(No Model.) 2 Sheets—Sheet 1.

G. BROWN & A. BREHMER.

MACHINE FOR BINDING BOOKS.

No. 312,609. Patented Feb. 24, 1885.

Fig. I

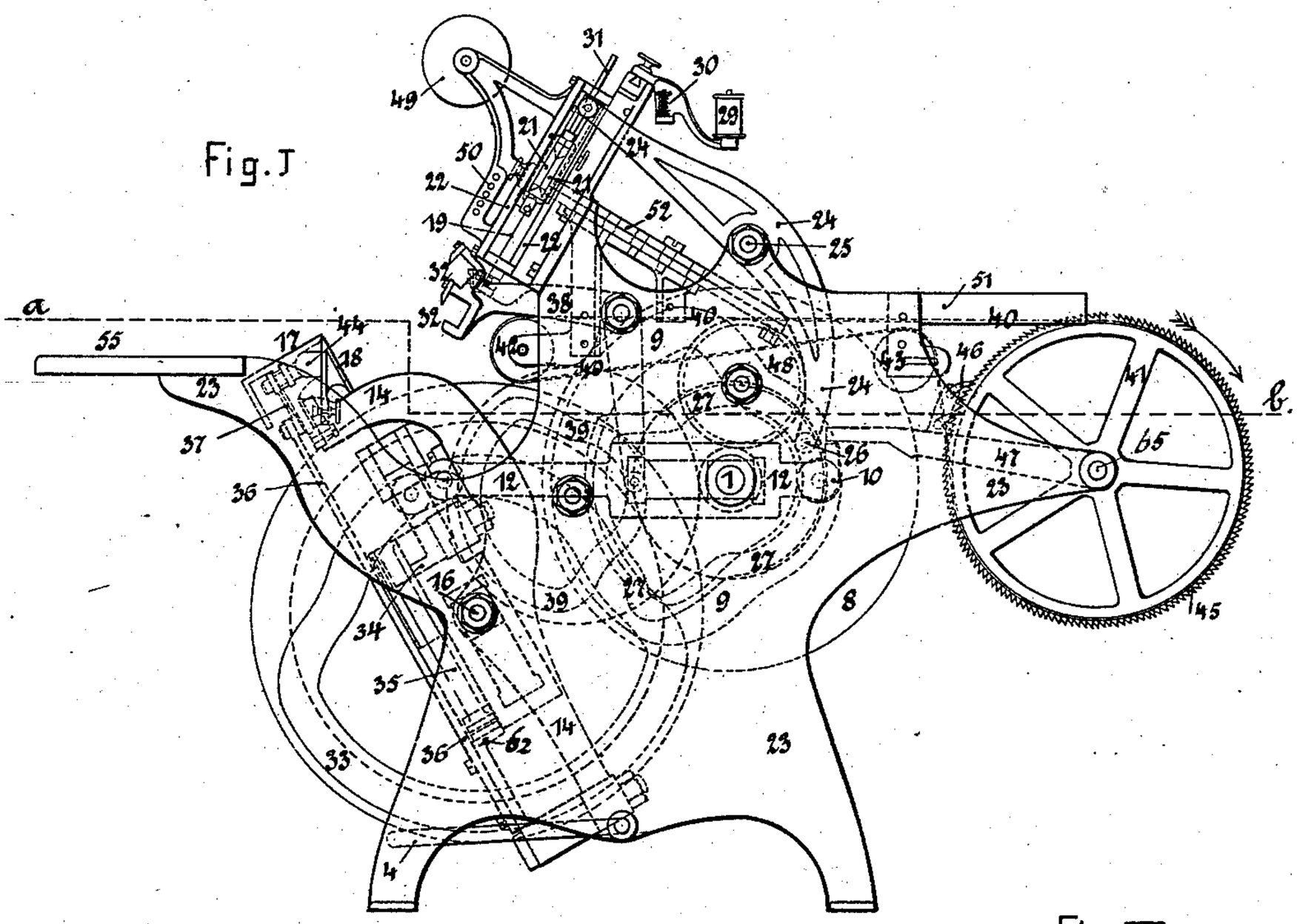
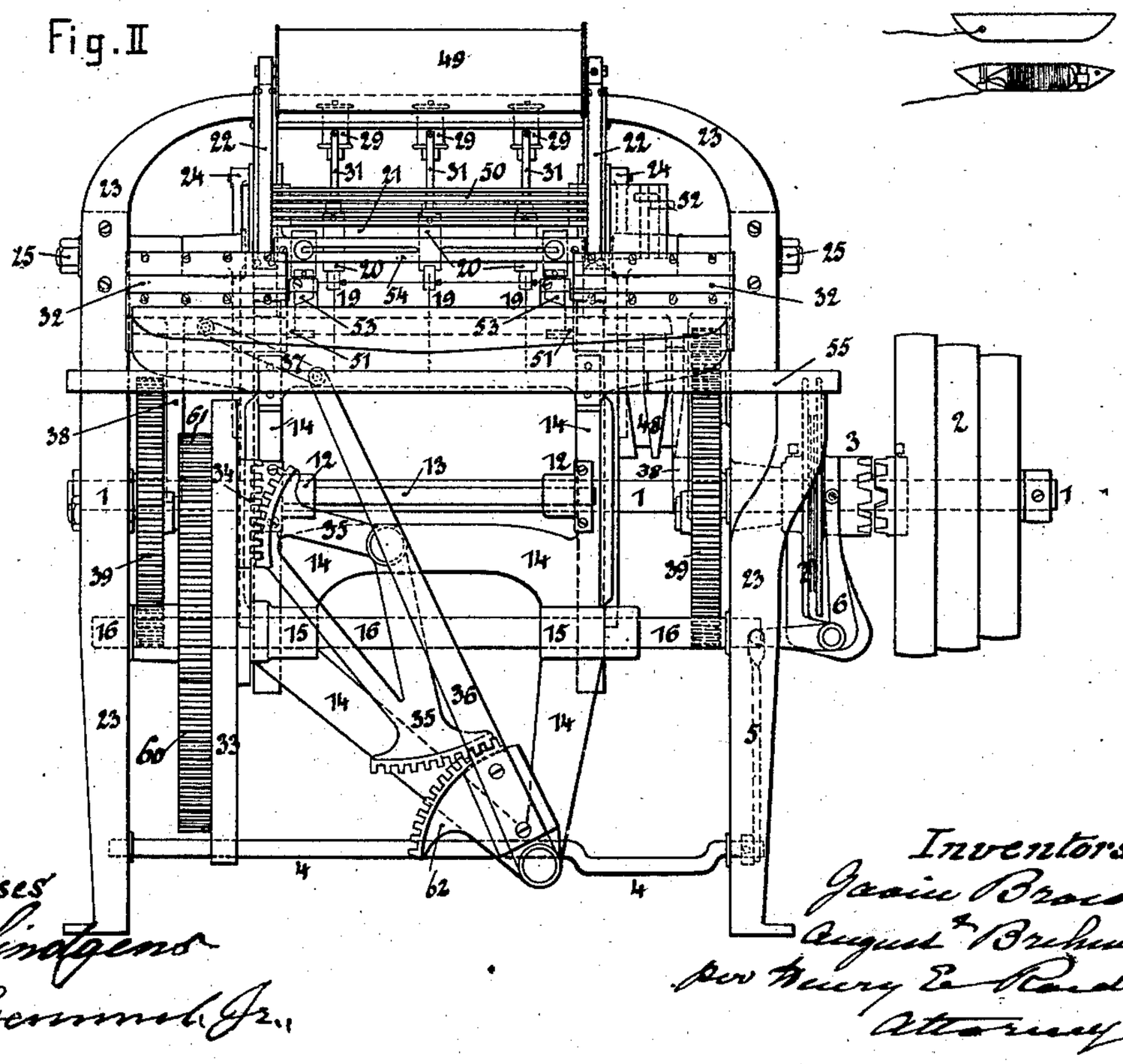


Fig. II



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(No Model.) 2 Sheets—Sheet 2.

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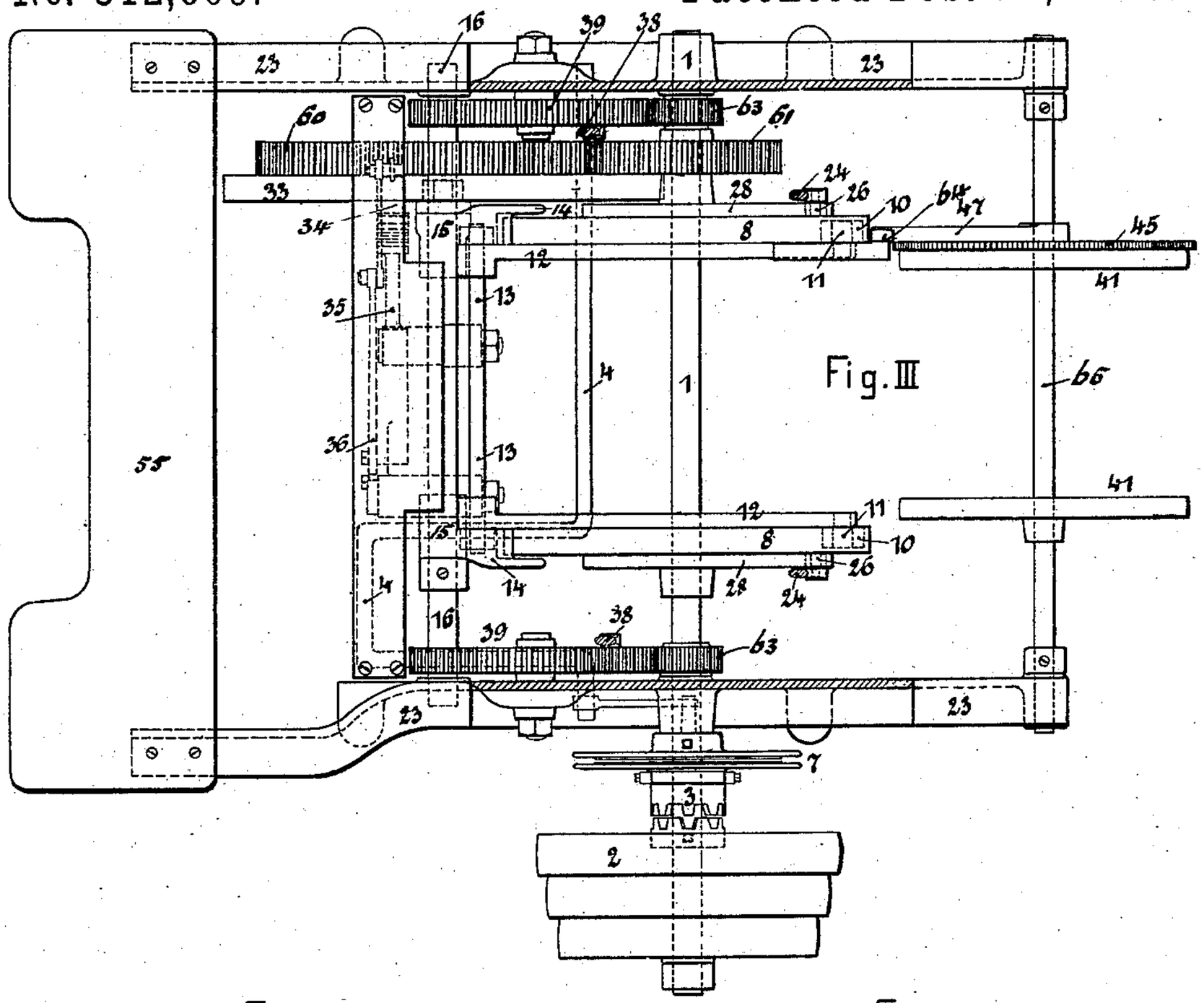


Fig. III

Fig. IV

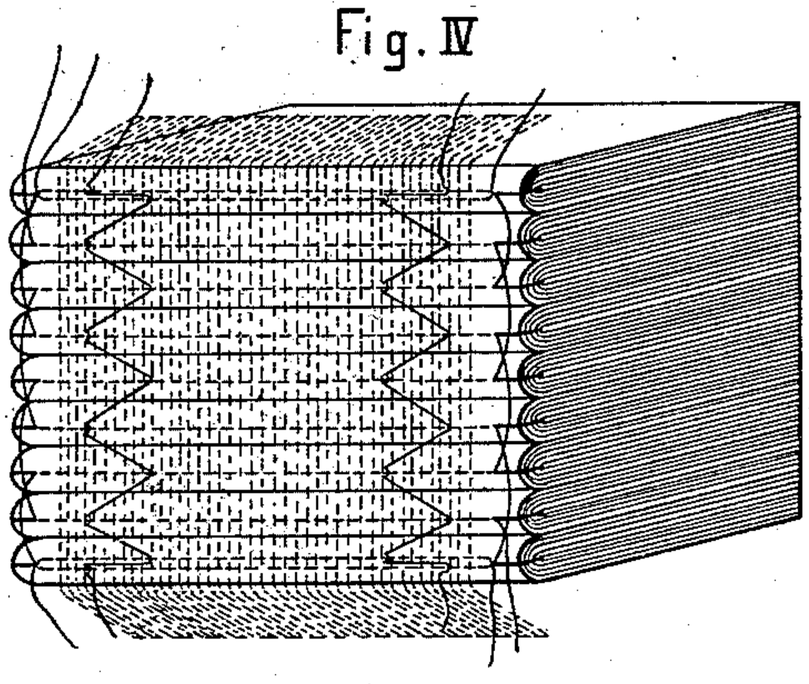


Fig. V

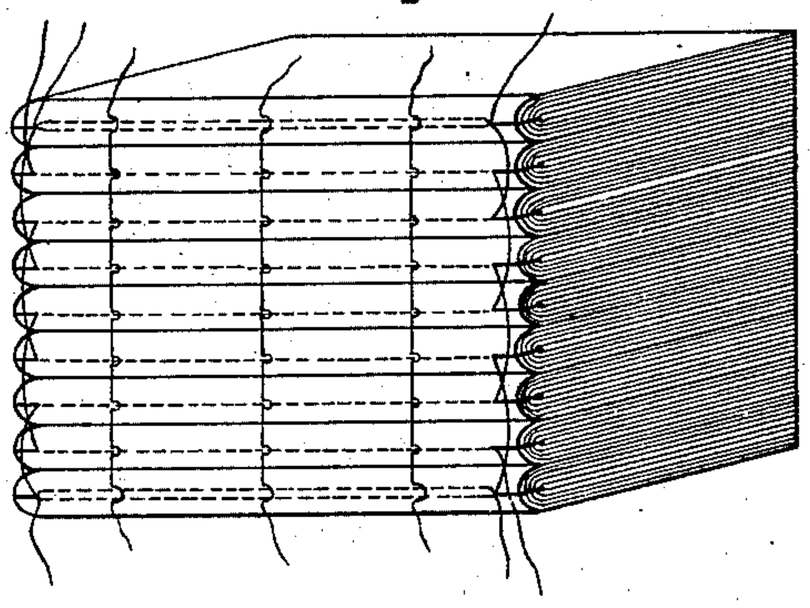


Fig. VI

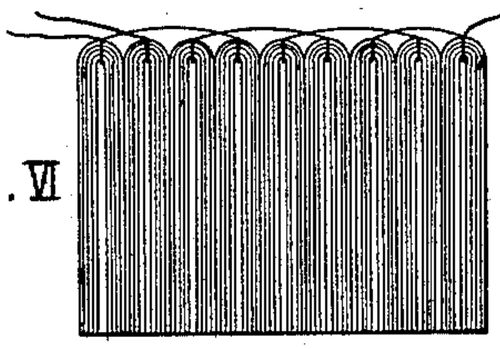
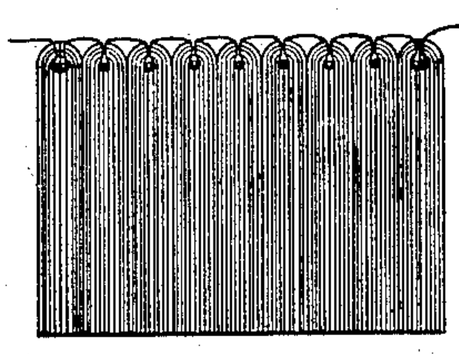


Fig. VII



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UNITED STATES PATENT OFFICE.

GAVIN BROWN, OF GLASGOW, SCOTLAND, AND AUGUST BREHMER, OF LEIPSIC, GERMANY.

MACHINE FOR BINDING BOOKS.

SPECIFICATION forming part of Letters Patent No. 312,609, dated February 24, 1885.

Application filed July 18, 1883. (No model.)

To all whom it may concern:

Be it known that we, GAVIN BROWN, a subject of the Queen of Great Britain and Ireland, and residing in Glasgow, Scotland, and AUGUST BREHMER, a subject of the Emperor of Germany, and residing in Leipsic, Empire of Germany, have invented certain Improvements in Mechanism for Binding Books, of which the following is a specification.

In the accompanying drawings, Figure I represents a side elevation of the machine. Fig. II is a front elevation of the same. Fig. III represents a sectional plan of the machine at line *a b*, Fig. I. Fig. IV shows a book sewed on crash or open cloth with three shuttle-threads and two needle-threads, the latter being shifted sidewise. Fig. V represents a book sewed without backing material, with three shuttle-threads and three needle-threads. Fig. VI is an end view of Fig. IV, showing the course which the shuttle-threads follow while running from section to section of the book. Fig. VII is an end view of Fig. V, showing the course of the needle-threads which pass around the shuttle-threads. Fig. VIII represents a side view and plan of the shuttle employed in the machine.

Similar numerals represent similar parts in all the figures.

The main shaft 1 of the machine carries the loose cone-pulley 2.

For starting the machine a clutch, 3, is made to enter corresponding teeth attached on the pulley by setting the operator's foot upon a treadle, 4, which connects with the clutch 3 by a connecting-rod, 5, and bell-crank 6. Lifting the foot up from the treadle will cause the clutch to fall out of gear, and a pair of friction-wheels, 7, will soon bring the machine to rest again.

Keyed fast upon the shaft 1 are two cams, 8, Fig. III, in the grooves 9 of which two rollers, 10, are guided, turning upon pins 11, which are riveted to connecting-rods 12. These two connecting-rods 12 are attached to a rod, 13, of the swinging arm or frame 14, which oscillates on bearings 15 upon the shaft 16. This swinging arm or frame 14 forms at its top an angle with flat surfaces 17 and 18, Fig. I, upon which the open sections of the book have to be placed, one at a time, for being sewed.

Fig. I shows the swinging arm in the position in which the angle has to receive the book-section. The arm will then swing up until the fold of the section stands below the needles 19. In this position the arm is temporarily at rest, while the needles enter from above through the fold of the section and into a slot formed at the point of the angle of the surfaces 17 and 18.

The needles, which may be employed in any desired number, are fastened by screws to needle-holders 20, which can be adjusted sidewise to any point upon sliding bars 21. These sliding bars, and with them the needles, are moved up and down in two suitable guides, 22, (which form a part of the frame 23 of the machine,) by two bell-cranks, 24, one of which is attached at each side of the sliding bars 21. The bell-cranks 24 oscillate upon two bolts, 25, and carry at their lower ends upon pins the two rollers 26, which are operated by grooves 27 of the cams 28, which latter are keyed to the shaft 1. The needles 19 receive the thread from a spool, 29, in a similar manner as on family sewing-machines. The thread has to pass through a device for friction, 30, and from there through a hole at the top of the needle-bar 31, down through the eye near the point of the needle. After the needles have reached the lowest point of their stroke, they will recede for a short distance in order to form the loop in the thread, through which a shuttle, Fig. VIII, has to pass. While the arm 14 oscillates, the shuttle is located in one of the shuttle-boxes, 32, which are placed to the right and left hand of the machine. The swinging arm 14 has near its top a channel, 44, which, when the arm is in its upper position, stands in line with one pair of the shuttle-boxes 32. Through this channel 44 the shuttle has to pass while traveling from the shuttle-box at one side to the shuttle-box on the other side of the machine, and in its course through this channel the shuttle will pass with a thread through the before-mentioned loops formed by the needle-threads. After the shuttle has passed the needles, and has been received by the shuttle-box on the other side

of the machine, the needles will go up again and the needle-threads will draw the thread delivered from the shuttle tight into the fold of the section. This operation repeats with every revolution of the machine.

In order to obtain the motion for the shuttle, the cam 33, running loose on the shaft 16, is geared to the main shaft in the proportion of two to one by means of the gearing 60 and 61. The cam 33, by means of a pin and roller, gives motion to the rack 34, which latter slides in a guide provided for the same on the swinging arm 14, and transfers its motion upon the bell-crank 35, which at its outer ends is provided with teeth forming segments of a gear-wheel. This lower part of the bell-crank 35, by means of a corresponding gear-segment, 62, attached to the lever 36, transfers the motion to said lever 36, the outer end of which is connected to the shuttle-carrier by a connecting-rod, 37.

The shuttle-carrier is so constructed that it will abandon its hold upon the shuttle when the swinging arm 14, and with it the whole shuttle-throwing mechanism, commences to swing back from its upper position, in order to allow the one flap of the just-sewed book-section to fall down and to make room for placing upon the angle of the swinging arm 14 the next section. When the swinging arm 14 reaches again its upper position, then the shuttle-carrier will regain its hold upon the same shuttle, or any other shuttle which may be brought into its reach by one of the shuttle-boxes 32.

In order to be able to sew various styles of books, it is necessary to have on each side of the machine one, two, or more shuttle-boxes 32, which are fastened to the bell-crank 33, which latter derives its motion from the cams 39, provided with teeth on their periphery gearing into pinions 63, fast upon the main shaft 1, and thus receive their required motion.

Our drawings show two shuttle-boxes at each side of the machine, and a machine thus arranged would allow the use of three shuttles, because one shuttle-box has to remain always empty to receive the shuttle thrown from the other side of the machine.

The cams 39 are so constructed as to give the corresponding motion for the shuttle-boxes. If it should be desired to use another number of shuttles, it would also require the arrangement of the cam 39 in a corresponding manner.

The books may be sewed onto a backing material—crash, cloth, &c.—which may run all the way or partly across the back of the book, or else on tapes or cords, as may be desired. The backing material may also be left out entirely, if desired. This material—cloth, tape, or cord—may be placed upon a bobbin, 49, from where it is guided over or through a row of friction-rods, 50, and over the fold of the sheets while being sewed.

The machine will sew an unlimited number of sections without interruption, which will pass along a suitable trough to the rear of the machine, with their backs upward and the sheets hanging downward. The sections thus sewed together will be taken out at the rear of the machine, and may there be cut apart, leaving any desired number of sections together.

If books are to be sewed so that each book is supplied with sufficient backing material (cloth, cord, or tape) projecting at each side of the book for being pasted to the covers of the books, then prismatic blocks of wood or other material may be placed between the books after the sewing of each complete book. The thickness of these blocks will determine the length of the backing material projecting at the sides of the book. These blocks are longer than the book, and are guided with their ends in guides 51, at the bottom of which carrying-belts 40 travel, upon which the ends of the blocks are laid, and thus the books are carried to the rear of the machine. These carrying-belts pass over wheels 41 and 42, attached to a shaft, 65, and may be tightened by the movable pulley 43. To one wheel, 41, a ratchet-wheel, 45, is fastened, which, by a pawl, 46, attached to a lever, 47, receives its motion from the crank or projection 64, attached to the end of one of the connecting-rods 12.

The needle threads or cords may run over the back of the book in a straight line, as shown in Fig. V, or they may run in a zigzag way, in order to obtain a stronger hold upon the backing material, as shown in Fig. IV. To obtain this zigzag motion the needle-bars 21 have to shift sidewise after the sewing of each section. This shifting motion is obtained from a cam, 48, receiving its motion from the main shaft 1. This cam 48 moves a roller attached to the lever 52, which latter acts upon the needle-bars 21. The cut at both ends of the sections, through which the shuttle-threads pass from one section to another, is made by a pair of knives, 53, which, to suit the different lengths of books, can be adjusted sidewise upon a bar, 54, which moves upward and downward with the needle-bars 21. At the front of the machine a wooden table, 55, is fastened to the frame 23, upon which the sections of the books may be laid before being sewed.

We hereby disclaim in favor of our application No. 124,629, filed December 18, 1883, all matter relating to the book or sheets bound, confining this application to the improvement in the mechanism hereinafter claimed.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A machine for sewing books, substantially as described, consisting of a swinging arm, 14, which serves to receive the sections for sewing, a shuttle-carrying mechanism, a needle mechanism, and a mechanism for cutting the ends of the sections, all substantially as described.

2. A signature-presenting mechanism, sub-

stantially as described, consisting of a swinging arm, 14, which serves to receive the sections before sewing, the grooved cams 8 on the driving-shaft, the rollers 10, and connecting-rods 12, whereby said swinging arm is operated, substantially as set forth.

3. The combination of the swinging arm 14 with the cam 33, the sliding rack 34, bell-crank 35, segment 62, and shuttle-throwing lever 36, substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GAVIN BROWN.
AUGUST BREHMER.

Witnesses to the signature of Gavin Brown:
THOMAS RUSSELL,
PETER FORGE.

Witnesses to the signature of August Brehmer:
HERM. LITERT,
OSW. SCHMIDT.