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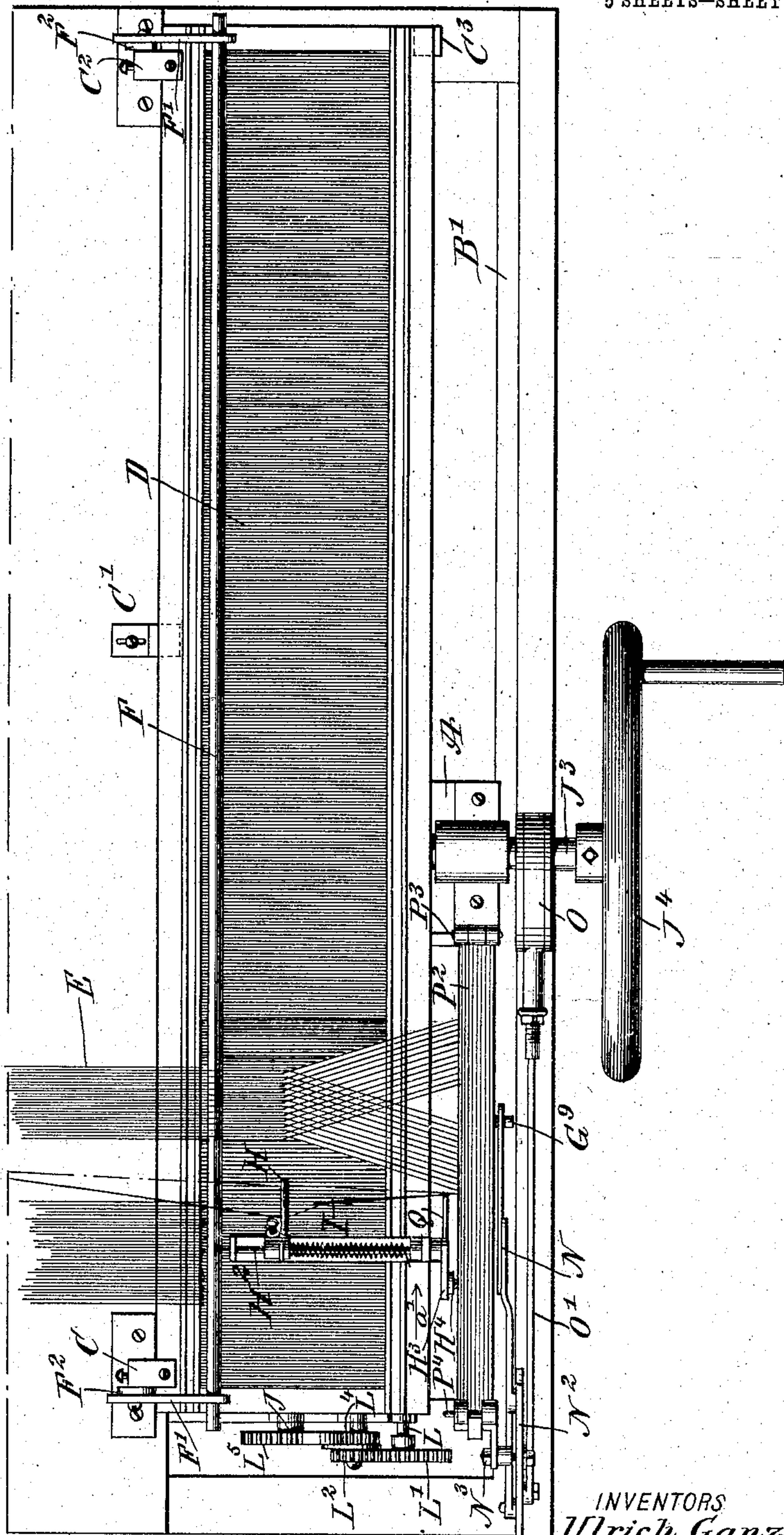
PATENTED JUNE 6, 1905.

U. GANZ & A. W. FRANÇOIS.
MACHINE FOR DRAWING-IN WARP THREADS.

APPLICATION FILED MAY 31, 1904.

5 SHEETS—SHEET 1.

FIG. 1



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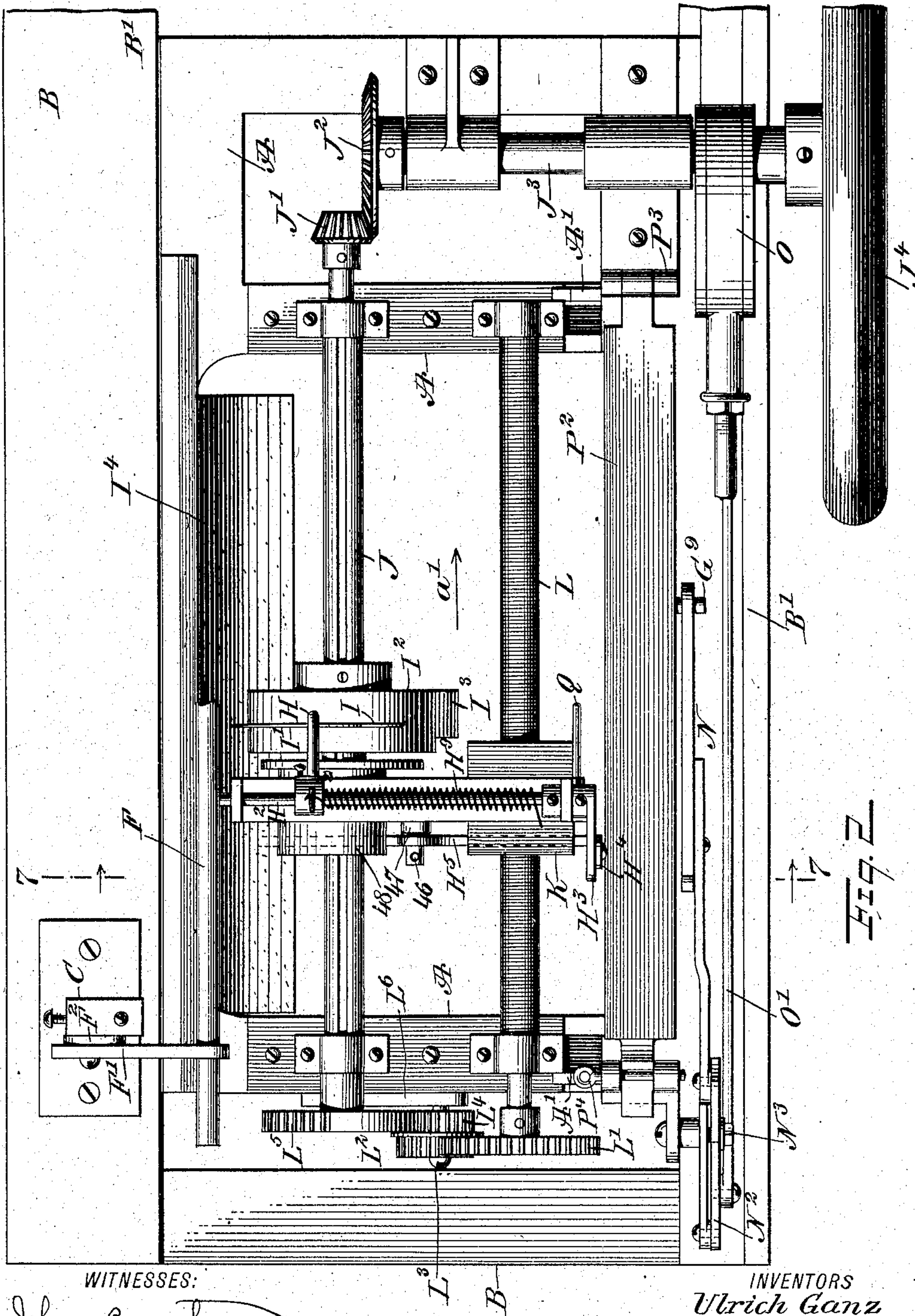
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5 SHEETS—SHEET 2.



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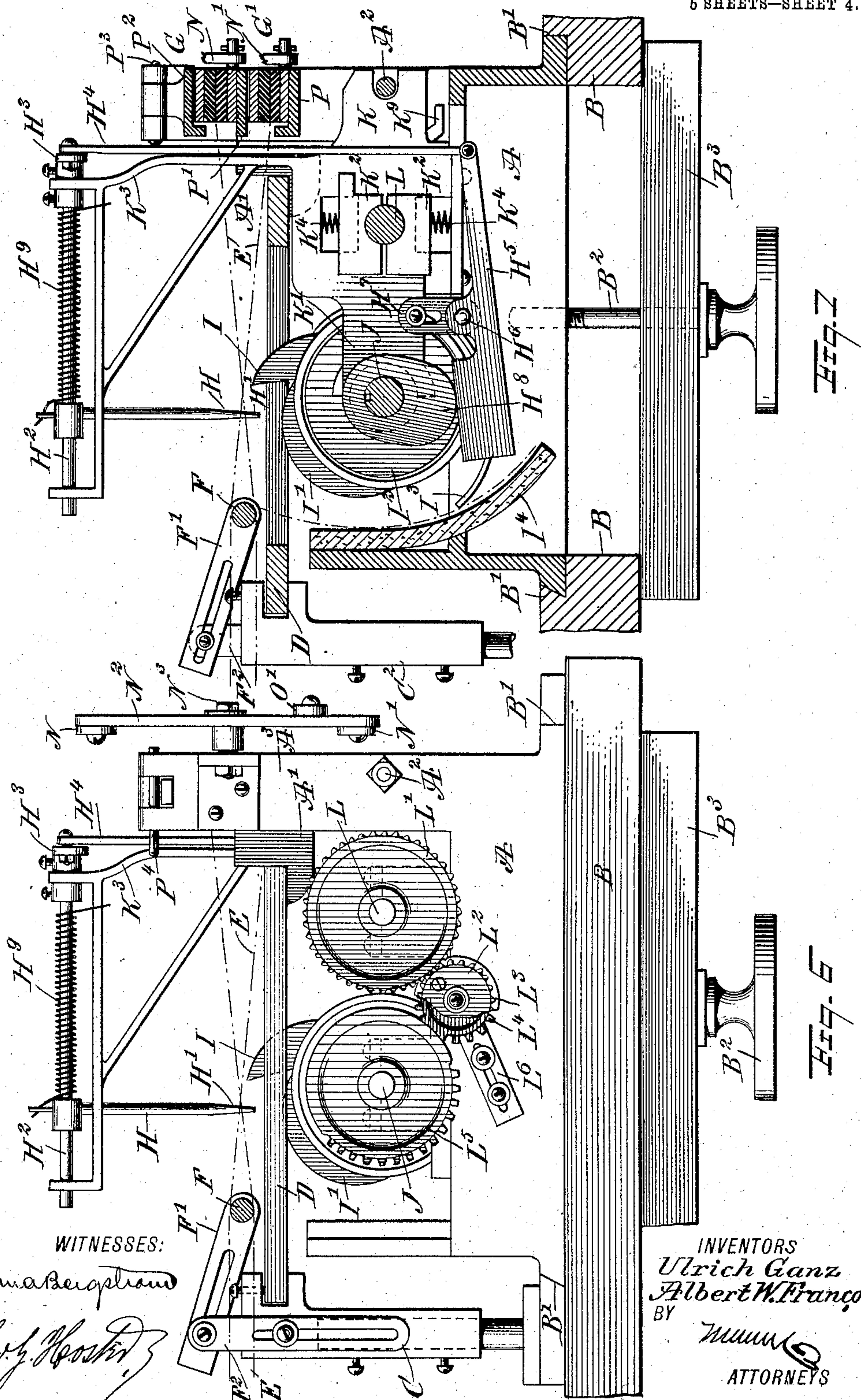
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UNITED STATES PATENT OFFICE.

ULRICH GANZ AND ALBERT W. FRANÇOIS, OF WILMINGTON, DELAWARE.

MACHINE FOR DRAWING IN WARP-THREADS.

SPECIFICATION forming part of Letters Patent No. 791,768, dated June 6, 1905.

Application filed May 31, 1904. Serial No. 210,445.

To all whom it may concern:

Be it known that we, ULRICH GANZ and ALBERT W. FRANÇOIS, citizens of the United States, and residents of Wilmington, in the county of Newcastle and State of Delaware, have invented new and Improved Machines for Drawing In Warp-Threads, of which the following is a full, clear, and exact description.

The invention relates to weaving textile fabrics; and its object is to provide a new and improved machine for drawing the warp-threads into the reed in an exceedingly accurate and quick manner and without the aid of skilled labor.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a plan view of the improvement, showing the reed and the warp-threads in position. Fig. 2 is an enlarged plan view of the improvement, the reed and warp-threads being omitted. Fig. 3 is a side elevation of the same. Fig. 4 is a cross-section of the guideways for the thread-holders on line 4 4 of Fig. 3. Fig. 5 is a plan view of the removable partition-plate between the guideways. Fig. 6 is an end elevation of the improvement, parts being broken out. Fig. 7 is a cross-section of the same on the line 7 7 of Fig. 2. Fig. 8 is a rear side elevation of the improvement, the frame being shown in section. Fig. 9 is a cross-section of the same on the line 9 9 of Fig. 8. Fig. 10 is a longitudinal sectional elevation of part of the mechanism for opening and closing the two-part feed-nut, the section being on the line 10 10 of Fig. 9. Fig. 11 is a side elevation of one of the warp-thread holders, parts being in section; and Fig. 12 is a plan view of the same.

A suitably constructed frame A is held lengthwise adjustable in suitable guideways B', formed or secured on a bed or base B, and the said frame A is held in position on the bed during the working of the machine by a

suitable clamping-screw B² and a clamping-bar B³, of which the screw B² screws in the frame A and turns in the bar B³, while the latter abuts against the under side of the bed B, as plainly shown in Figs. 6 and 7. On loosening the screw B² the frame A can be manually shifted lengthwise on the bed B to a desired position and then again fastened in place by screwing up the screw B². The lengthwise adjustment of the frame A on the bed B permits using the machine for drawing in the warp-threads in a reed of any desired length, as hereinafter more fully described.

On the bed B are arranged a number of vertically-adjustable supports C, C², and C³ for removably supporting a reed D, disposed horizontally, and between the dents of which warp-threads E are drawn in, as hereinafter more fully explained. The reed is also supported by brackets A' on the frame A. The warp-threads E, which are threaded in the heddles, extend therefrom alternately over and under a guide-rod F, arranged lengthwise of the reed above the top thereof, near one side, as plainly shown in the drawings, the guide-rod F being held in suitable transverse arms F', adjustably attached on arms F², vertically adjustable on the supports C and C², so as to permit the operator to bring the guide-rod F into proper relation relative to the reed D. The warp-threads E which pass under the guide-rod F and then extend across the reed D in lengthwise alinement with the dents thereof have their ends fastened in an upper thread-holder G, while the warp-threads E that pass over the guide-rod F are fastened at their ends in a lower thread-holder G', both thread-holders G and G' being mounted to reciprocate lengthwise relative to the reed D in suitable guideways carried by the frame A, as hereinafter more fully described.

The left-hand warp-thread E is adapted to be engaged by the hook end H' of a thread-carrier H, mounted to swing in a vertical plane extending approximately through the middle of the reed D in the direction of the length of the reed, and this thread-carrier H draws the left-hand warp-thread E across the path of a hook I, mounted to revolve in a trans-

verse direction and adapted to pass between adjacent dents of the reed from the under side thereof to finally project above the upper face of the reed to engage the warp-thread carried across by the thread-carrier H. The adjacent dents are somewhat opened or pressed apart in advance of the hook I by a rib I', wedge shape in cross-section and secured on the peripheral face of a hub I² for the revoluble hook I. (See Fig. 2.) The latter besides having a rotary motion is intermittently and bodily shifted lengthwise in the direction of the reed, so that the hook I at each revolution passes between successive adjacent dents of the reed, and for each revolution the carrier H carries the left-hand warp-thread across the path of the hook I for the latter to engage the warp-thread and draw it down between adjacent dents. The end of each warp-thread engaged by the thread-carrier H and hook I at the time is drawn out of the corresponding thread-holder G or G', and the end of the thread is engaged by a wiper I³ in the form of a spring-plate secured to the peripheral face of the hub I², and this wiper I³ moves the thread end in contact with a piece of felt or similar fabric, I⁴, attached to the frame A, so that the end of the warp-thread clings to the fabric, as will be readily understood by reference to Fig. 7.

The hub I² of the revoluble hook I is mounted to turn with and to slide lengthwise on a shaft J, disposed longitudinally and mounted to turn in suitable bearings carried on the main frame A, and on the right-hand end of the shaft J is secured a bevel-pinion J', (see Fig. 2,) in mesh with a bevel gear-wheel J², secured on the inner end of a transverse shaft J³, likewise journaled in suitable bearings on the frame A and provided at its outer end with a hand-wheel J⁴ for turning the shaft J³ to rotate the hook-shaft J and the hook I for the purpose above described. Instead of the hand-wheel J⁴ a pulley connected by belt with other machinery may be employed in case it is desired to drive the machine by power.

The thread-carrier H besides having a swinging motion moves intermittently and in unison lengthwise with the revoluble hook I in the direction of the arrow a', and for this purpose a carriage K is provided, mounted to slide on a longitudinal guideway A², forming part of the frame A. (See Fig. 7.) On the carriage K is secured or formed a shifting-fork K', in engagement with an annular groove on the hub I² of the hook I, so that on shifting the carriage K longitudinally in the direction of the arrow a' or in the reverse direction thereof the hook I is moved along by the carriage sliding on its shaft J. On the carriage K is mounted a feed-nut made in parts or sections K² K², adapted to engage a feed-screw L, extending longitudinally and journaled in suitable bearings carried by the frame A. On the left-hand end of the feed-

screw L is secured a gear-wheel L', (see Figs. 2 and 6,) in mesh with an intermediate gear-wheel L², mounted to turn on a stud L³, and on the gear-wheel L² is secured a mutilated gear-wheel L⁴, in mesh with a similar gear-wheel L⁵, fastened to the hook-shaft J. When the hook-shaft J is continuously rotated from the main driven shaft J³, then the mutilated gear-wheel L⁵ intermittently rotates the gear-wheel L⁴, and consequently the gear-wheel L², which by the gear-wheel L' intermittently rotates the feed-screw L. The intermittent rotation of the feed-screw L causes an intermittent feeding of the carriage K by the feed-nut K² K², so that the hook I is intermittently shifted in the direction of the arrow a' (see Figs. 2 and 3) while the machine is running. The thread-carrier H is secured on a transversely-extending shaft H², journaled in suitable bearings carried by a bracket K³ on the carriage K, so that when the latter is intermittently fed in the direction of the arrow a' the thread-carrier H is carried along simultaneously with the revolving hook I, so that the thread-carrier H and the hook I are always in the same relative position to each other.

The two parts K² K² of the feed-nut are pressed in engagement with the feed-screw L by springs K⁴, (see Fig. 7,) and when the carriage reaches the end of its travel from the left to the right and it is desired to shift the carriage back to a left-hand position the operator moves the parts K² K² apart out of engagement with the feed-screw L to allow of pushing the carriage and with it the hook I and the thread-carrier H back into a left-hand-end position. In order to conveniently move the parts K² K² out of engagement with the feed-screw L, the said parts are provided with guideways K⁵, (see Fig. 9,) engaged by the free ends of arms K⁶, fulcrumed on the carriage K and engaged at their opposite sides by an arm K⁷, extending diametrically on a shaft K⁸, mounted to turn in a suitable bearing arranged on the carriage K, as plainly indicated in Fig. 10. A handle K⁹ is secured on the shaft K⁸ and is under the control of the operator, so that when the handle K⁹ is swung inwardly the arm K⁷ swings the arms K⁶ apart, so that the said arms move the parts K² K² of the feed-nut out of engagement with the feed-screw L to allow the operator to quickly shift the carriage K back from its right-hand-end position to the left-hand-end position. When the carriage K is returned, the operator releases the handle K⁹, and the springs K⁴, acting on the nut parts K² K², move the latter back into engagement with the feed-screw L.

The thread-carrier H is caused to swing in unison with the rotation of the hook I, and for this purpose the shaft H² is provided with an arm H³, connected by a link H⁴ with a cam-lever H⁵, fulcrumed at H⁶ on a bracket H⁷, adjustably secured to the carriage K. (See Fig. 13)

7.) The inner free end of the cam-lever H^5 is in contact with the peripheral face of a cam H^8 , secured on the hub I^2 of the revoluble hook I , so as to move with the latter in a longitudinal direction and to rotate with the hook I . A spring H^9 is coiled on the shaft H^2 and secured at one end to the bracket K^3 , pressing at its other end on the thread-carrier H , so as to hold the cam-lever H^5 at all times in contact with the peripheral face of the cam H^8 . The cam H^8 is so arranged relative to the hook I that when the shaft J is rotated a swinging motion is given to the thread-carrier H to move the latter from the right to the left across the reed-dents immediately in front of the hook I , the thread-carrier H by its hook H' engaging the left-hand warp-thread E during its downward movement from the right to the left to carry this thread across the hook I for the latter to engage the thread and draw it down between the adjacent reed-dents.

The thread-holders G and G' are both alike in construction, and hence it suffices to describe but one in detail, special reference being had to Figs. 11 and 12. Each thread-holder is provided with clamping-jaws G^2 G^3 , preferably made of rubber, between which the threads are passed and clamped, the rubber yielding sufficiently to allow a thread to be readily drawn out between the two jaws, when the thread-carrier H engages a thread and exerts a pull thereon to draw the thread across and in advance of the hook I , as previously explained. The lower jaw G^3 rests on a bottom plate G^4 , while the top of the upper jaw G^2 is engaged and pressed downward by a plate G^5 , removably connected at one end with a screw G^7 , carried by the bottom plate G^4 . The other end of the plate G^5 is engaged by a screw G^8 , screwing in the bottom plate G^4 . By unscrewing the screw G^8 the plate G^5 can be readily removed from the clamping-jaw G^2 to allow of moving the jaws G^2 and G^3 apart for conveniently bringing the warp-threads E between the jaws, and then the jaws are moved together and the plate G^5 is engaged first with the screw G^7 , then pressed down, and finally engaged by the screw G^8 , screwed up by the operator to clamp the threads between the jaws G^2 and G^3 . Each of the bottom plates G^4 of the thread-holders G and G' is provided with a transversely-extending pin G^9 , and the pins G^9 of the thread-holders G and G' are pivotally connected by adjustable links N and N' with a rocking lever N^2 , fulcrumed at N^3 on the frame A , and the said rocking lever N^2 is pivotally connected with the outer end of the eccentric-rod O' of an eccentric O , held on the main shaft J^3 , so that when the latter is rotated the eccentric O imparts a continuous rocking motion to the lever N^2 , which by the links N and N' reciprocates the thread-holders G and G' to

move the latter simultaneously in opposite directions.

In order to permit of pulling the threads between the open jaws, it is necessary to remove the thread-holders G and G' from their guideways on the frame A , and for this purpose the guideways are constructed in the following manner: The lower thread-holder G' is mounted to slide between bearing-plates P and P' , of which the bearing-plate P is rigidly secured to brackets A^5 , attached to posts A^3 A^4 , forming part of the main frame A . The plate P' is removably held in the brackets A^5 , and between this plate P' and a plate P^2 is mounted to slide the upper thread-holder G . The upper plate P^2 is fulcrumed at P^3 on the post A^3 and is connected by a pin P^4 at its free end with the other post A^4 , so that when the pin P^4 is withdrawn by the operator the top bearing-plate P^2 can be swung up to allow removal of the upper thread-holder G , and then the middle bearing-plate P' can be removed by the operator to give access to the lower thread-holder G' , which can now also be removed for receiving its threads. When the threads are placed in position on the lower holder G' , the latter is returned to the plate P , and then the bearing-plate P' is again placed in position on the brackets A^5 , and when the threads have been placed in position on the thread-holder G then the latter is returned to the bearing-plate P' , after which the top bearing-plate P^2 is swung back into position and locked in place by the pin P^4 .

The eccentric O is so arranged that the thread-holders G and G' stand in end positions at the time the thread-carrier H carries a thread across the projecting end or point of the hook I , the thread-carrier H then having hold of the left-hand thread of that holder G or G' which has moved into a right-hand end or forward position. Now in order to stop the threads in the holder moving into a left-hand or rearmost position, so that the left-hand end thread may be in position to be engaged by the thread-carrier H , an abutment Q is provided, disposed vertically on the forward side of the carriage K between the thread-holders G G' and the thread-carrier H . The thread-carrier H engages the free left-hand thread about the time the forwardly-moving thread-holder G or G' has reached the middle of its forward stroke.

The operation is as follows: The frame A is first held in its extreme left-hand position on the bed B , and the carriage K is at the left-hand end of the feed-screw L , so that the revoluble hook I stands in transverse alinement with the first pair of dents on the left-hand end of the reed D . By having the warp-threads E extending alternately over and under the guide-rod F and fastening the ends of the threads which pass under the guide-rod

F to the upper thread-holder G and fastening the threads which pass over the guide-rod F to the lower thread-holder G' it is evident that the warp-threads E alternately cross each other approximately at the middle of the reed D, (see Fig. 1,) and that, owing to the reciprocation of the thread-holders in opposite directions, when a thread-holder G or G' moves into a left-hand end position the first thread on the left-hand side becomes separated and is pulled taut to extend obliquely from the abutment Q across the reed D a distance away from the next following warp-thread, (see dotted line, Fig. 1,) so as to stand in the path of the thread-carrier H to be engaged by the latter on its downward swinging motion. It is understood that when the thread-holders G and G' stand in middle position directly above each other all the warp-threads E stand at right angles between the guide-rod F, and the thread-holders G and G' and the threads are crossed; but as soon as the thread-holders G and G' pass the middle position and move in opposite directions the extreme left-hand thread becomes separated, to be engaged by the thread-carrier H, as before described. When the hand-wheel J⁴ is turned, the revolving shaft J causes the rib I' to pass between the first pair of reed-dents and spread the same apart for the following hook I to readily pass between the reed-dents. At this time the thread-carrier H swings downward from the right to the left and engages the previously-separated left-hand thread E of the now forwardly-moving thread-holder G or G' and draws the thread across the advancing hook I from the right to the left, so that the hook engages the thread and draws it down between the first pair of reeds. The pull exerted by the hook I on the thread draws the end thereof out of the clamping-jaws of the thread-holder G or G', and the flexible wiper I³ engages the thread below the reed D and wipes it over onto the surface of the fabric I⁴, to which the thread readily adheres. During the downward movement of the hook I below the reed the carriage K, and with it the hook I and carrier H, are shifted in the direction of the arrow a' a distance between two reed-dents, so that on the next revolution of the hook I the latter passes between the second and third dent, and the thread-carrier H now engages the separated thread from the other forwardly-moving thread-holder G or G' and passes it in front of the hook I for the latter to engage this thread and draw it down between the second and third reed-dents. It is understood that the gear-wheels J' and J² are proportioned as one to two, so that one revolution of the shaft J³ causes two revolutions of the shaft J and hook I, while each thread-holder G or G' moves but one full forward and backward stroke for every revolution of the shaft J³. When all the threads have been alternately drawn out of the hold-

ers and drawn between successive reed-dents, then the machine is stopped, and the frame A and parts carried thereby are shifted forward on the bed B and again secured in place when the desired position is reached. The double feed-nut is now again engaged with the feed-screw L, and the thread-holders G and G' are removed from their guideways, rethreaded and replaced, and the above-described operation is then repeated.

The gear-wheels L' and L² are interchangeable to permit of using the machine for reeds having more or less dents to the inch. For a reed having, for instance, sixty dents to the inch the feed-screw L has thirty threads to the inch, the gear-wheel L' seventy-two teeth, and the gear-wheel L² thirty-six teeth, so that for each revolution of the shaft J the carriage K, hook I, and thread-carrier H are bodily moved in the direction of the arrow a' the distance of one-sixtieth of an inch. For reeds having more or less dents to the inch the gear-wheels L' and L² are differently proportioned to produce a corresponding result.

The wheel L⁴ is preferably in the form of a Geneva stop-wheel (see Fig. 6) to prevent the wheel L⁴ from being rotated further by acquired momentum at the time the gear-wheel L⁵ moves out of mesh with the gear-wheel L⁴.

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

1. A machine for drawing in warp-threads, comprising a revoluble hook adapted to pass between adjacent reed-dents, a thread-carrier for delivering the thread to the hook, and means for supporting the reed.

2. A machine for drawing in warp-threads, comprising a revoluble hook adapted to pass between adjacent reed-dents, means for intermittently feeding the revoluble hook bodily in the direction of its axis, a thread-carrier for delivering the thread to the hook, and means for supporting the reed.

3. A machine for drawing in warp-threads, comprising a revoluble hook adapted to pass from one face of the reed between adjacent reed-dents and in the direction of the length of the reed-dents, to project on the other face of the reed, a movable thread-carrier for delivering a thread to the projecting point of the hook, and means for supporting the reed.

4. A machine for drawing in warp-threads, comprising a revoluble hook adapted to pass from one face of a reed between adjacent reed-dents and in the direction of the length of the reed-dents, to project on the other face of the reed, a swinging thread-carrier for delivering a thread to the projecting point of the hook, means for moving the hook intermittently in the direction of the length of the reed and at the time the hook is out of engagement with the reed, and means for supporting the reed.

5. A machine for drawing in warp-threads,

comprising a thread-guide rod, reciprocating thread-holders reciprocating in the direction of the length of the guide-rod, a revoluble hook adapted to pass from one face of the reed between adjacent reed-dents to project on the other face of the reed, and a thread-carrier for engaging a thread at a time and delivering it to the said hook.

6. A machine for drawing in warp-threads, comprising a thread-guide rod, reciprocating thread-holders reciprocating in the direction of the length of the guide-rod, a revoluble hook adapted to pass from one face of the reed between adjacent reed-dents to project on the other face of the reed, a thread-carrier for engaging a thread at a time and delivering it to the said hook, a carriage having an intermittent traveling motion and carrying the revoluble hook along, a bearing on the carriage for the thread-carrier to swing in, and means for imparting a swinging motion to the thread-carrier in unison with the rotation of the hook.

7. A machine for drawing in warp-threads, comprising a thread-guide rod, reciprocating thread-holders reciprocating in the direction of the length of the guide-rod, a revoluble hook adapted to pass from one face of the reed between adjacent reed-dents to project on the other face of the reed, a thread-carrier for engaging a thread at a time and delivering it to the said hook, a carriage having an intermittent traveling motion and carrying the revoluble hook along, a bearing on the carriage for the thread-carrier to swing in, means for imparting a swinging motion to the thread-carrier in unison with the rotation of the hook, and intermittent feeding means for the carriage.

8. A machine for drawing in warp-threads, comprising a hook adapted to pass from one face of the reed between adjacent reed-dents and in the direction of the length of the reed-dents, to project on the other face of the reed, a thread-carrier for delivering a thread to the projecting point of the hook, a wiper moving in unison with the hook for engaging the thread drawn in, and a retainer for receiving and holding the thread.

9. A machine for drawing in warp-threads, provided with a revoluble hook, and an opener in front of the hook for opening the dents of a reed.

10. A machine for drawing in warp-threads, provided with a revoluble hook, an opener in front of the hook for opening the dents of a reed, and a wiper following the hook for clearing the said hook.

11. A machine for drawing in warp-threads, provided with a revoluble hook, and an opener in front of the hook for opening the dents of a reed, the opener being in the form of a wedge-shaped rib.

12. A machine for drawing in warp-threads, provided with thread-holders reciprocating in

opposite directions and each having clamping-jaws, between which the free ends of the warp-threads are clamped.

13. A machine for drawing in warp-threads, provided with means, whereby adjacent warp-threads will cross each other at about the middle of the reed, and means for releasing the end thread.

14. A machine for drawing in warp-threads, provided with a guide-rod over and under which the warp-threads alternately pass, and thread-holders reciprocating in opposite directions, one thread-holder removably holding the ends of the threads that pass under the guide-rod and the other thread-holder removably holding the threads that pass over the guide-rod.

15. A machine for drawing in warp-threads, provided with a guide-rod over and under which the warp-threads alternately pass, and thread-holders reciprocating in opposite directions, the thread-holders being located one above the other and the upper thread-holder removably holding the ends of the threads that pass under the said guide-rod and the lower thread-holder removably engaging the threads that pass over the said guide-rod.

16. A machine for drawing in warp-threads, provided with a guide-rod over and under which the warp-threads alternately pass, thread-holders reciprocating in opposite directions, the thread-holders being located one above the other, the upper thread-holder removably holding the ends of the threads that pass under the said guide-rod and the lower thread-holder removably engaging the threads that pass over the said guide-rod, and a fixed stop between the thread-holders and the guide-rod for the end thread.

17. A machine for drawing in warp-threads, comprising a thread-guide rod, reciprocating thread-holders reciprocating in the direction of the length of the guide-rod, a revoluble hook adapted to pass from one face of the reed between adjacent reed-dents to project on the other face of the reed, a thread-carrier for engaging a thread at a time and delivering it to the said hook, a carriage having an intermittent traveling motion and carrying the revoluble hook along, a bearing on the carriage for the thread-carrier to swing in, means for imparting a swinging motion to the thread-carrier in unison with the rotation of the hook, and a stop on the carriage, between the thread-carrier and the thread-holders for the end thread.

18. A machine for drawing in warp-threads, comprising a thread-guide rod on one side of the reed, a pair of thread-clamps on the other side of the reed, the latter reciprocating in opposite directions, a hook rotating transversely to the reed and adapted to pass between adjacent dents to project on the face of the reed, a carriage mounted to slide intermittently in the direction of the length of the

reed and arranged to move the revoluble hook
bodily along, a thread-carrier mounted to
swing on the carriage in the direction of the
length of the reed, and a thread-stop on the
5 carriage, between the thread-clamps and the
thread-carrier.

19. A machine for drawing in warp-threads,
comprising a thread-guide rod on one side of
the reed, a pair of thread-clamps on the other
10 side of the reed, the latter reciprocating in
opposite directions, a hook rotating trans-
versely to the reed and adapted to pass be-
tween adjacent dents to project on the face of
the reed, a carriage mounted to slide inter-
15 mittently in the direction of the length of the
reed and arranged to move the revoluble hook
bodily along, a thread-carrier mounted to
swing on the carriage in the direction of the
length of the reed, a thread-stop on the car-
20 riage, between the thread-clamps and the
thread-carrier, a main shaft, and means driven
from the said shaft to revolve the hook, to
intermittently reciprocate the carriage, to re-
ciprocate the thread-clamps and to impart a
25 swinging motion to the said thread-carrier.

20. A machine for drawing in warp-threads,
comprising a hook having a rotary motion in
the direction of the length of the reed-dents
and an intermittent bodily motion length-
30 wise of the reed, thread-holders reciprocating
in opposite directions and lengthwise of
the reed, and a thread-carrier mounted to
swing in a direction at right angles to the
dents of the reed, for carrying a thread across
35 the path of the said hook, the thread-carrier
having a bodily intermittent movement in
unison with the said hook.

21. In a machine for drawing warp-threads,

thread-holders reciprocating in opposite di-
rections, a hook for drawing the threads 40
through the dents of a reed, and a thread-car-
rier for delivering a thread to the hook.

22. In a machine for drawing warp-threads,
thread-holders reciprocating in opposite di-
rections, a rotary hook for drawing the threads 45
through the dents of a reed, and a swinging
thread-carrier for delivering a thread to the
hook.

23. In a machine for drawing warp-threads,
a guide-rod over and under which the threads 50
alternately pass, holders reciprocating in op-
posite directions, and in which the threads are
held, a hook for drawing the threads through
the dents of a reed, and movable thread-car-
rier for delivering a thread to the hook. 55

24. In a machine for drawing warp-threads,
a guide-rod over and under which the threads
alternately pass, holders reciprocating in op-
posite directions and in which the ends of the
threads are held, means for drawing the threads 60
through the dents of a reed, and means for
feeding the threads to the thread-drawing
means.

25. A machine for drawing in warp-threads,
provided with a revoluble hook, and an opener 65
for opening the dents of a reed.

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

ULRICH GANZ.
ALBERT W. FRANÇOIS.

Witnesses:

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JOSEPH S. GRAHAM,
WILLIAM F. KURTZ.