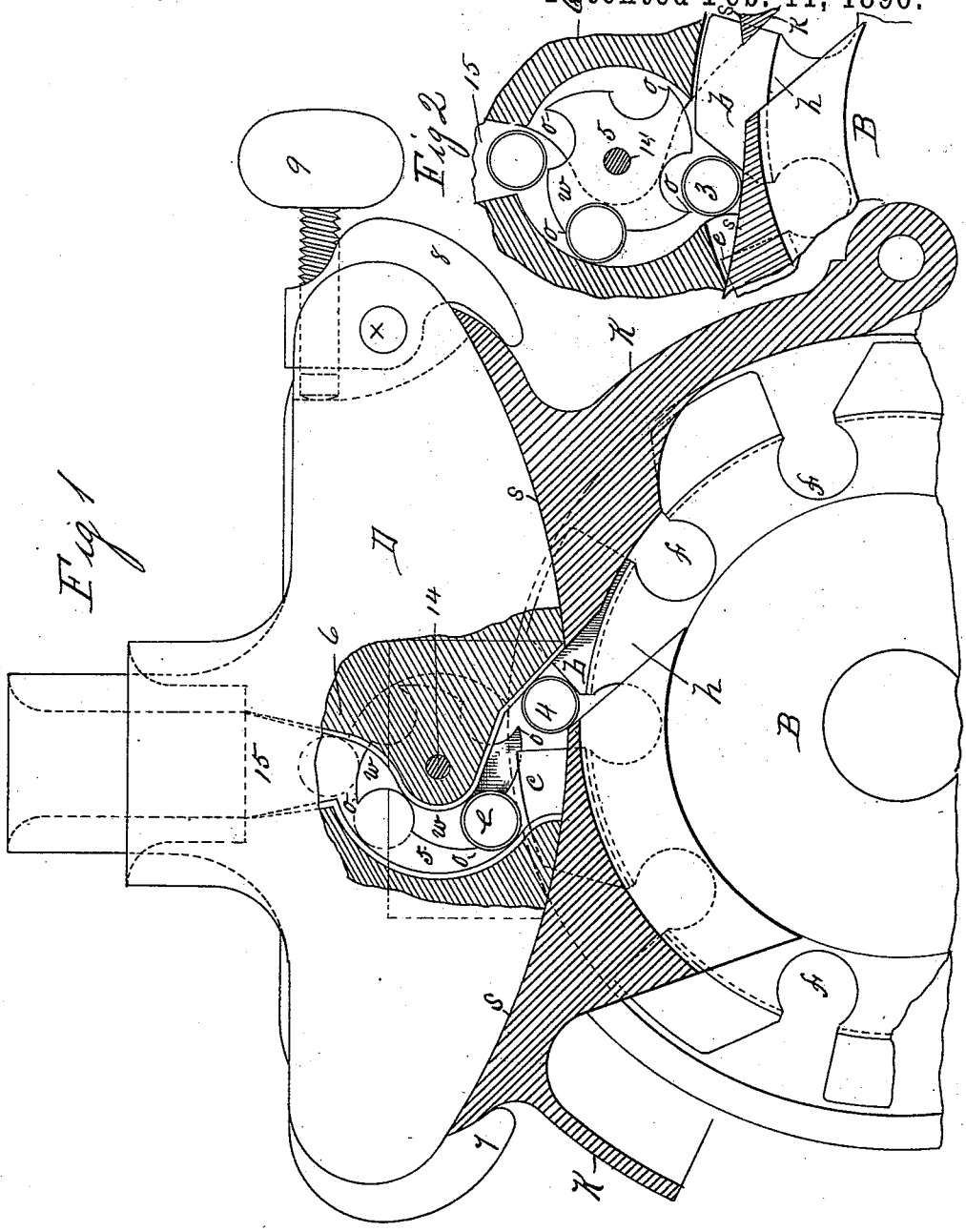
(No Model.)

3 Sheets—Sheet 1.

# L. F. BRUCE.

## CARTRIDGE FEEDING DEVICE.

No. 421,348. Patented Feb. 11, 1890.

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(No Model.) 3 Sheets—Sheet 2.

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## CARTRIDGE FEEDING DEVICE.

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Fig 3

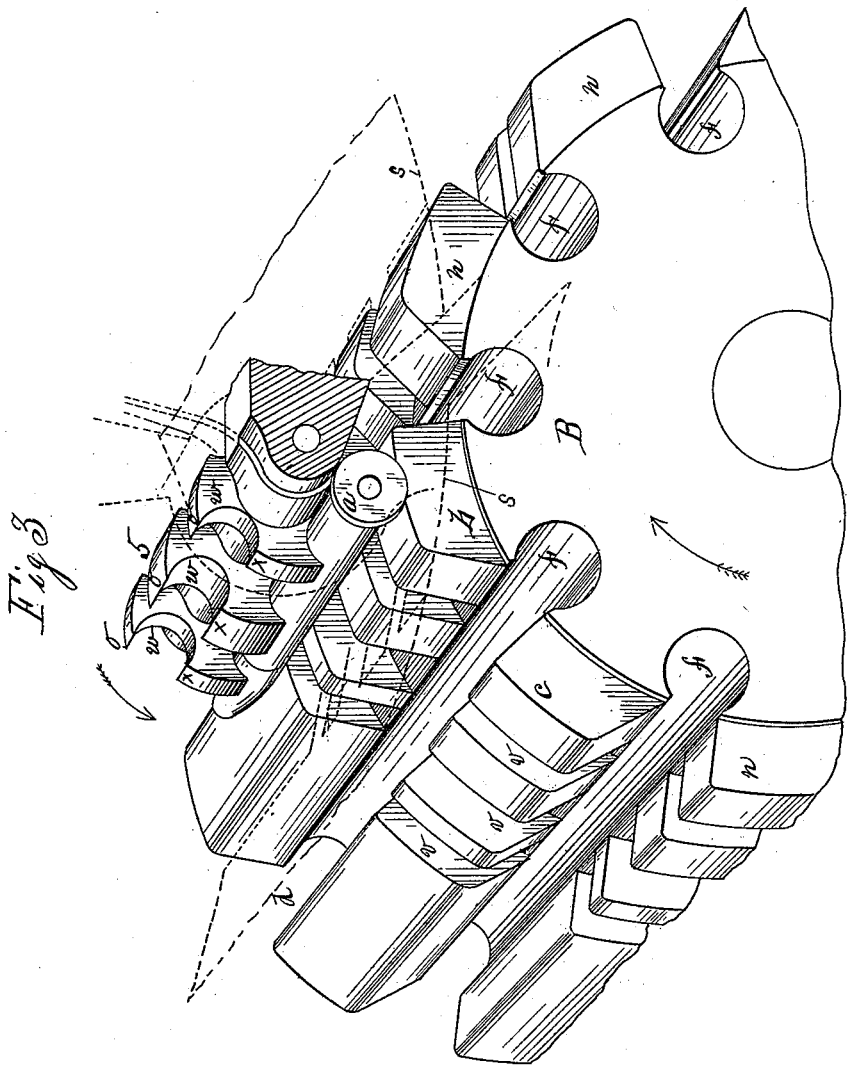


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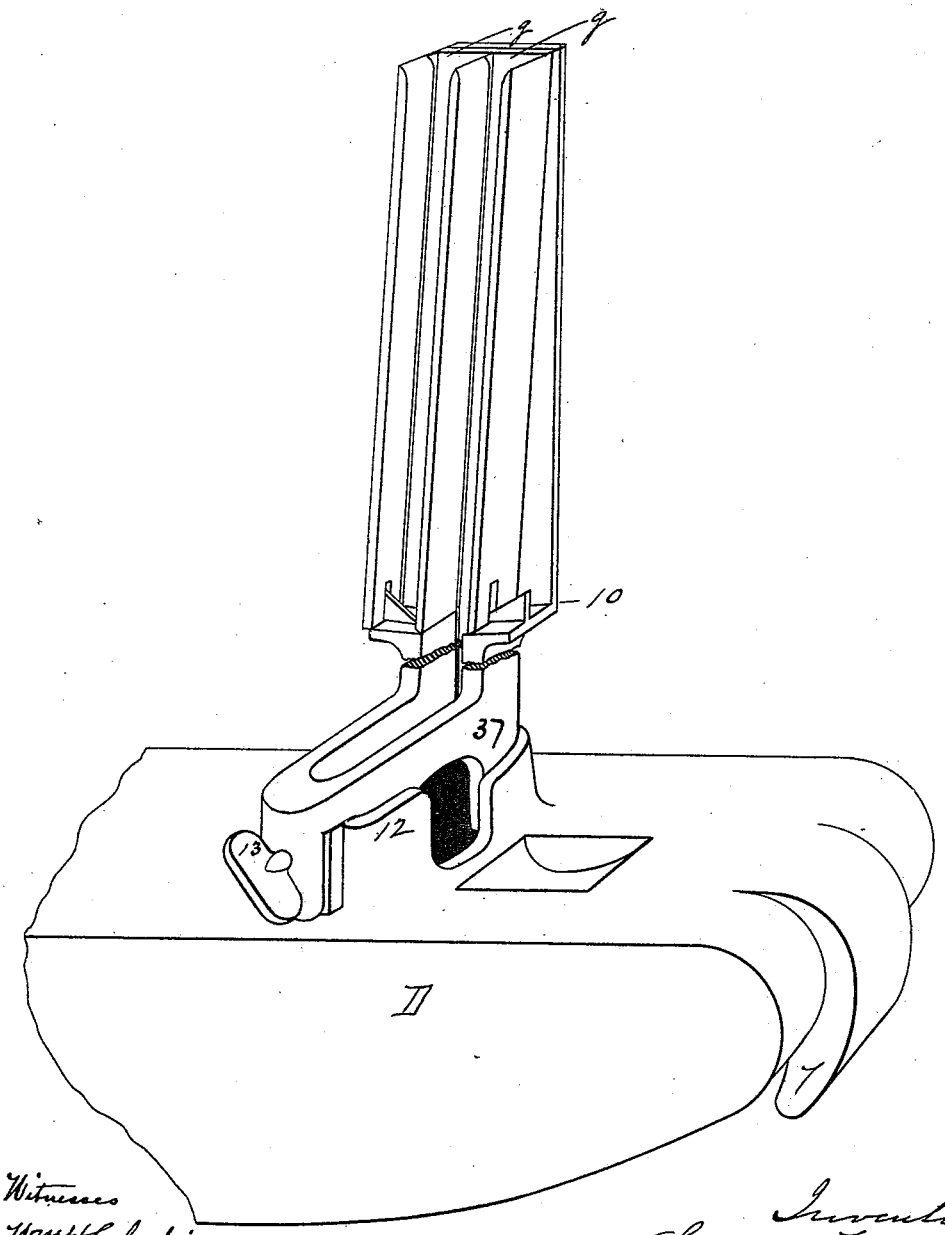
Fig 4

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# UNITED STATES PATENT OFFICE.

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## CARTRIDGE-FEEDING DEVICE.

SPECIFICATION forming part of Letters Patent No. 421,348, dated February 11, 1890.

Application filed June 26, 1889. Serial No. 315,490. (No model.)

*To all whom it may concern:*

Be it known that I, LUCIEN F. BRUCE, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Cartridge-Feeding Devices for Machine-Guns, of which the following is a specification.

This invention relates to cartridge-feeding devices for machine-guns, and pertains to improvements in mechanism for controlling the movement of cartridges between the feeder into which the cartridges are first placed and the revolving carrier of the gun; and the invention consists in the peculiar construction and arrangement of said mechanism, whereby it is brought into co-operative relation with and under the control of said carrier, and in improved means for attaching said mechanism to the gun, all as hereinafter fully described, and set forth in the claims.

In the drawings forming part of this specification, Figure 1 is an end elevation of a portion of the revolving cartridge-carrier of the well-known Gatling gun, showing a portion of the casing inclosing said carrier in section, and having applied thereto cartridge-controlling mechanism constructed according to my invention. Fig. 2 illustrates detail parts of said cartridge-controlling mechanism and a portion of the case inclosing the same, and a portion of the carrier of the gun, and is hereinafter fully described. Fig. 3 is a perspective view of a portion of the rotating cartridge-carrier of the gun, together with a portion of the aforesaid cartridge-controlling mechanism, showing a cartridge in a certain position between a part of said mechanism and the carrier, all as hereinafter described, said figure having the base of the hopper indicated thereon in dotted lines. Fig. 4 is a perspective view of the cover portion of the said case in which is located said cartridge-controlling mechanism, and of a cartridge-feeder of well-known construction attached to said case in operative position.

Cartridge-feeding devices for machine-guns heretofore constructed with a cartridge guiding or controlling wheel similar to the wheel 5 of this application have said wheel applied thereto in a different operative relation to the cartridge-carrier of the gun from that herein shown and described.

The essential object of this invention is to provide such construction and arrangement of the cartridge-carrier of the gun and of a cartridge guiding and controlling wheel co-operating with and having its rotation controlled by said carrier as insures the most reliable and accurate movement of the cartridges with great rapidity into the gun, and which obviates the danger of clogging and stopping the feed of the cartridges during rapid firing.

In the drawings, B indicates the cartridge-carrier of the well-known Gatling gun, said carrier in practice being adapted to be rotated with the barrels and holding cartridges in longitudinal semi-cylindrical grooves in positions in a line with the bore of said barrels.

K indicates the portion of the hopper of the gun directly over said cartridge-carrier, and 6 the feeding-wheel case, which is located in the hopper-cover D. The mouth 12 of the hopper is adapted to receive the foot of the cartridge-feeder 10, the latter being secured to the hopper-mouth by a thumb-screw 13.

The hopper-cover D is secured to the hopper by means of a fixed hook 7 on one end thereof, which engages with the adjoining edge or border of the hopper, as shown in Fig. 1, and the hook 8, which is pivoted on the opposite end of the cover, capable of engaging by one end with the border of the hopper, as shown, and having a thumb-screw 9 passing through its opposite end and against the end of the cover D, whereby said hook is swung into engagement with the hopper to secure the cover thereto, or is disengaged therefrom to permit said cover to be removed.

The said cartridge-carrier B is made with the usual longitudinal ribs *b c n* thereon, which ribs are substantially identical in form, but are differently designated, as above, for the purpose of more clearly explaining the operation of the within-described improvements. The above-referred-to semi-cylindrical grooves in the carrier are those shown between said ribs, and are indicated by *f*. To adapt the said cartridge-carrier B to the improvements herein described, it has a series

of annular grooves *v* formed in the said ribs thereon, there being as many of said grooves as there are sections *w* of the feeding-wheel 5, and the width of said grooves is such as permits said sections to enter them more or less when said wheel is rotated, as shown in Fig. 1.

The base or bottom *s* of the hopper K has a longitudinal slot *h* therein, which constitutes the throat of the hopper, and through which the cartridges pass into the grooves *f* between the said ribs on the cartridge-carrier. Said base *s* is also formed, as indicated by dotted lines in Fig. 3, to permit the said ribs to project through it as the cartridge-carrier B rotates. Fig. 1 also shows the projection of said ribs through the base of the hopper.

The feeding-wheel case 6 is formed in or attached to the hopper-cover D and contains a cylindrical wheel-chamber, as shown in Figs. 1 and 2, in which the feeding-wheel 5 is hung to rotate on a suitable shaft 14. A passage 15, through which cartridges pass from the feeder 10 to the said wheel and its chamber, is formed in the upper part of the cover D. The discharge-opening for cartridges at the lower side of said wheel-chamber is much wider than said passage 15 at its upper side, in order to permit the extremities of said ribs to enter said chamber more or less, in order to properly co-operate with the feeding-wheel 5, as below described, in governing the movement of and manipulating the cartridges, so that they are made to take their proper places successively in the grooves of the carrier B. The said feeding-wheel 5 is constructed with sections *w*, having circular notches in their peripheries, as shown. Said notches are formed in a line in the several sections and at four different points in said peripheries, and they constitute, so to speak, four cartridge-grooves in said wheel, parallel with the axis thereof, to receive the cartridges, as shown in Figs. 1, 2, and 3, while they move through the wheel-chamber. Teeth *o* are formed on each wheel-section *w*, which are adapted to enter the said annular grooves in the ribs of the cartridge-carrier, as and for the purpose below described.

The cartridge-feeder 10, (shown in Fig. 4,) in connection with the hopper-cover D, is a well-known device, and is employed in connection with said cover, hopper, and the cartridge-controlling mechanism, to receive cartridges from a box into its vertical grooves *g g* and hold them by their heads while they move downward by gravity through the mouth 12 into said wheel-chamber. Any other suitable feeder than that shown in Fig. 4 may be employed to convey cartridges into the hopper if it be capable of properly directing the cartridges.

The operation of the above-described improvements in causing cartridges to be deposited one after another in regular order in the cartridge-receiving grooves of the rotating cartridge-carrier is as follows: The first of a line of cartridges *a* moving down from the feeder lands on the wheel 5 and causes it by its weight to turn in the direction of the arrow at the end of said wheel, Fig. 3, and the cartridge and said wheel will come to a stop in the position shown in Fig. 3, said cartridge *a* being engaged by the wheel 5 and lying against the outer side of the rib *b*, it being understood that other cartridges will lie against the wheel above said first one in the positions shown by dotted lines in Fig. 1. On starting the carrier the cartridge *a* and the wheel 5 remain momentarily quiet, while the rib *b* of the carrier moves under said cartridge, and said rib having passed from under the cartridge *a* the latter drops onto the base *s* of the hopper in such position that the approaching rib *c* engages with said cartridge (see Fig. 2) and by the movement of the rib *c* against it it is carried along to the mouth of the hopper-throat *h*, into which it is carried by said rib *c* until it arrives at the position shown by cartridge 4 in Fig. 1—that is to say, at the mouth of said throat—when it passes at once down the latter into one of the cartridge-chambers *f* between the ribs of the carrier. As soon as the rib *b* passes from under the said cartridge *a* the latter rolls off the edge of said rib and its ends strike said base *s* of the hopper, as aforesaid, and on which it is carried along toward the throat *h*, and while said cartridge is so moving the teeth *o* of the wheel enter the annular grooves *v* of the cartridge-carrier, as indicated in Fig. 1, where one of said teeth is shown partly emerged from one of said grooves, behind which tooth follows the cartridge *e*. While the said teeth *o* are entered into the grooves *v*, a cartridge, as *e*, follows directly behind said teeth, (see Fig. 1,) and, owing to the fact that the space between said base *s* and the extremity of the teeth *o* is of less width than the diameter of the cartridge, the latter, in order to pass along after dropping on the base *s*, must engage to a certain degree with the wheel 5, (see Fig. 2, cartridge 3,) and thus each cartridge constitutes, so to speak, a connection between one of the ribs of the cartridge-carrier and the wheel, whereby the latter and said carrier are caused to move in consonance, and hence no blocking of the feed can take place, for the wheel and carrier move in unison, carrying the cartridges one after another between them.

Heretofore in cartridge-feeding devices in which a wheel similar to wheel 5 is employed said wheel has not been controlled by engagement with the carrier through the intermediary of a cartridge, as above described, and hence such devices failed to produce the necessary uniform movement of wheel and cartridge-carrier. The said wheel and cartridge-carrier as heretofore made and arranged are capable of rotary movements when conveying cartridges, but under such conditions act more or less independently of each other, and as a consequence the cartridges from time to time become blocked be-

tween the carrier and the adjoining walls of the hopper; but said inconveniences are entirely obviated by the use of the within-described improvements, for the feeding-wheel and cartridge-carrier are in engagement by means of each of the interposed cartridges as they move along, and each cartridge can only reach its proper groove in the carrier by the uniform triple movement of the wheel, the carrier, and the cartridge itself.

What I claim as my invention is—

1. The cartridge-carrier of a machine-gun capable of a rotary movement under the hopper thereof, having a series of longitudinal ribs and cartridge-receiving grooves, as described, and a series of annular grooves transversely through said ribs, combined with a feeding-wheel having a free rotary motion at the side of said carrier, consisting of united sections *w*, having teeth thereon whose extremities enter said annular grooves, and circular notches therein to receive cartridges, and a wheel-chamber, as described, within which said feeding-wheel rotates, substantially as set forth.

2. The cartridge-carrier having longitudinal ribs thereon and a series of annular grooves transversely through said ribs, as described, combined with a freely-rotating feeding-wheel capable of engaging with a cartridge lying on one of said ribs and of entering said annular grooves, substantially as set forth.

3. The cartridge-carrier having longitudinal ribs thereon and a series of annular grooves transversely through said ribs, as described, combined with the hopper K, having perforations through its base to permit the separated portions of said ribs to extend therethrough, and a freely-rotating feeding-wheel capable of engaging with a cartridge lying on one of said ribs and on said hopper-base therebetween during the movement of the cartridge toward the throat of the hopper, substantially as set forth.

4. The hopper-cover D, having the rigid hook 7 on one end, the hook 8, pivotally attached to its opposite end, and the screw 9, passing through one end of said pivoted hook, combined with the hopper K, having a border with which said hooks engage, substantially as set forth.

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