

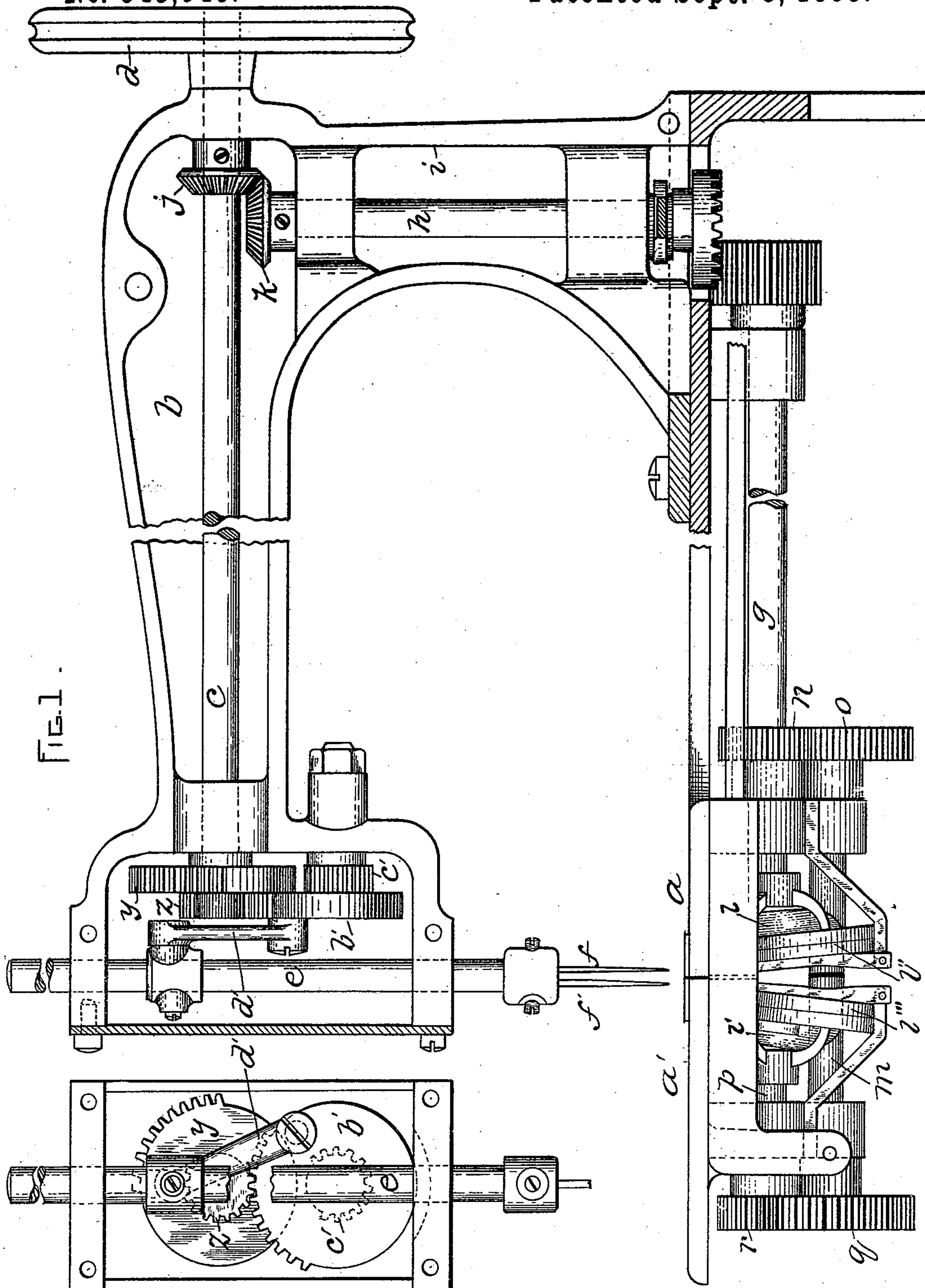
(No Model.)

2 Sheets—Sheet 1.

G. L. HARLOW.
SEWING MACHINE.

No. 545,646.

Patented Sept. 3, 1895.



WITNESSES:
H. Brown
A. D. Harrison.

INVENTOR:
by Geo. S. Harlow
Might, Brown & Co. attys.

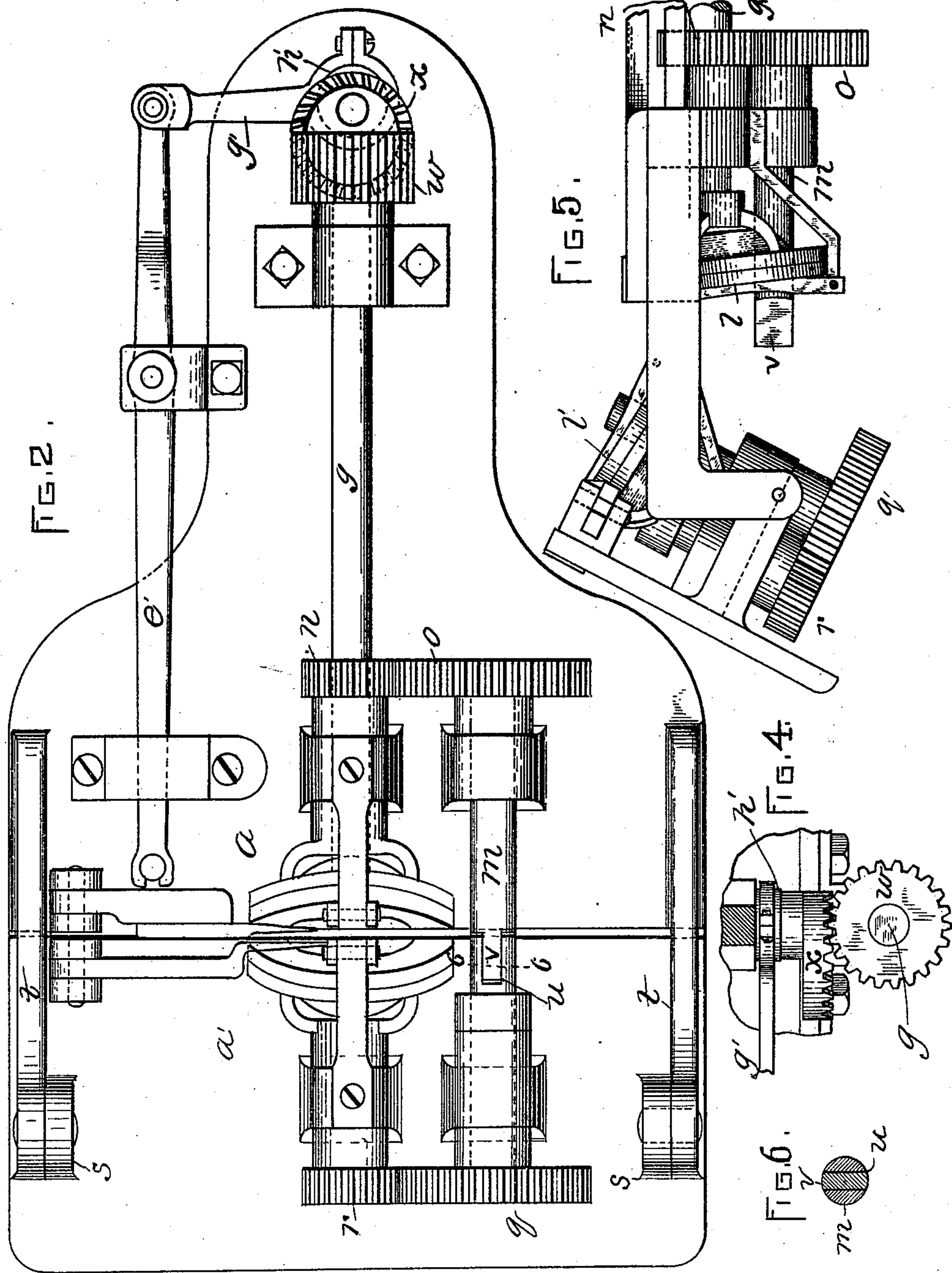
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SEWING MACHINE.

No. 545,646.

Patented Sept. 3, 1895.



WITNESSES:

H. Brown.
A. D. Hanson.

INVENTOR:

Geo. L. Harlow.
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UNITED STATES PATENT OFFICE.

GEORGE L. HARLOW, OF SOMERVILLE, MASSACHUSETTS.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 545,646, dated September 3, 1895.

Application filed October 16, 1893. Serial No. 488,264. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. HARLOW, of Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

This invention relates to that class of sewing-machines in which there are employed two needles and two shuttles, with the object of simultaneously producing two parallel rows of stitches.

One object of the invention is to provide a construction whereby more ready access may be had to the shuttles and appurtenances than heretofore for cleaning, repairing, or other purposes.

It is also the object of the invention to provide improved means for securing a differential motion of the needles, so that they may operate with a comparatively quick motion during the initial movements of forming the stitch and with a slower movement while the shuttles are passing through the loops and the stitches are being drawn or completed.

Reference is to be had to the annexed drawings and to the letters marked thereon, forming a part of this specification, the same letters designating the same parts or features, as the case may be, wherever they occur.

In the drawings, Figure 1 is a front view, partially in section and parts being shown as broken away, of a sewing-machine embodying my improvements. Fig. 2 is a bottom view of the same. Fig. 3 is an end view of a part of Fig. 1, parts being represented as broken away, showing the means whereby a differential motion of the needle-bar is secured. Fig. 4 is a detail view showing the means for securing a differential movement of the shuttles in unison with the needle-bar. Fig. 5 is a detail view in front elevation, showing the manner in which access is gained to the shuttles and shuttle-carriers. Fig. 6 is a sectional detail view taken on the line 6 6 of Fig. 2.

In the drawings, *a* designates the bed of the machine.

b is the overhanging arm.

c is the driving-shaft, having its bearings in the overhanging arm.

d is the pulley for operating the driving-shaft.

e is the vertically-reciprocating needle-bar, equipped with two needles *f f'*.

g is the bottom shaft, from which the shuttles are driven.

h is the vertical shaft in the vertical standard *i*, connecting the driving-shaft *c* with the bottom shaft *g*. A miter-gear *j* on the driving-shaft engages and drives a miter-gear *k* on the upper end of the shaft *h* and so operates the latter.

The machine is equipped with two flat-faced shuttle-races *l l'*, one for each needle, the shuttle in the race *l* co-operating with the needle *f* and the shuttle in the race *l'* with the needle *f'*, and the two shuttles fitting the shuttle-races *l''* and *l'''*. The carrier for the shuttle in race *l* is driven directly by the shaft *g*, while the carrier for the shuttle in race *l'* is driven through the medium of a divided counter-shaft *m*, connected with the shaft *g* by means of a pinion *n* and gear *o*, and communicates motion to the shaft *p* for operating the carrier for the shuttle in race *l'* through the medium of gear *q* and pinion *r*. The bearings for the shaft *p* and that part of the divided counter-shaft *m* carrying the gears *q* and *r* are supported by a divided part of the bed-plate *a'*, provided with ears *s*, pivoted to ears or projections *t*, connected with the bed-plate *a*.

One part of the counter-shaft *m* is provided at its end with a slot or groove *u* and the other part is provided with a tongue or tenon *v*, adapted to fit the groove *u*, so that when the parts are in position, as shown in Figs. 1 and 2, the divided parts of the shaft *m* will be connected, but so that the part *a'* of the bed-plate may be tipped up on its pivots and said shaft *m* disconnected, so that access may be gained to the shuttles and shuttle-carriers and their adjuncts.

The shuttles and shuttle-races are inclined toward each other at their upper edges, which, with the flat-faced features of said parts, permits them to be operated close together and to co-operate with needles arranged closely together. On the rear end of the shaft *g* there is an elongated gear *w*, and on the bottom of

the shaft *h* there is an inverted skew crown-gear *x*, eccentrically arranged with respect to the axis of the shaft *h*, which inverted crown-gear engages the gear *w* and drives the same.

5 With this construction and arrangement of parts it will be seen that while the shaft *h* may be driven at a uniform speed, a varying or differential motion will be imparted to the shaft *g*, since when the teeth of the gear *x* nearest the axis of the shaft *g* are in engagement with the teeth of the gear *w* the shaft *g* will be driven relatively slow, but when the teeth of said gear *x* farthest from the axis of shaft *h* are in engagement with the teeth of gear *w* the shaft *g* will be driven comparatively fast.

On the forward end of the driving-shaft *c* there is affixed a gear *y*, a portion of the teeth of which is mutilated or cut away, and compounded with said gear *y* is a pinion *z*, a portion of the teeth of which is cut away, the said gear and pinion being mutilated at opposite points.

Supported on a suitable journal or stud 25 connected with the head of the machine is a gear *b'* and a pinion *c'*, compounded therewith, which last-mentioned gear or pinion has its teeth mutilated or cut away in a manner corresponding to that described with reference to gear *y* and pinion *z*, the parts being constructed and arranged so that the teeth of gear *y* will engage those of pinion *c'* and the teeth of pinion *z* will engage those of the gear *b'*, while the mutilated parts of said gears and pinions, as mentioned, will come opposite each other.

d' is a pitman pivoted at one end upon the gear *b'* and at the other end to the needle-bar, so that as the gear *b* is rotated the needle-bar 40 will be reciprocated vertically. Now, as the gear *b'* will be driven at times by the gear *y* engaging the teeth of the pinion *c'* at a comparatively rapid rate, and at other times by the teeth of the pinion *z* engaging the teeth of the gear *b'* at a comparatively slow rate, it follows that the needle-bar *e* will be moved quickly at times and more slowly at other times. The slow and quick movements of the needle-bar will correspond to the slow and 50 quick movements of the shuttles, the slow movements occurring when the stitches are being formed or completed and the quick movements during the initial stitch movements. This variation in or differential movement of the stitch-forming mechanism is an important feature of this invention, inasmuch as it is important to the certainty and perfection of the operation of a two-shuttle and two-needle machine that the setting or draw-

ing of the stitch should be a slow movement 60 as compared with the initial stitch-forming movements.

e' designates a lever fulcrumed on the bottom of the machine and connected at its rear end, through the medium of a pitman *g'*, with 65 an eccentric *h'* on the shaft *h*, and at its forward end connected with the means for imparting a backward and forward motion to the feed mechanism, the latter being of any known or convenient form and forming no 70 part of the present invention.

By the improvements described I have re-organized a sewing-machine adapted to employ two needles, so that the same may be operated with entire certainty and exactness, 75 and so, also, that the needles may be brought as closely together as may be desired and ready access obtained to the shuttles and immediate shuttle-operating means.

Having thus explained the nature of the 80 invention and described a way of constructing and using the same, though without attempting to set forth all the form in which it may be made or all of the modes of its use, it is declared that what is claimed is— 85

1. In a sewing machine, the combination of a needle-bar carrying two needles, two shuttles for co-operation with said needles respectively, a bed-plate having a hinged section supporting one of said shuttles, a driving shaft applied to the other shuttle, a counter-shaft composed of sections detachably joined between the sections of the bed-plate, gearing connecting one section of said counter-shaft with the driving shaft, and gearing 95 connecting the other section of the counter-shaft with the shuttle on the hinged section of the bed-plate, substantially as and for the purpose set forth.

2. In a sewing machine, a reciprocating 100 needle-bar provided with needles, combined with a driving shaft, a gear and pinion having a portion of their teeth mutilated or cut away, a second gear and pinion having a portion of their teeth cut away, said gears and 105 pinions being adapted to co-operate as explained, and a pitman connecting the second mentioned gear and pinion with the needle-bar, as set forth.

In testimony whereof I have signed my 110 name to this specification, in the presence of two subscribing witnesses, this 8th day of August, A. D. 1893.

GEORGE L. HARLOW.

Witnesses:

ARTHUR W. CROSSLEY,
WALTER F. MCLEOD.