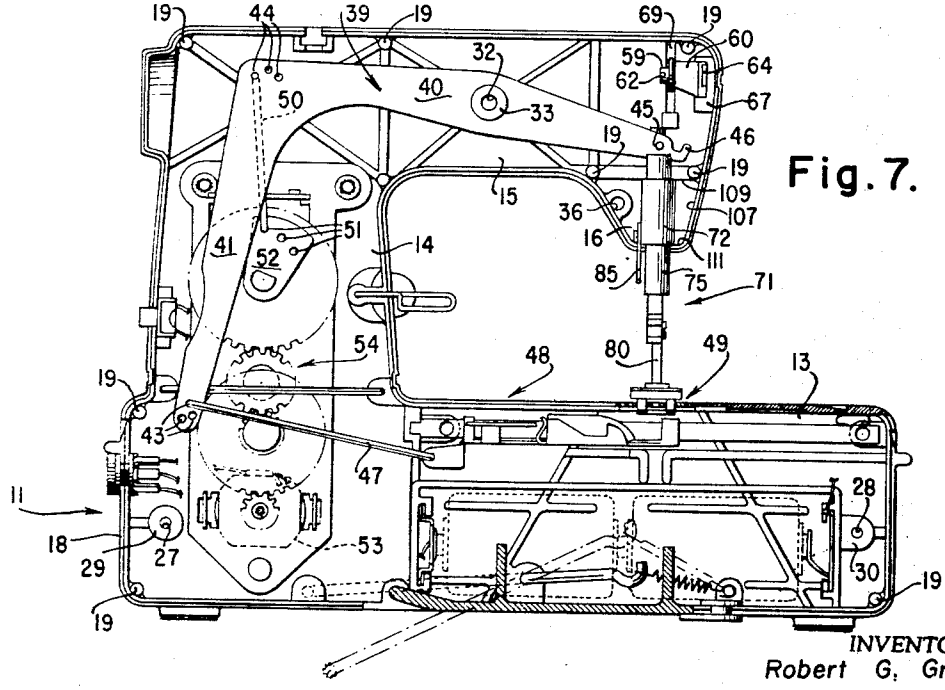


Fig.7.



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United States Patent Office 3,420,198 Patented Jan. 7, 1969

3,420,198

NEEDLE BAR AND PRESSER BAR SUBASSEMBLY

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Filed Apr. 17, 1967, Ser. No. 631,271
U.S. Cl. 112—238 4 Claims
Int. Cl. D05b 29/00

ABSTRACT OF THE DISCLOSURE

A needle bar and presser bar subassembly for sewing machines preassembled before final assembly in the frame of a sewing machine. The needle bar and presser bar subassembly includes means for lifting a presser bar when desired.

Cross-reference to related application

The feed mechanism and long shuttle mechanism are more fully disclosed in a copending United States patent application Ser. No. 631,339, filed Apr. 17, 1967.

Background of the invention

(1) Field of the invention.—The invention relates to needle driving mechanisms, presser devices, and presser lifting devices for sewing machines.

(2) Description of the prior are.—Heretofore, needle bars, presser bars, and presser lifting devices have been assembled separately in sewing machine frames. The foregoing procedure is expensive because the entire machine frame must be set up in a drill jig and holes bored for the needle bar and the presser bar. If a large number of machines are to be made, a special drilling machine must be built. In addition, assembly of the parts directly into the machine frame is a tedious time-consuming task whether during initial assembly or later to replace worn or broken parts.

Summary of the invention

It is therefore an object of the invention to provide a needle bar and presser bar subassembly for sewing machines.

Another object of the invention is to provide a needle bar and presser bar subassembly which includes means for lifting a presser bar.

Another object of the invention is to provide a needle bar and presser bar subassembly which includes a manual presser lifter which can be composed of a single length of wire.

Another object of the invention is to provide a needle bar and presser bar subassembly which can be composed of a minimum number of inexpensive parts.

Other objects and a fuller understanding of the invention may be had by referring to the description and claims taken in conjunction with the accompanying drawings.

Brief description of the drawings

FIG. 1 is a front perspective view of a sewing machine incorporating the invention;

FIG. 2 is a cross-sectional view through the sewing head of the sewing machine of FIG. 1 as viewed from the standard of the sewing machine;

FIG. 3 is a partially sectioned detail view of the needle bar and presser bar subassembly of FIG. 2 with the presser foot in raised position;

FIG. 4 is a cross-sectional view taken substantially along the line 4—4 in FIG. 3;

FIG. 5 is an enlarged perspective view of the needle bar and presser bar subassembly of FIG. 2;

FIG. 6 is an exploded perspective view of the inside of the front shell of the frame of the sewing machine;

FIG. 7 is an elevational view of the inside of the front shell of the frame of the sewing machine; and

FIG. 8 is an elevational view of the inside of the rear shell of the frame of the sewing machine.

Description of the preferred embodiment

With reference to the drawings, the invention is illustrated embodied in a sewing machine for children.

The sewing machine has a frame including a front shell **11** and a rear shell **12** each composed of plastic. Each shell has a bed portion **13** or **13***a*, a standard portion **14** or **14***a* rising from one end of the bed portion, an arm portion **15** or **15***a* at the top of the standard portion overhanging the bed portion, and a sewing head portion **16** or **16***a* at the free end of the arm portion. An L-shaped control panel **17** is formed on the arm and standard portions of the front shell.

The two shells register with each other through a peripheral flange **18** and bosses **19** formed in the front shell which mate with a peripheral groove **20** and holes **21** formed in the rear shell. The shells are held together by three screws **22**, **23** and **24**. Two of the screws extend through clearance holes **25** and **26** in the bed portion of the rear shell into tapped holes **27** and **28** in bosses **29** and **30** formed in the bed portion of the front shell. The remaining screw **24** extends through a clearance hole **31** in the arm portion of the rear shell into a tapped hole **32** in a boss **33** formed in the arm portion of the front shell. Also holding the two shells together is an arbor **34** for a thread tension device indicated generally at **35**. The arbor extends through a clearance hole **36** in the front shell into a tapped hole **37** in a boss **38** formed in the rear shell.

Mounted in the arm and standard portions of the front shell is an L-shaped bell crank **39** having upper and lower arms **40** and **41**. The bell crank has a hole **42** in the upper arm by which it is pivotally mounted on the boss **38** for one of the screws which hold the two shells together.

The bell crank also has a group of three small holes **43** on the free end portion of the lower arm, a group of three small holes **44** in the juncture of the lower and upper arms, a single small hole **45** in the free end portion of the upper arm, and an upwardly projecting hook **46** formed at the free end of the upper arm.

A link **47** is pivotally mounted in one of the three small holes **43** in the lower arm to transmit motion to a long shuttle mechanism indicated generally at **48** and a feed mechanism indicated generally at **49**. Groups of three small holes are used to provide an adjustment feature. The long shuttle mechanism and the feed mechanism are

more fully described in the previously cited copending United States patent application.

A second link **50** is pivotally mounted in one of the three small holes **44** in the juncture of the lower and upper arms. The other end of the second link is pivotally mounted in one of three small holes **51** in a crank **52**. Rotating motion is imparted to the crank by an electric motor **53** through a gear train indicated generally at **54** or, in the alternative, by a coaxial handwheel **55** which can be manually rotated by a removable hand crank **56**. Rotation of the crank **52** transmits oscillating motion to the bell crank **39** through the second link **50**.

The hook **46** at the free end of the upper arm of the bell crank and the small hole **45** in the free end portion of the upper arm transmit motion to a thread take-up lever **57** and a needle bar **58**, respectively, both of which are presently to be described.

The thread take-up lever **57** is pivotally mounted on a boss **59** on a mounting block **60**. The take-up lever has a keyhole **61** and the mounting block has a key **62** which prevents the take-up lever from being removed from the mounting block except when the keyhole is correctly aligned with the key. The mounting block has opposed tabs **63** and **64** which seat in recesses **65** and **66** in bosses **67** and **68** formed in the sewing head portions of the two shells to removably mount the mounting block in the frame of the sewing machine. The free end of the take-up lever **57** extends through a vertical slot **69** in the sewing head portion of the front shell, and an eyelet **70** for thread is formed in the free end of the take-up lever. The hook **46** at the free end of the upper arm of the bell crank lies underneath the lower portion of the free end of the take-up lever.

The needle bar **58** is part of a needle bar and presser bar subassembly indicated generally at **71**. The needle bar and presser bar subassembly includes a second frame **72** having two parallel holes **73** and **74**. The needle bar is mounted in one of the holes **73**, and a presser bar **75** is mounted in the other hole **74**.

The hole **74** for the presser bar has a reduced portion **76** and an enlarged portion **77** thereby forming a shoulder **78** at an intermediate portion of the hole. Diametrically opposed keyways **79** are formed in the reduced portion **76** of the hole.

Integrally formed at the lower end of the presser bar is a presser foot **80** which forms a shoulder **81** on the presser bar, and diametrically opposed keys **82** are formed on the presser bar. The presser bar is mounted in the hole **74** for the presser bar with the keys **82** sliding on the keyways **79** to prevent rotation. A coil spring **83** is mounted on the presser bar between the shoulder **81** formed by the presser foot and the shoulder **78** between the enlarged and reduced portions of the hole for the presser bar.

In order to lift the presser bar and with it the presser foot, a manual presser lifter **84** is provided. The presser lifter includes a lever **85** formed from a single length of wire with an intermediate portion bent into a substantially triangular cam **86** having sides **87**, **88** and **89**, and an end portion **90** bent into a position substantially perpendicular to the plane of the cam. The free end portion of the lever serves as a handle. The bent end portion **90** of the lever extends through a vertical slot **91** in the frame of the needle bar and presser bar subassembly into a radial hole **92** in the presser bar. The cam portion **86** of the lever bears against a bearing surface **93** in the bottom of a groove **94** formed on the frame by a raised ledge **95** on a peripheral flange **96** around the frame of the needle bar and presser bar subassembly.

Mounted in an axial hole **97** in the lower end of the needle bar **58** is a needle **98** having a shank **99** and an eye **100**. A needle positioning screw **101** obstructs the hole **97** for the needle so that the needle can only be inserted into the hole for the needle with a flat surface on the shank facing the inner end of the needle positioning screw. Thus, it is impossible to incorrectly connect the needle to the needle bar. The needle is held in the hole in the needle bar by a clamping screw **102**, and a crank pin **103** projects laterally from the top portion of the needle bar.

The frame **72** of the needle bar and presser bar subassembly has a lower shoulder **104** formed by the peripheral flange **96** and an intermittent upper shoulder **105** formed by the tops of lateral bosses **106**. The shoulders **104** and **105** seat in recesses **107** and **108** formed between shelves **109** and **110** and floors **111** and **112** of the sewing head portion of the shells of the frame to mount the needle bar and presser bar subassembly in the frame. The crank pin **103** on the needle bar seats in the single small hole **45** in the free end portion of the upper arm of the bell crank **39**, the presser foot **80** opposes the feed mechanism **49**, and the lever **85** of the presser lifter **84** projects through a vertical slot **113** in the sewing head portion of the rear shell of the frame.

In operation, reciprocating motion is imparted to the needle bar **58** by oscillating motion of the bell crank **39** which is connected to the needle bar by the crank pin **103** seating in the small hole **45** in the free end portion of the upper arm of the bell crank.

With specific reference to FIGS. 2 and 3, when it is desired to raise the presser foot **80**, the lever **85** is manually moved upwardly so that the bottom side **89** of the triangular cam **86** bears against the bearing surface **93** on the frame **72** of the needle bar and presser bar subassembly. When the lever is moved downwardly to lower the presser foot, one of the lateral sides **88** of the triangular cam bears against the bearing surface on the frame of the needle bar and presser bar subassembly.

Although the invention has been described in its preferred form with a certain degree of particularly, it is understood that the present disclosure of the preferred form has been made by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention.

Having thus set forth the nature of the invention, what is claimed is:

1. A needle bar and presser bar subassembly adapted for mounting as a unit in a sewing machine having a frame, a presser bar for a presser foot, a needle bar for a needle, means mounted in the frame of the sewing machine for imparting reciprocation to the needle bar, means for connecting the needle bar to the means for imparting reciprocation to the needle bar, and a complementary stitch-forming mechanism mounted in the frame, said needle bar and presser bar subassembly comprising a second frame separate from said sewing machine frame having two holes, the needle bar mounted in one hole and the presser bar mounted in the other hole, means for biasing the presser bar downwardly, means connected to the frame of the needle bar and presser bar subassembly for lifting the presser bar when desired, and means for mounting the needle bar and presser bar subassembly comprising said second frame as a separate unit in the frame of the sewing machine so that the needle bar can be connected to the means for imparting reciprocation to the needle bar, a needle on the needle bar can cooperate with the complementary stitch-forming mechanism to form stitches, and a presser foot on the presser bar can act upon work fabric in which stitches are to be formed.

2. The needle bar and presser bar subassembly of claim **1** in which the frame of the sewing machine includes two shells which together from the frame, and the needle bar and presser bar subassembly comprising said second frame is mounted as a unit in one shell and entrapped in the frame by the other shell.

3. The needle bar and presser bar subassembly of claim **1** in which the frame of the needle bar and pressure bar subassembly has a bearing surface and a slot parallel to and communicating with the hole in the frame for the presser bar, and the means for lifting the presser bar includes a lever, a cam on the lever, and means for con-

necting the lever to the presser bar through the slot in the frame so that the cam on the lever can bear against the bearing surface on the frame for lifting the presser bar when the lever is manually manipulated.

4. The needle bar and presser bar subassembly of claim **3** in which the bearing surface on the frame of the needle bar and presser bar subassembly is at the bottom of a groove fromed on the frame, the presser bar has a small radial hole in the side which can be aligned with the slot in the frame which communicates with the hole for the presser bar, and the lever is formed from a single length of wire having an end portion pivoted in the small radial hole in the needle bar, an intermediate portion bent into

a figure forming the cam which bears against the bearing surface on the frame, and a free end portion serving as a handle.

References Cited

UNITED STATES PATENTS

2,346,637	4/1944	Wesson	112—235
2,481,286	9/1949	Bouwkamp et al.	112—235
2,848,966	8/1958	Ritter et al.	112—238
2,892,429	6/1959	Fischbein	112—235

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