(No Model.) 4 Sheets—Sheet 1.

M. H. PEARSON.

EYELETING MACHINE.

No. 478,759. Patented July 12, 1892.

Fig. 4.

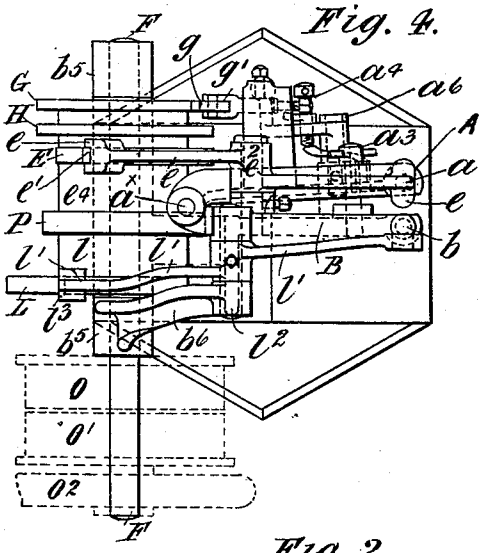


Fig. 5.

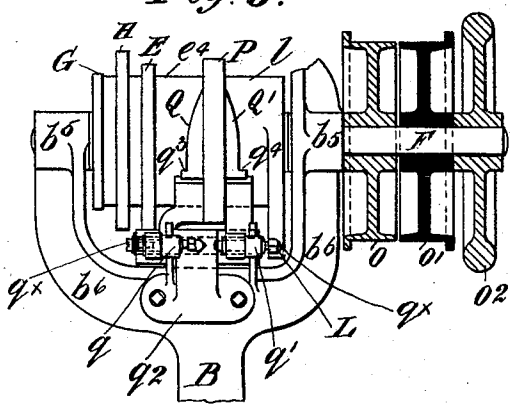


Fig. 2

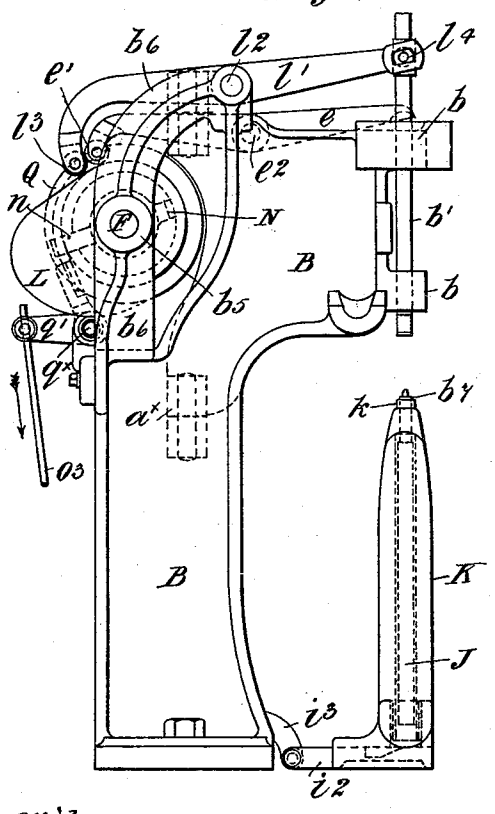
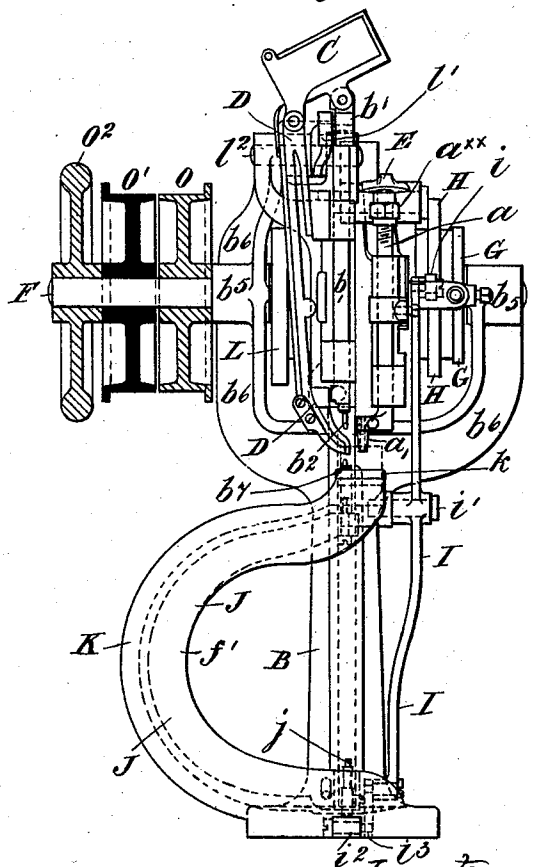


Fig. 1.



Witnesses,

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Baltus D. Long.

Inventor,

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By his Attys.

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(No Model.) 4 Sheets—Sheet 2.

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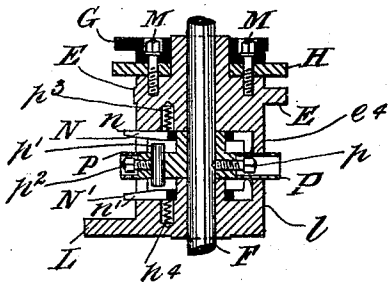
Fig. 6.



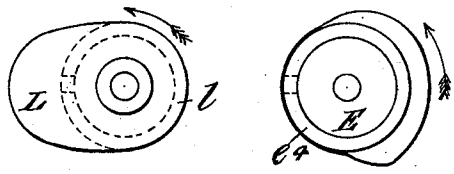


Fig. 7

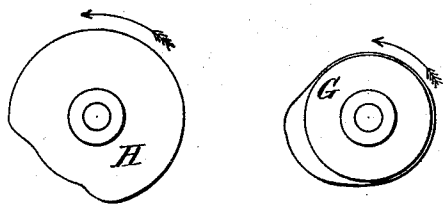


Fig. 3.

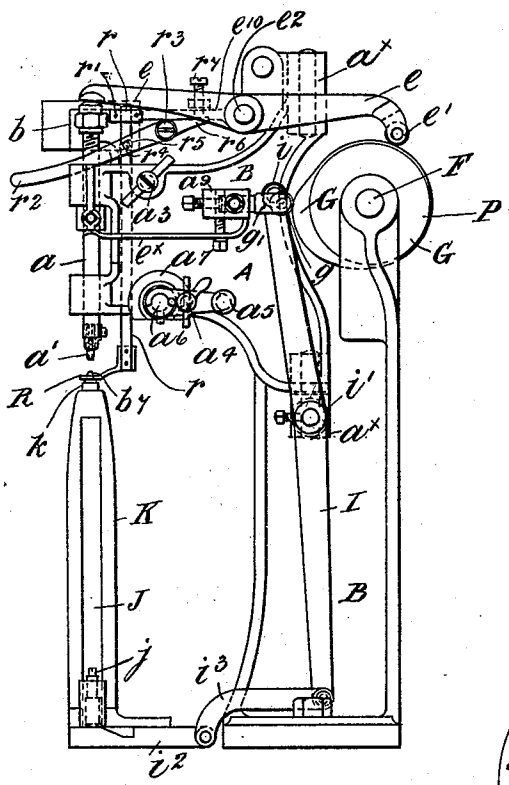


Fig. 8.

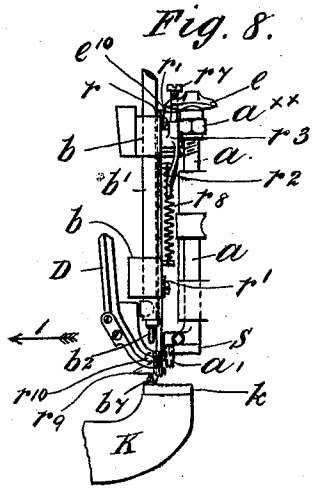


Fig. 9.

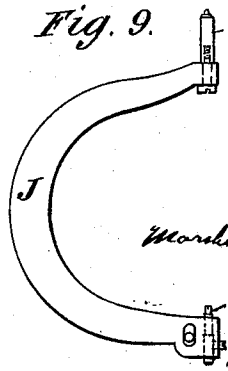
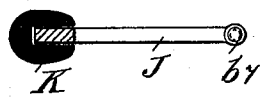


Fig. 10.



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(No Model.) 4 Sheets—Sheet 3.

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EYELETING MACHINE.

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Fig. 11.

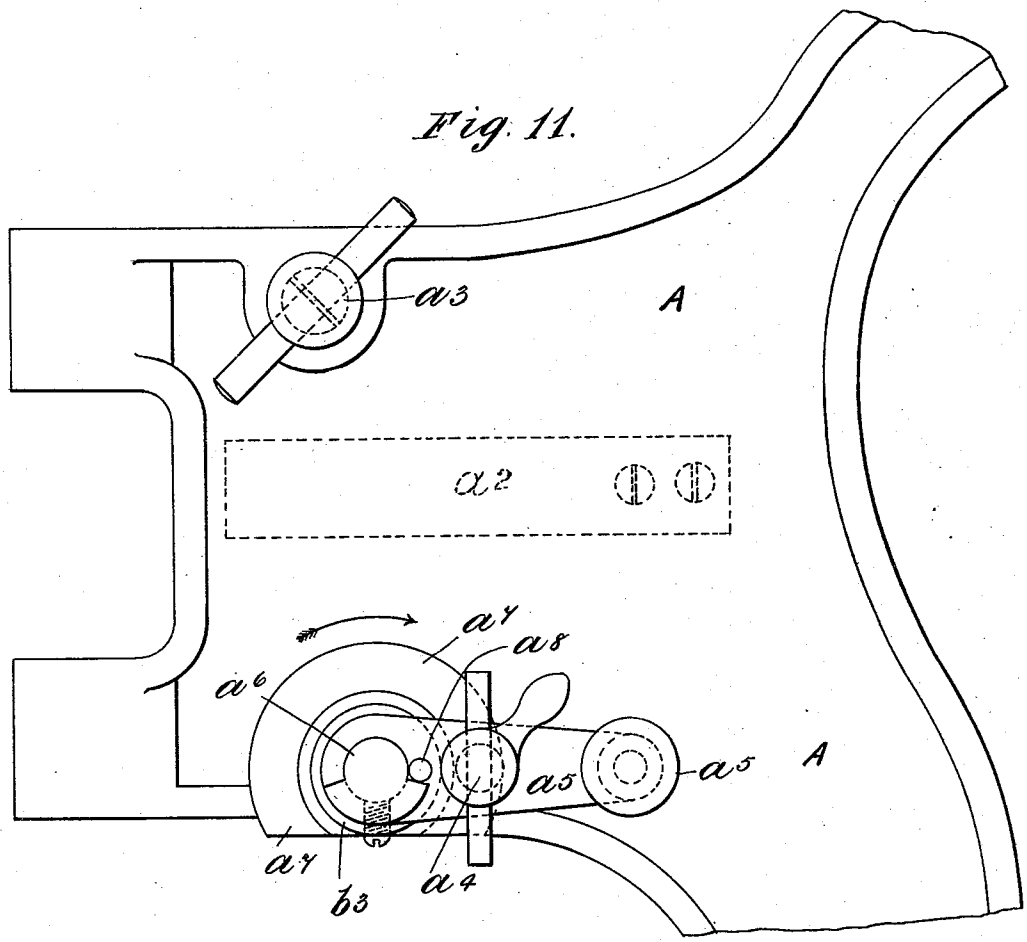

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Fig. 13.

Fig. 14.

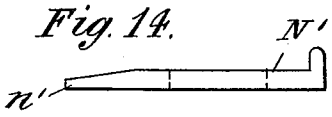


Fig. 12.

Fig. 15.

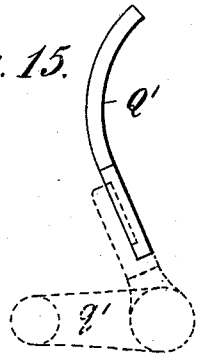
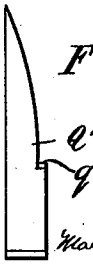


Fig. 16.



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UNITED STATES PATENT OFFICE.

MARSHALL HENRY PEARSON, OF LEICESTER, ENGLAND.

EYELETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 478,759, dated July 12, 1892.

Application filed January 20, 1892. Serial No. 418,694. (No model.) Patented in England May 16, 1891, No. 8,477.

To all whom it may concern:

Be it known that I, MARSHALL HENRY PEARSON, a subject of the Queen of Great Britain, residing at Leicester, in the county of Leicester, England, have invented new and useful Improvements in Punching and Eyeleting Machines, (for which I have applied for Letters Patent in Great Britain and Ireland the 16th day of May, 1891, No. 8,477,) of which the following is a specification.

My invention relates to that class of punching and eyeleting machines such as are described in the specification of United States Letters Patent granted to me and Charles Bennion the 29th day of January, A. D. 1889, No. 396,890; and the object of the present invention is, first, to make the machines self-feeding—that is, in addition to automatically supplying the eyelets to the clinching mechanism to intermittently traverse the work forward after the punching and eyeleting operations or punching operation alone have or has taken place—and, second, to provide suitable power driving and stopping mechanisms for actuating and arresting the motion of the eyeleting and punching spindles. I attain these objects by mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the machine with the stand and treadle arrangement removed. Figs. 2 and 3 are respectively left and right hand elevations with driving-pulleys and fly-wheel removed; Fig. 4, a plan looking at the top as it appears after the removal of the horn and eyelet-receiving box; Fig. 5, a part back elevation of machine; Fig. 6, a section through the cams, disk, and drivers; Fig. 7, elevations of the cams; Fig. 8, a part front elevation showing presser-foot arrangement; Fig. 9, an elevation of means for supporting the lower die; Fig. 10, a part sectional plan of horn and method of supporting the lower die. Figs. 11 and 12 are respectively a part elevation and plan, drawn to an enlarged scale, of means for adjusting the position of the punching and eyeleting spindles. Figs. 13 and 14 are respectively side and end elevations of drivers. Figs. 15 and 16 are respectively side and end elevations of curved wedges.

Similar letters refer to similar parts throughout the several views.

A is the swinging frame or cheek (hereinafter termed "cheek") in which the punching-spindle a (armed with a punch a') works. The cheek A is hinged at $a^{\times}$ to the main frame-work B of the machine. In bearings b of the frame-work B the eyeleting-spindle b' (armed with the upper clinching-die b^2) intermittently reciprocates. C is the eyelet-receiving box, which is jointed to the chute D.

All the above-mentioned parts may be of the same construction and are operated (with the exception of the spindles a and b') in the same manner as described in the aforesaid patent.

The cheek A, carrying the punching-spindle a, is held away from the main frame-work B by a spring a^2, (see Figs. 11 and 12,) and the distance between the punch and eyeleting-dies b^2 b^7 may be regulated by two screws a^3 a^4. In order to adjust the distance between the punching and eyeleting dies to two sizes, the upper a^3 of the two screws is employed for regulating the longer distance, while the lower stop a^4 (which may consist of an adjusting-screw a^4, armed with a lock-nut, mounted in a lever a^5, carried by a spindle a^6, fixed in a boss b^3 on the frame B) is made to overcome the pressure of the spring a^2 whenever the end of the screw a^4 is made to describe a semicircle (in the direction of arrow) on the face of the cam-shaped piece a^7, fixed on the cheek A. The position of the screws a^3 a^4 may, when desired, be reversed. In the above-described arrangement of lower stop a^4 the head of the spindle a^6 (on which the lever a^5 turns) is cut away, as shown at Fig. 11, to form a stop against which a pin a^8, mounted on the lever a^5, works.

The required intermittent vertical reciprocating motion is imparted to the punching-spindle a from a cam E on the driving-shaft F (mounted in the bearings b^5, formed on the bifurcated portion b^6 of the frame-work B) of the machine through a double-ended lever e, armed at the cam end with a runner e', fulcrumed to the frame-work B at e^2. The punching-spindle a, which may be provided with an adjustable head $a^{\times\times}$, is kept in contact with its actuating-lever e by means of a suitable spring $e^{\times}$, which is also employed for retaining the runner e' at the opposite end of lever e in contact with cam E. The cam E

first causes the punching-spindle a to descend and punch the hole, and when this has been done the punch a' slightly rises in the material, but not clear of it, and then remains stationary, as regards its vertical movement, until the lateral feeding motion has taken place for placing the hole in position to be eyeleted.

The feeding of the work is accomplished by means of a cam G, also mounted on the driving-shaft F, acting upon a runner g, mounted in a carrier g', adjustably or otherwise attached to the cheek at a^9. Just before the lateral feeding motion takes place the lower eyeleting-die b^7 is made to fall below the level of the punching plate or bed k to permit of the punch a' moving the material forward, as described, and immediately the punch has completed its horizontal feeding movement the lower die b^7 rises into the hole previously punched in the material. The spindle a at the same time is raised by its spring $e^{\times}$. The motion for raising and lowering the lower eyeleting-die b^7 is obtained from a third cam H, mounted on the driving-shaft F, which acts upon a runner i, mounted in the upper end of a double-ended lever I, fulcrumed at i' to the frame-work B. The opposite or lower end of lever I is attached by a link i^3 to a sliding cam-piece i^2, which actuates the lower die-supporting piece J. The supporting-piece J is shaped somewhat similar to a horseshoe (see Fig. 9) and works within the horn K of the machine, as shown at Figs. 1, 2, and 3. The position of the lower eyeleting-die b^7 and its supporting-piece J may be adjusted by set-screw j.

The eyeleting-spindle b' is reciprocated by a fourth cam L, mounted on the driving-shaft F, by means of a double-ended lever l', (which is fulcrumed at l^2 to the frame-work B and armed at one end with a runner l^3, while the opposite end is slotted to receive a die l^4, mounted on a pin fixed to the eyeleting spindle,) which first causes the spindle to descend and take an eyelet from the chute D, insert it in the material, and then to clinch it upon the lower die b^7. Suitable springs may also be employed for retaining the cams E, G, H, and L in contact with the runners e', g, i, and l^3.

On reference to the drawings it will be seen at Fig. 6 that the cams E, G, and H are arranged so that they may be secured by set-screws M M, so as to operate together. The whole of the cams E, G, H, and L may be mounted loosely upon the driving-shaft F, but are so connected together that they will operate upon their respective parts in proper order. They also remain stationary upon the shaft F, except when acted upon by the drivers N N′—that is to say, on the driving-shaft F, (to which a continuous rotary motion is imparted through driving-pulley O from any convenient source of power. O′ is a loose pulley and O^2 a fly-wheel,) on which the cams E, G, H, and L are mounted loosely and remain at rest until put into motion by treadles, (not shown in the drawings, but may be two in number), and of a similar construction to those described and illustrated in the aforesaid patent. Between the cams E and L—that is, the eyeleting and punching cams—is a disk P, which is secured by a set-screw p to the shaft F, and is free to rotate with it. Mounted in or upon the disk P is a steel pin p', (which is held in position by a set-screw p^2,) so as to project on each side thereof to engage with the drivers N N′. The drivers are mounted loosely on the hubs of the disk P, and are arranged, respectively, within the bosses l and e^4 of the eyeleting-cam L and punching-cam E. The ends $n\,n'$ of the drivers N N′ project beyond the peripheries of the bosses l and e^4, while their opposite ends are each within the said bosses. As the drivers revolve with the cams E and L they are arranged to come separately or simultaneously in contact with one or both of the curved wedges Q Q′, the inner faces of which are shaped to fit the peripheries of the bosses e^4 l, as shown at Fig. 2. Each wedge Q or Q′ is adjustably attached to a bell-crank lever q or q', which in turn is jointed or centered at $q^{\times}$ to a bracket q^2, fixed to the bifurcated portion b^6 of the framing B. When a driver N or N′ during its rotation comes in contact with the wedge Q or Q′, it is thereby caused to move away from the pin p' in the disk P. The disk P is then free to revolve. A shoulder or projection q^3 or q^4 is formed on each wedge Q Q′ for preventing the drivers N N′ continuing their rotation—that is, each shoulder acts as a positive stop. A slight pressure on either of the treadles will cause the rod O^3 and lever q' to be depressed in the direction of arrow for moving one of the wedges Q or Q′ away from the boss of the cam, thereby releasing it from contact with the driver N or N′, which is then free to be pressed inward toward the disk P by a spring p^3 or p^4 (arranged within the said cams) within the circuit of rotation of the pin p'. As soon as the pin strikes the driver it causes the cam (to which the driver is connected) to rotate. Thus if the eyeleting-spindle b' is required to be operated the eyeleting-treadle will be depressed thereby, withdrawing the projection q^4 on wedge Q′ from its contact with driver N′, which permits the spring p^4 to press said driver N′ within the circuit of pin p' for operating the cam L. When the opposite treadle is operated, a similar result will be obtained for punching and feeding—namely, on wedge Q being moved outward projection q^3 will be released from its contact with the driver N, thereby allowing the spring p^3 to press the driver into contact with the end of pin p' for rotating cams E, G, and H; but when desired before a complete revolution of the cams has been made the treadle or treadles may be released and the wedge or wedges returned to its or their normal position, thus forcing the driver or drivers out of

contact with the pin p' and against the stops q^3 or q^4 for stopping the rotation of the cam or cams. If the cams are required to make several rotations without stopping, the treadle or treadles may be held down by the foot of the operator. The two wedges Q Q′ are controlled by separate treadles, which may be depressed singly or simultaneously, as required.

A presser-foot R is provided to hold down the material while the punch a' is being withdrawn and also for keeping the work in position until the eyelet is clinched. The presser-foot R is mounted on a bar r, carried in suitable bearings r' r' on the frame-work B, as shown at Figs. 3 and 8. The requisite motion for raising the presser-foot is obtained from the double-ended lever e through a set-screw r^7, (mounted in a projection e^{10} on the lever e,) which is made to engage with the end r^6 of the lifting-bar r^2, fulcrumed at r^3 to the frame-work B. The lifting bar or lever r^2 is connected to the presser-bar r by means of a pin r^4, which is arranged to work in the slot-hole r^5. The presser-foot R is returned to and kept down to its work by a spring r^8. In order to move the eyelet-chute D to the left—that is, in direction of arrow 1—whenever the presser-foot R is raised (by the means described) a cam r^9 is formed on or attached to the presser-foot, which is arranged to engage with a pin r^{10}, projecting from the back of the chute D. A small chute S may also be attached to the punching-spindle a for conveying the punchings away, thus preventing them from falling under the punching or eyeleting die.

The mechanism for sorting and feeding the eyelets, also the upper eyeleting-die b^2, may be of the same construction and actuated in the same manner as that described in the aforesaid patent.

The cycle of movements is as follows: The punch a' first descends and makes a hole and then rises just clear of the punch-bed k; second, the lower die b^7 descends and the punch a' moves laterally, carrying the material with it; third, the lower die b^7 rises into the hole punched and punch a' rises and moves back to its original position, and, lastly, the upper eyeleting-die b^2 descends, receives an eyelet from chute D, and clinches it in the material, and then rises to its original position. During the above cycle of movements the presser-foot is arranged so that it will always press upon the material, except during the time that the punch is in the material—that is, the presser-foot is raised as soon as the punch enters the material and it falls when the punch is raised after the feeding movement has taken place.

Having now particularly described the nature of my invention, what I claim, and desire to be secured by Letters Patent, is—

1. In a punching and eyeleting machine, the combination, with the framework, of a hinged cheek, a punching-spindle mounted therein, a reciprocating eyeleting-spindle mounted in the framework, a spring for holding the cheek away from the framework, and adjusting devices comprising a cam for holding the cheek in the desired position relatively to the frame to vary the distance between the punching and eyeleting spindles.

2. In a punching and eyeleting machine, a cheek A, hinged to framework B, having a spring a^2 interposed between the said cheek and framework, and a distance-regulating screw a^8, in combination with punching and eyeleting spindles mounted in the cheek and the framework, all substantially as set forth.

3. In a punching and eyeleting machine, a cheek A, hinged to framework B and spring a^2, with a screw a^4, mounted in a lever a^5, (armed with a pin a^8,) turning on a spindle a^6, attached to said framework, and a cam a^7, in combination with the punching and eyeleting spindles mounted in the cheek and framework, all substantially as set forth.

4. In a punching and eyeleting machine, the combination of punching and eyeleting devices, their power driving and feeding mechanisms, consisting of cams E, G, H, and L, mounted on driving-shaft F, disk P, drivers N N′, pulleys O O′, wedges Q Q′, levers e, l, I, and i^3, lower-die-supporting piece J, and cam-piece i^2, all substantially as specified.

5. The combination, in a punching and eyeleting machine, of a reciprocating punching-spindle mounted in a hinged cheek, with a double-ended lever fulcrumed to the frame-work, a cam for operating said lever, a disk mounted on the driving-shaft and armed with a pin, a driver mounted on the hub of said disk, and a curved wedge hinged to the frame-work, all as set forth.

6. The combination, in a punching and eyeleting machine, of eyeleting devices, cams E, G, and H, disk P, pin p', spring p^3, driver N, curved wedge Q, driving-shaft F, pulleys O O′, levers e, spring e^x, spindle a, cheek A, runner g, carrier g', and bracket a^9, as and for the purposes set forth.

7. In a punching and eyeleting machine, the combination of a spindle b', mounted in bearings on the main framing B, with lever l', cam L, driving-shaft F, pulleys O O′, disk P, pin p', spring p^4, driver N′, and curved wedge Q′, all substantially as and for the purposes set forth.

8. The combination, in a punching and eyeleting machine, of cams E, G, H, and L, driving-shaft F, disk P, pin p', drivers N N′, set-screws M M p and p^3, and springs p^3 and p^4, substantially as shown, for the purposes specified.

9. In a punching and eyeleting machine, the combination, with punching and eyeleting devices, of the disk P, armed with a pin p' and having drivers N N′ mounted on its hub, and connections between the drivers and the eyelet setting and punching devices, substantially as shown, and for the purposes specified.

10. The combination, with punching and eyeleting devices, of a power-driven shaft, cams thereon, connections between the cams and the punching and eyeleting devices, the drivers, connections between the drivers and the cams, the curved wedges Q Q′, having projections q^3 q^4 formed on their sides, and means for operating the wedges, substantially as and for the purpose specified.

11. The combination, in a punching and eyeleting machine, of a driving-shaft, cams loosely mounted thereon, a disk P, secured to the shaft, a driver N′, a pin p' for connecting the driver with the disk, a wedge Q′ for moving the driver, the support for the lower clinching-die, the spindle of the upper clinching-die, the lever l', connecting the spindle with its operating-cam, and connections between the support of the lower clinching-die and its operating-cam.

12. The combination, in a punching and eyeleting machine, of framework B, reciprocating spindle b', die b^2, lever l, cam L, driving-shaft F, wedge Q′, driver N′, disk P, pin p', with horn K, and lower die b^7, all substantially as specified.

13. In a punching and eyeleting machine, the combination of a vertically-reciprocating punching-spindle a, means for moving it laterally to feed the material, a presser-foot R, the vertically-moving rod on which it is mounted, the lever r^2, connected to the vertical rod of the presser-foot, power-driven devices operating upon said lever for actuating the presser-foot, an eyelet-feeding chute, and eyelet-setting devices.

14. In a punching and eyeleting machine, the combination of the vertically-reciprocating punching-spindle, eyeleting devices, means for actuating the punching-spindle and the eyeleting devices, an eyelet-feeding chute D, a vertically-reciprocating presser-foot, and devices carried by the presser-foot for moving the eyelet-chute laterally, substantially as and for the purpose set forth.

15. The combination, in a punching and eyeleting machine, of the hinged cheek A, connected with the framework B, reciprocating spindle a, reciprocating spindle b', levers e and l', eyelet-box C, chute D, presser-foot R, bar r, lifting-lever r^2, set-screw r^7, spring r^8, cam-piece r^9, and pin r^{10}, all substantially as set forth.

16. The combination, in a punching and eyeleting machine, of a cheek A, hinged to framework B, reciprocating spindles a and b', stops a^3 a^4, lever a^5, spindle a^6, cam a^7, cams E, G, H, and L, driving-shaft F, pulleys O O′, levers e, I, and l', carrier g', cam-piece i^2, link i^3, supporting-piece J, horn K, drivers N N′, treadle-rod O^3, disk P, pin p', springs p^3 p^4, wedges Q Q′, presser-foot R, bar r, lifting-lever r^2, adjusting-screw r^7, spring r^8, cam r^9, and pin r^{10}, all substantially as herein set forth.

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

MARSHALL HENRY PEARSON.

Witnesses:

FRED FELLOWES WIGGINS,

GEORGE WM. COLTMAN.