

(No Model.)

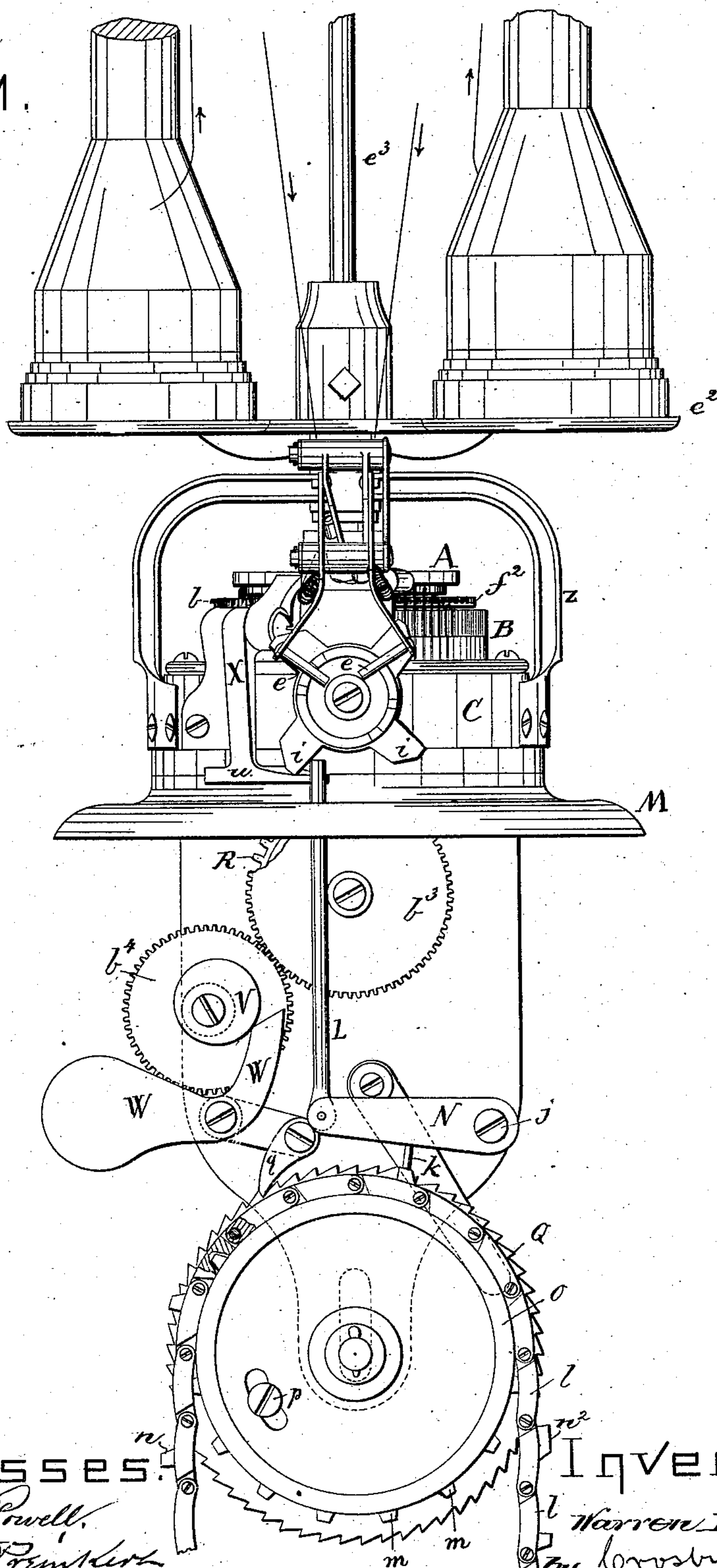
3 Sheets—Sheet 1.

W. D. HUSE.
KNITTING MACHINE.

No. 292,490.

Patented Jan. 29, 1884.

Fig:1.



Witnesses:

Fred A. Powell,
John F. C. Frinkler

Inventor.

Warren D. Huse

by Crosby & Company

(No Model.)

3 Sheets—Sheet 2.

W. D. HUSE.
KNITTING MACHINE.

No. 292,490.

Patented Jan. 29, 1884.

Fig: 2.

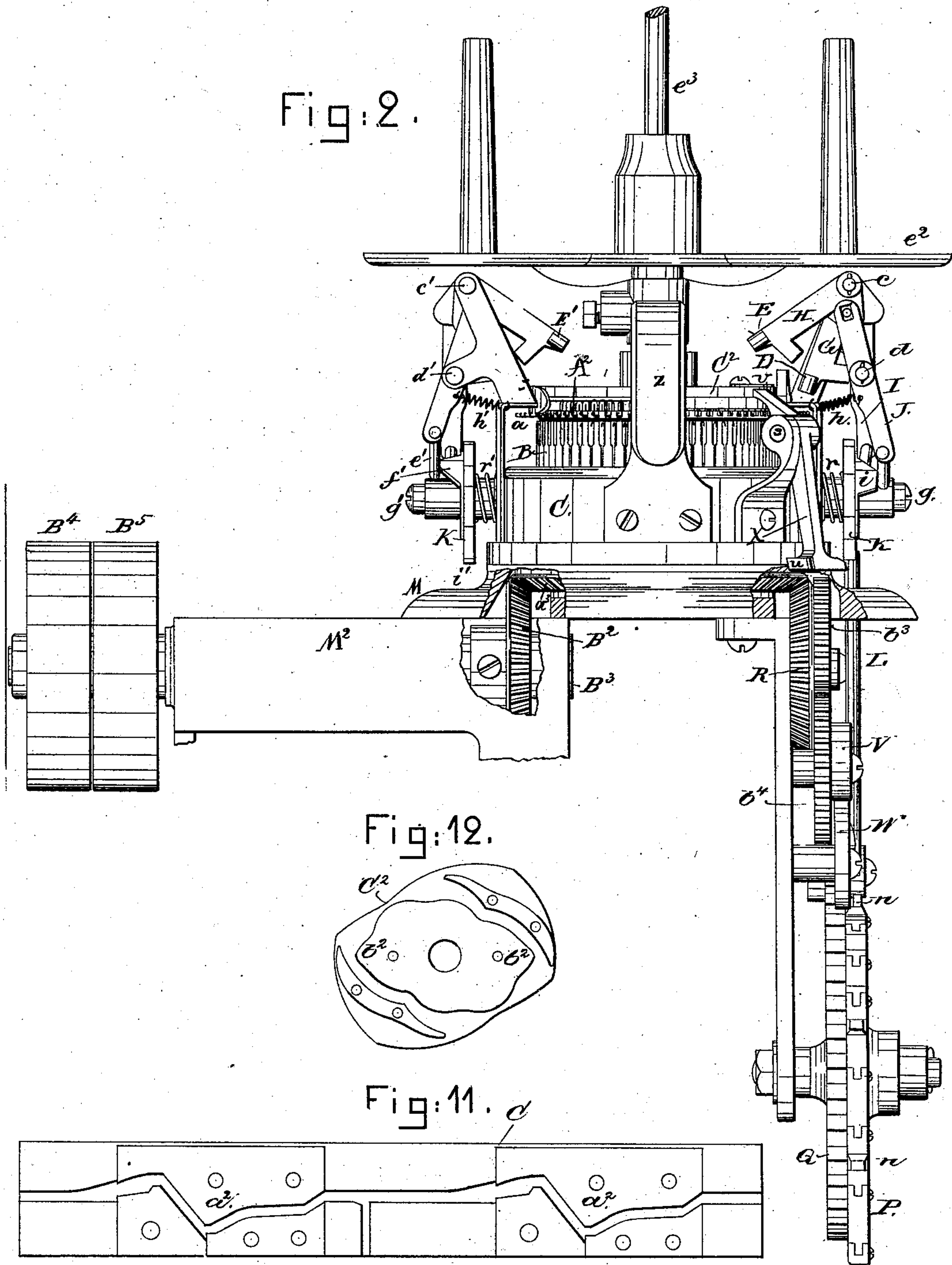


Fig: 12.

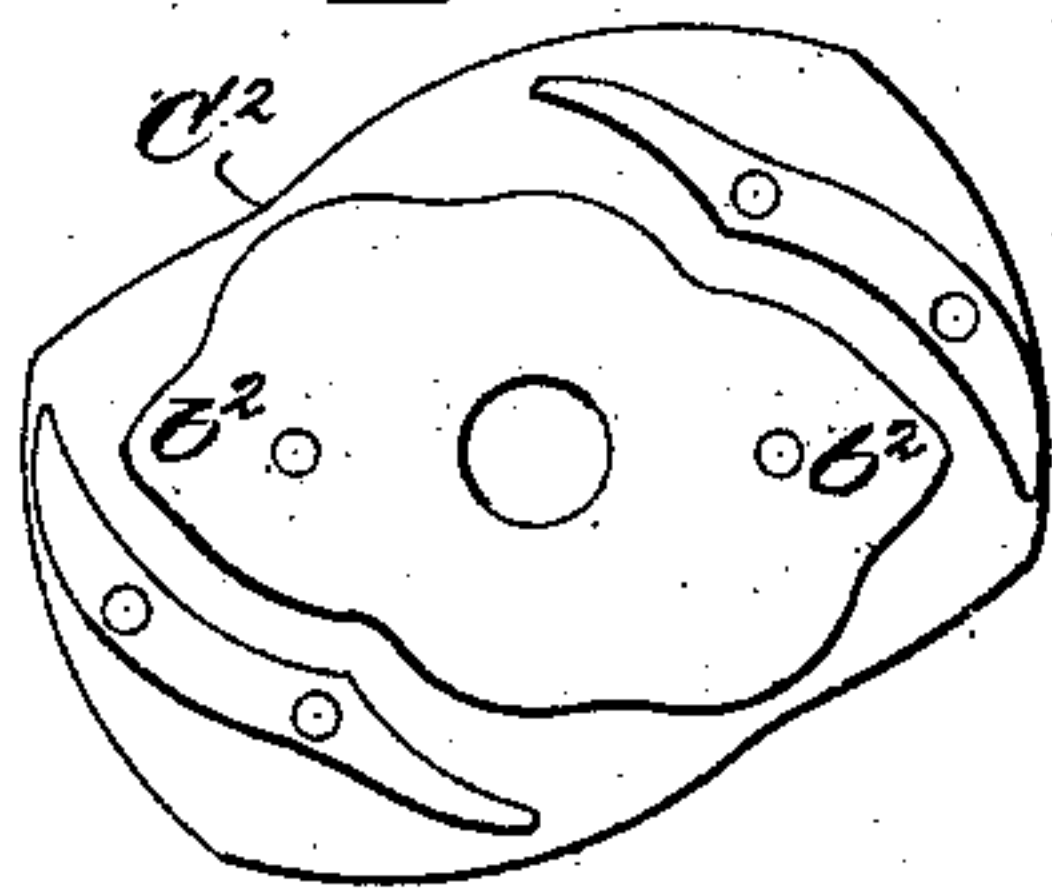
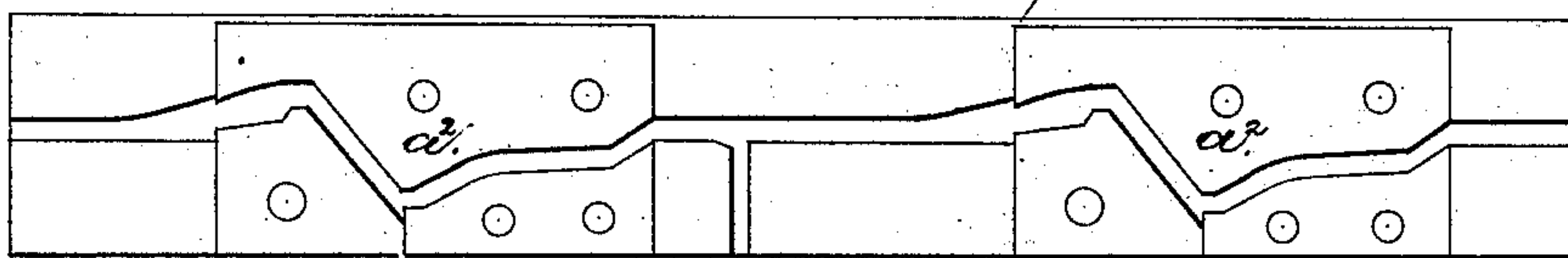


Fig: 11.



Witnesses.

Fred A. Powell.
John F. C. Pinkert

Inventor.

Warren D. Huse,
by Crosby & Gregory attys

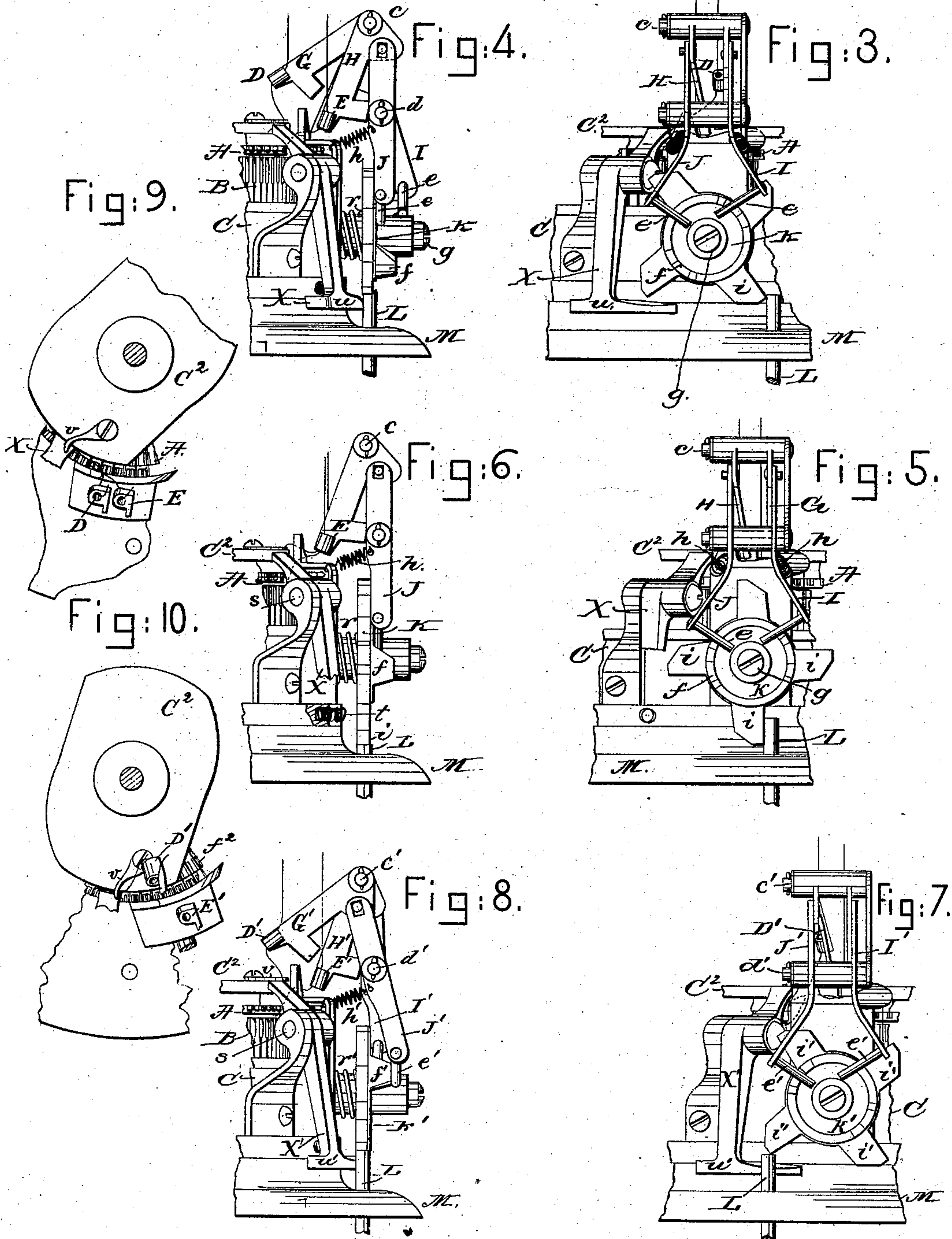
(No Model.)

3 Sheets—Sheet 3.

W. D. HUSE.
KNITTING MACHINE.

No. 292,490.

Patented Jan. 29, 1884.



Witnesses.

Fred A. Powell,
John F. C. Printz

Inventor.

Warren D. Huse,
by Crosby & May

UNITED STATES PATENT OFFICE.

WARREN D. HUSE, OF LACONIA, N. H., ASSIGNOR TO O. TWOMBLEY, OF LAKE VILLAGE, N. H., AND T. S. NOWELL, OF BOSTON, MASS.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 292,490, dated January 29, 1884.

Application filed April 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, WARREN D. HUSE, of Laconia, county of Belknap, State of New Hampshire, have invented an Improvement in Knitting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention is an improvement on United States Patent No. 239,168, granted to me March 22, 1881, and has for its object to increase the capacity of the said machine, both as to the amount of work and the variety of color in the fabric, and consequently of patterns, which may be produced thereon. In the machine described in the patent referred to two yarns of different colors were employed, and when it was desired to change from one to the other yarn, the yarn-guide containing the yarn to be used was thrown into operative position automatically, and immediately thereafter the yarn-guide containing the yarn to be discontinued was automatically thrown out of operative position, and its thread was automatically broken off. In the patented machine referred to the pattern-chain could not be moved for more than one step at one revolution of the cam-cylinder which actuates the needles, and the cam-cylinder had but one set of knitting-cams, so that but one change of color could be made at any one rotation of the cam-cylinder. Such construction limited the scope of the machine as to colors of yarn introduced and varieties of pattern which could be produced. To increase the efficiency of the said patented machine, I have provided the cam-cylinder, and also the usual cam-plate for the dial-needles, with two sets of knitting-cams; and I have also provided the machine with two sets of yarn-guides, each composed of at least two yarn-guides; and I have also provided mechanism for operating both or either of these yarn-guides during each rotation of the cam-cylinder; and I have also arranged the gearing by which the pattern-chain is operated so that the said pattern-chain is or may be turned twice during each revolution of the cam-cylinder, thus enabling either one of four yarns in the four yarn-guides to be thrown into or out from action during any one course of knitting.

Figure 1 is an elevation representing a sufficient portion of a knitting-machine, taken in connection with my said patent, to enable one to understand my improvements, the said figure showing some of the parts as broken out; Fig. 2, a side view of Fig. 1, partially broken out to show the gearing; Figs. 3 to 6, details of the yarn-guides and their actuating parts in different positions; Figs. 7 and 8, details of the yarn-guides at the opposite side of the cam-cylinder; Fig. 9, a partial top view of the machine when the yarn-guides are as in Fig. 6; Fig. 10, a similar view, with the yarn-guides as in Fig. 8; Fig. 11, a developed interior view of the cam-cylinder; and Fig. 12, a similar view of the dial-plate for moving the dial-needles, the said two figures last referred to being on a smaller scale.

The dial-plate A, dial-needles *a*, needle-cylinder B, cylinder-needles *b*, cam-cylinder C, yarn-guides D E, swinging arms G H, pivot *c*, levers I J, pivot *d*, studs or pins *e*, yarn-changing pattern K, having cams *f* and teeth *i*, pivot *g*, springs *h*, rod L, machine-frame M, lever N, pivot *j*, stud *k*, disk O, ratchet-wheel Q, pattern-chain P, links *l*, projections *m n*, screw *p*, bevel-wheel R, eccentric V, counter-weighted lever W, pawl *q*, spring *r*, catch-lever X, pivot *s*, cam *u*, and yoke *z* are the same in construction and operation as in my patent referred to, except as hereinafter pointed out, and the said devices are designated by like letters.

The cam-cylinder, provided with gear-teeth a^3 at its lower end, (see Fig. 2,) is engaged by a bevel-gear, B², on the shaft B³, provided with loose and fast pulleys B⁴ B⁵, the said shaft being extended through a part, M², of the frame M. In this my present invention the cam-cylinder C (shown developed in Fig. 11) has two sets of knitting-cams, a^2 , of usual construction, at nearly opposite points, to operate the needles *b* twice during each revolution of the cam-cylinder, and at its outer side the said cylinder carries two extra pairs of yarn-guides, D' E', like those marked D E, and co-operating with the same are arms G' H', actuating-levers I' J', pattern K' *i'* *f'*, and a lever, X' *u'*, springs *r'* *h'*, the same as those at the opposite side of the cam-cylinder C, and marked with like letters without the "prime." The

cam-plate C^2 (see Fig. 12) has also two sets of knitting-cams, b^2 , each to operate the needles a twice during each revolution of the cam-plate, thus enabling two courses to be knitted at each revolution of the cam-cylinder and cam-plate, and also enable either or both of the yarn-guides of each set to deliver the yarn carried by it to the needles for the whole or part of each knitted course. The teeth a^3 of the cam-cylinder engage the teeth of the bevel-gear R common to my said patent; but the latter gear has a gear, b^3 , connected with it, which engages the gear b^4 , with which is attached the eccentric V . These gears $b^3 b^4$ are, however, of such size with relation to the gear R and the ratchet Q that the latter is moved for the space of two of its teeth during each revolution of the cam-cylinder, so that the said ratchet-wheel and pattern-chain P , the links l of which are supposed to be of a length sufficient to control the color of the yarn used for four successive courses, is moved sufficiently far at each stroke of the pawl q to carry a link, l , completely under and past the pin k of the lever N . The links have projections n , of various widths and located at different points thereon, in order to determine which pair or set of thread-guides is to be operated during a certain revolution of the cam-cylinder, or whether both of the said sets are to be operated at each revolution of the said cam-cylinder in successive or alternate courses, a narrow projection, n , holding the rod L up only while the ratchet-wheel Q is moved one step, whereas a broader projection, as at n^2 , will hold the said rod L up while the said ratchet-wheel is moved two steps or more, according to how much of the length of each link is occupied by a projection to hold up the lever N . In the patent referred to the ratchet-wheel is moved but for one step during each rotation of the cam cylinder, and but one color could

appear in any one course, and but one course could be knitted at one rotation of the cam-cylinder; but in this my improved machine I am enabled to knit two courses at each revolution of the cam-cylinder, and I am enabled to throw into operation either two of the four yarns during each revolution, and I am thus enabled to produce four courses of knitting during any two revolutions of the cam-cylinder, and the said four courses may all be produced with yarns of different colors, and either color may appear in either course, that being determined by the location of the projection on the links l of the pattern-chain.

The bobbins for yarn, two only of which are shown, are supported on a plate, e^2 , and usual tension devices (not shown) for the said yarns will be carried by the rod e^3 .

The bed for the dial-needles is marked f^2 .

I claim—

The cam-cylinder having two sets of knitting-cams, the cylinder-needles, needle-bed, the bed or plate for the dial-needles, the cam-plate, the dial-needles, and two sets of knitting-cams on the cam-plate, and two sets of yarn-guides composed each of two separate yarn-guides, combined with two yarn-changing patterns, a pattern-chain, and means actuated thereby to permit the two yarn-changing patterns to be moved at each revolution of the cam-cylinder, and with means to rotate the said cam-cylinder and to move the pattern-chain two steps at each revolution of the cam-cylinder, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WARREN D. HUSE.

Witnesses:

G. W. GREGORY,
B. J. NOYES.