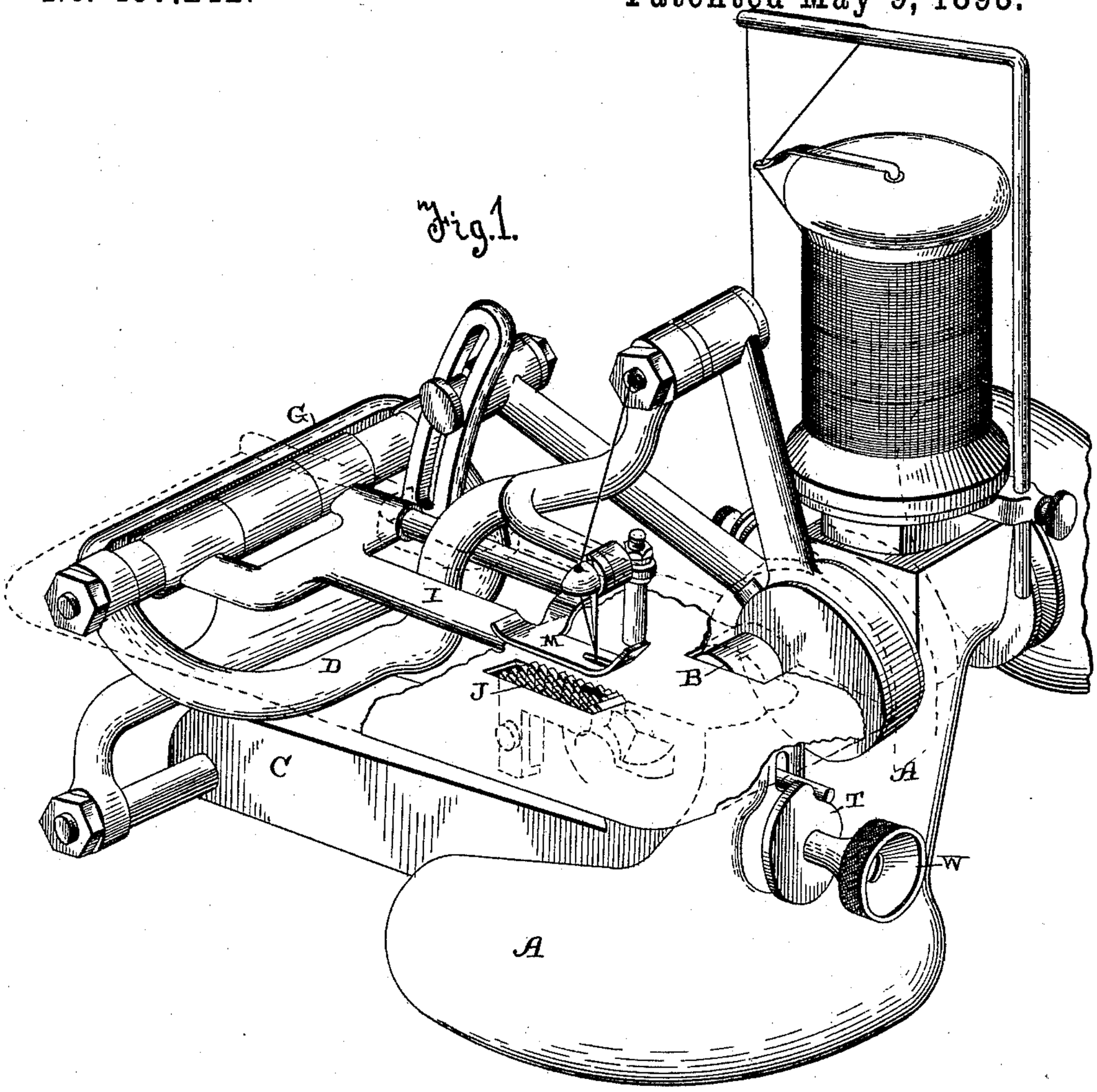
(No Model.) 2 Sheets—Sheet 1.

C. M. HINE.

SEWING MACHINE.

No. 497,242. Patented May 9, 1893.

Fig. 1.



WITNESSES_

Geo. E. Fitch.

R. Fitzgerald.

INVENTOR_

Chas. M. Hine

per Lehmann & Pattison

Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

C. M. HINE.

SEWING MACHINE.

No. 497,242. Patented May 9, 1893.

FIG_2_

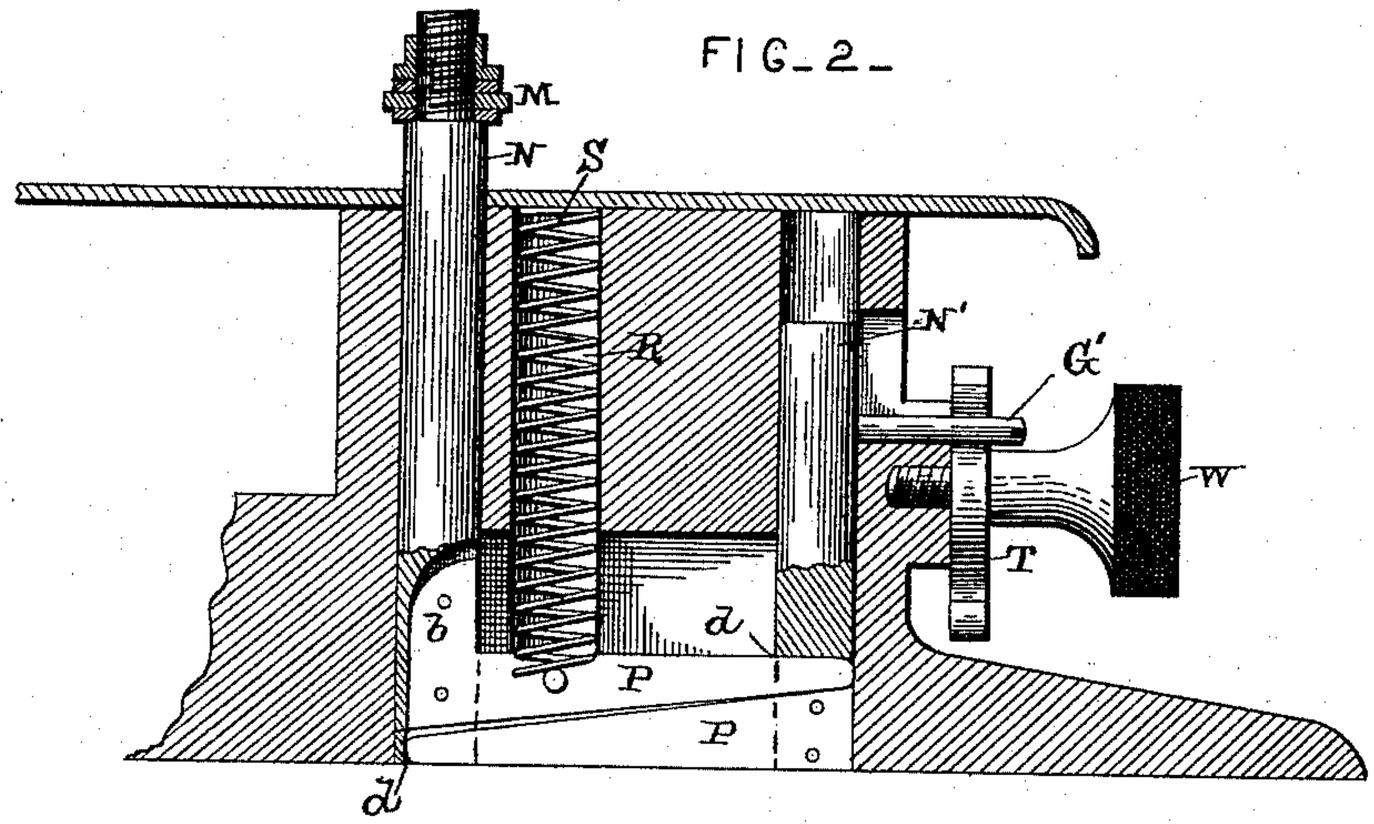
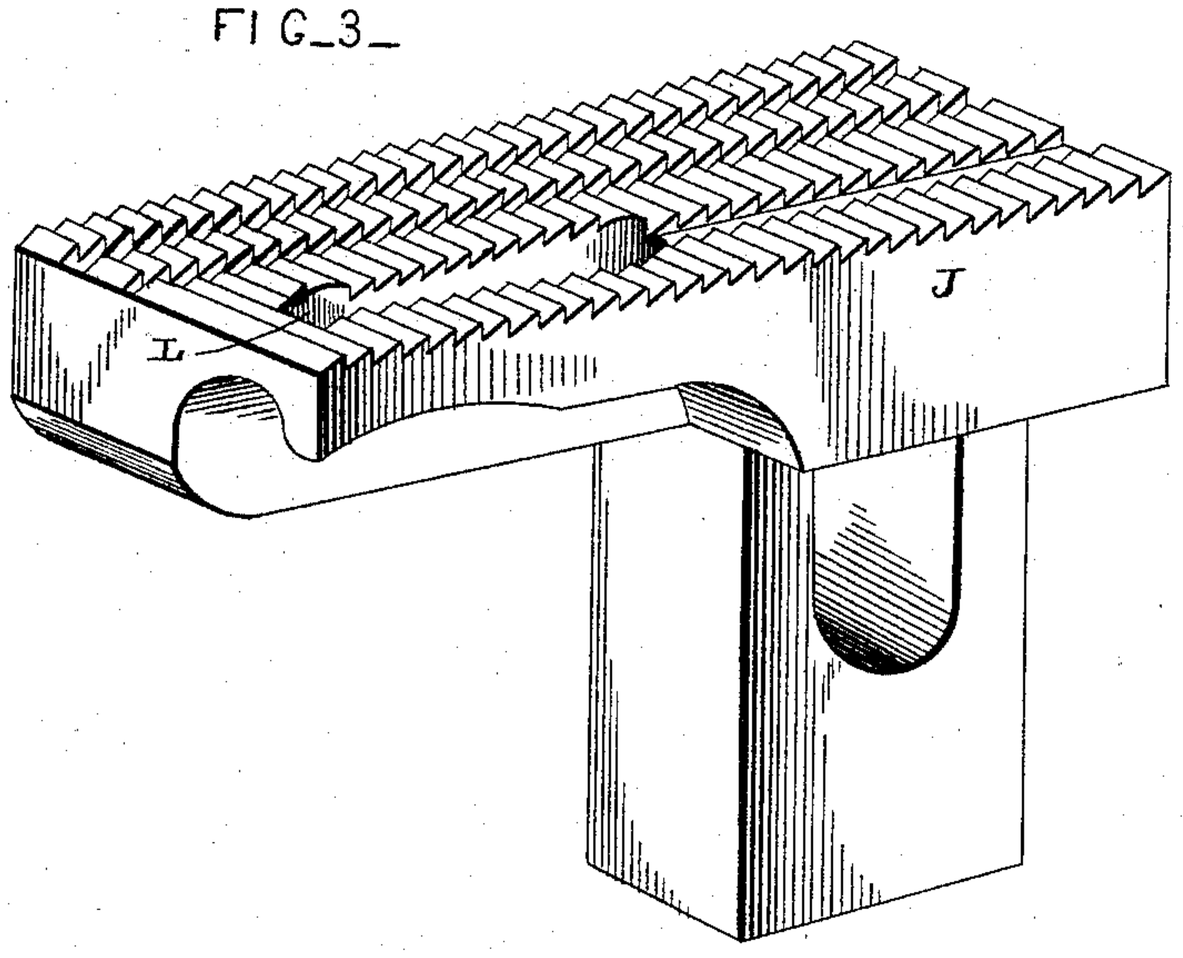


FIG_3_



WITNESSES_

Geo. E. Frech.

R. Fitzgerald

INVENTOR_

Chas. M. Hine

per Lehmann & Pattison

Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES M. HINE, OF ALLEGHENY, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE SHIELDS COMPANY, OF NEW YORK, N. Y.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 497,242, dated May 9, 1893.

Application filed September 11, 1891. Serial No. 405,419. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. HINE, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in sewing machines; and which is intended as an improvement upon my pending application filed January 16, 1891, Serial No. 378,017, and my patents, Nos. 254,043 and 254,044, granted June 16, 1891, and it consists in the construction and arrangement of parts which will be fully described hereinafter and particularly referred to in the claims.

The primary object of my invention is to do away in a sewing machine with the throat plate and make the feed surface serve the double purpose of a feed and a throat plate, by making in the feed surface the needle opening proper, and having no portion whatever of the throat plate surround the needle, or any other portion or part whatever surround the needle, other than the feed surface, which is itself provided with the needle opening. By this construction, I am enabled to sew very fine fabrics, such as illusion, and laces, and very soft and loosely woven fabrics, without drawing the goods in any manner whatever when the stitch is being drawn, as is the case in the ordinary construction of sewing machines, and their feed. Where a needle plate, or other immovable portion of a sewing machine is provided with the needle opening, when the feed raises the fabric from the needle plate, there is a portion of the fabric which is left suspended in mid air, and not clamped or held, so that when the stitch is drawn, the goods are drawn and caused to gather. So also in the ordinary construction of sewing machines, the goods are fed while the needle is out of the goods; and the feed surface is down below the plate and out of engagement with the goods, when the needle is forced through them. Owing to this fact, when very fine fabric is being sewed on the ordinary machine, the goods are held between the smooth surfaces of the needle plate and the presser foot, while the stitch is being drawn, and the fine goods having very little body, the threads thereof are forced or drawn through the needle opening by the thread, and become entangled with the looper, which makes it absolutely impossible to sew fine laces and illusion on the ordinary machine in a satisfactory manner.

Where the operation of the feed surface and needle bar is like that shown in my aforesaid pending application, the motion is reversed from the ordinary sewing machine, the feed surface being up and the goods clamped between it and the presser foot when the needle passes down, which when the feed surface performs the function of a needle plate (as shown in this application) the goods are tightly held all around the needle, and cannot be drawn down through the opening in the feed surface by the drawing of the stitch. So also owing to the reversal of the motion of my feed surface as compared to the ordinary machine, and its construction, the goods are tightly clamped between it and the presser foot when the stitch is being formed and drawn, which prevents the goods from being thereby gathered. At the same time that the stitch is being formed and drawn, the goods are being fed forward. In this manner gathering of the goods is prevented and fine laces and soft and loosely woven fabrics can be sewed with perfect smoothness and certainty.

The other objects of this present invention consist in providing a presser foot which has its working parts below the cloth plate, so that no parts requiring to be oiled are above the goods; and to reverse the position of the needle-arm yoke whereby it is shortened up and the weight thereof brought nearer to the center of vibration, which greatly reduces the strain on the machine to overcome the momentum of the vibrating parts, when the machine is running at high speed.

In the drawings, Figure 1 is a perspective view of a sewing machine which embodies my improvements, a portion of the cloth plate being broken away, and shown in dotted lines. Fig. 2 is a cross section taken through the machine showing the presser foot mechanism.

Fig. 3 is an enlarged perspective view of the feed dog.

The operation of this machine being the same as that disclosed in my aforesaid pending application and patents, those parts and their operation which do not form any part of my present improvement will only be incidentally mentioned.

A, indicates a base, B the driving shaft, and C an arm extending outward from the base which arm through the medium of the construction fully disclosed in my said patents supports a needle-arm-yoke D. This needle arm yoke D in the present instance is placed inside of the vibrating part which supports it, instead of outside as in my patents, and extends downward at a slight angle as shown. The purpose of reversing the position of this yoke, is to shorten up the length of the needle carrying arm, thereby increasing its rigidity without increasing its weight, and to bring its weight as near as possible to the center of the point of vibration, which reduces very materially the strain necessary to overcome the momentum of the vibrating parts incidental to a machine running at a high rate of speed, and reduces the amount of power to run it. For the purpose of preventing the spreading of this yoke, the ends thereof are connected by a suitable tie-bar G, as shown, which is cast as a part thereof.

A feed bar or arm I is connected and operated in the same manner as shown in my pending application referred to, and connected to the outer end of this arm is a combined feed dog and needle plate J. This combined feed dog and needle plate is rectangular in shape as shown and is provided with a needle opening L, instead of having a needle opening in a needle plate, or in the cloth plate itself. It will be noticed that the only part of the machine proper that the needle passes through is the combined feed dog and needle plate J, as no part of the cloth plate or of a needle plate, or a needle race extends through or over the feed dog and the needle opening is cut in the face of the serrated surface of the dog as shown, the teeth extending to the edge of the opening. The advantages of this construction are that the goods are clamped between the combined feed dog and needle plate and the presser foot all around the needle, so that the thread or needle cannot draw down any of a fine fabric or of a soft loosely woven fabric through the needle hole, for the reasons already set forth, nor can the drawing of the thread to tighten the stitch cause the goods to be drawn or gathered for the reasons already specified, permitting the finest fabrics to be sewed with an evenly drawn seam without any tendency toward drawing or gathering the goods.

Placed under the cloth plate in the base of the machine, is a presser foot mechanism which consists of two vertical bars N, N′, which move in vertical holes made in the base A. The rod N extends up through the base and the cloth plate, and has secured thereto a presser foot M. Each of these bars is provided with a slot *d* at its lower end in which one end of a horizontal torsion bar P is rigidly secured, the opposite ends of these torsion bars fitting loosely in the vertical slot made in the opposite bars. These torsion bars P are cut on an incline as shown, so that they form together substantially a rectangular connection between the presser bar N and the lifting bar N′. The upper torsion bar has its widest end rigidly secured in the presser bar and its narrow end placed loosely in the vertical slot of the lifting bar, and the lower torsion bar has its widest end rigidly secured in the lifting bar slot, and its opposite narrow end placed loosely in a slot in the presser bar, which construction allows the presser and lifting bars to work freely in their respective bearings without any tendency to cramp or bind therein. That end of the upper torsion bar which is rigidly secured to the presser foot bar has an upper extension *b*, to allow of placing the securing rivets farther apart and thus adding strength and rigidity thereto, as the presser bar is lifted by the upper torsion bar, owing to the fact that the incline is such that the lower torsion bar engages the upper torsion bar only at the free end of the upper bar, thus relieving the lower torsion bar of all lifting strain. Made in the base between the said bars N, N′, is a vertical hole R, in which is placed a spiral spring S, which rests upon a pin extending laterally from the upper torsion bar P, and thus holds the bars N, and the presser foot normally downward. For the purpose of moving the presser foot vertically against the pressure of the spring S, a cam T is provided which engages a pin G′ that extends outward from the lifting bar N′, through a slot cut in the base. This cam T is provided with a thumb nut or head W, by means of which it is turned and the presser foot through the medium of the construction just described is raised.

Having thus described my invention, I claim—

1. In a sewing machine of the character described, the combination of a driving shaft, a vibrating yoke support at one side thereof, a yoke placed inside of the said support, and having its ends pivoted to the said support and carrying a needle arm, eccentrics upon the shaft, and rods connecting the yoke, needle arm and eccentrics, for the purpose described.

2. In a sewing machine the combination with a stitching mechanism of a cloth plate, a base beneath the cloth plate having two vertical holes, bars therein, one of said bars extending through the cloth plate and carrying a presser foot, the said base having also a horizontal opening communicating with said vertical holes, two horizontal bars each having one end connected with one vertical bar,

and its opposite end separate from but adapted to raise the other vertical bar, substantially as described.

3. In a sewing machine, the combination with a stitching mechanism, of a cloth supporting surface, a base having two vertical holes and a vertical slot connecting the said holes, a vertical bar in each of said holes having a vertical slot, and two horizontal bars, each having one end connected with one of the said vertical bars and its opposite end extending loosely into the vertical slot of the other vertical bar, one of the vertical bars extending above the base, a presser foot secured to this extended end, a spring for holding the vertical bars down, and a means for raising them substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES M. HINE.

Witnesses:
GRAHAM L. GORDON,
J. M. NESBIT.