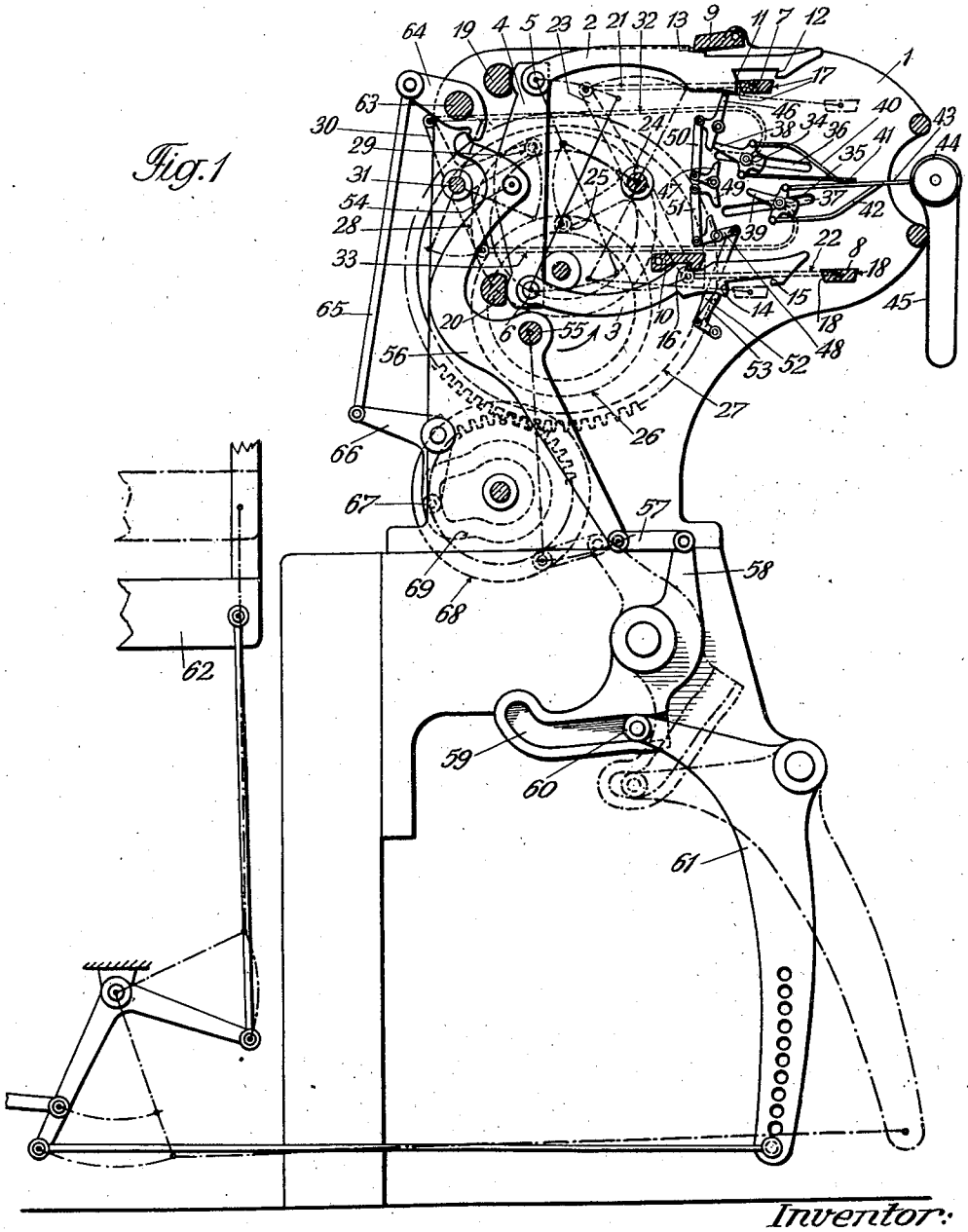
Nov. 25, 1947. G. WIGET 2,431,597

DOUBLE-LIFT, OPEN-SHED DOBBY

Filed Jan. 30, 1945 2 Sheets-Sheet 1

Fig. 1



Inventor:
Georg Wiget
by Michael & Michael,
Attys

Nov. 25, 1947. G. WIGET 2,431,597

DOUBLE-LIFT, OPEN-SHED DOBBY

Filed Jan. 30, 1945 2 Sheets-Sheet 2

Fig. 2.

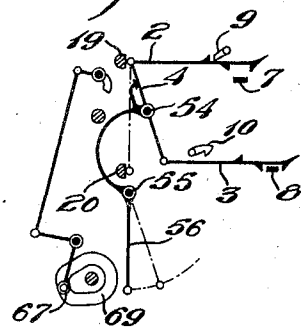


Fig. 3.

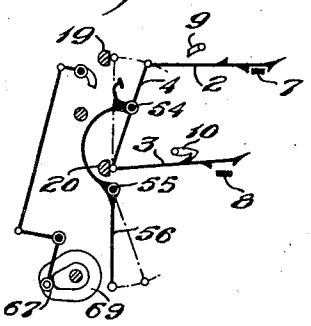


Fig. 4.

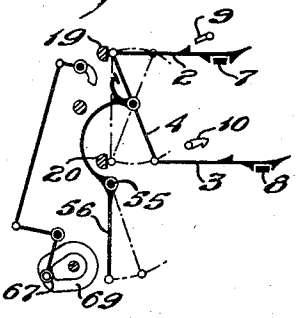


Fig. 5.

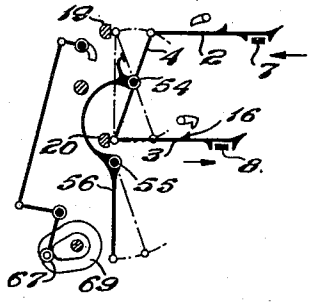


Fig. 6.

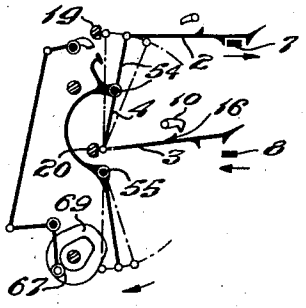
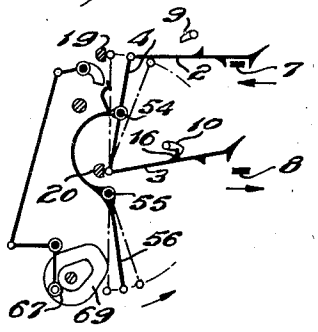


Fig. 7.



INVENTOR.
Georg Wiget
BY
Michaels & Michaels
ATTORNEYS

Patented Nov. 25, 1947 2,431,597

UNITED STATES PATENT OFFICE

2,431,597

DOUBLE-LIFT OPEN-SHED DOBBY

Georg Wiget, Arbon, Switzerland, assignor to Aktiengesellschaft Adolph Saurer, Arbon, Switzerland

Application January 30, 1945, Serial No. 575,293
In Switzerland January 18, 1944

3 Claims. (Cl. 139—74)

1

This invention relates to a double-lift, open-shed dobby in which to each harness two hooks are correlated which for the purpose of forming the shed in accordance with a pattern card control mechanism are moved into engagement with reciprocatory actuating knives by being released from engagement with stationary stops.

In connection with machines of this kind, it is known to hold the harnesses by means of springs in the position enforced by the hook stops. This arrangement involves the drawback that it is difficult to accommodate springs of the strength required for heavy fabrics and that by using strong springs the forces acting upon the hooks in lifting them into the upper shed become unduly great, because the thread tensions and the spring forces must be overcome at the same time.

An existing machine working without springs is highly involved and its harness motion is not continuous as it is not positively guided at all times in the course of this movement.

In the machine according to the present invention, positive motion is obtained by the provision, on each hook, of three rests, two of which correspond to the side faces of the associated actuating knife and grasp this knife with little clearance only when pivotally engaging with it for operation. The third rest engages with a stationary knife while the respective hook is retracted from engagement with that actuating knife which secures the hook in its end position as determined by a correlated stop.

Preferably during selection of the hooks when the actuating knives are passing through their dead centre positions, those hooks that are not selected are pressed against the associated stops so that the rests on the hooks cooperating with the knives are temporarily relieved of pressure and the selecting device can readily displace these hooks. Since one of the hooks associated with each harness is anyway pressed against its stop, when the other hook is drawn, a separate pressing device is required to become operative only if neither of the two hooks is drawn by an actuating knife. This can be accomplished by a reciprocatory lever engaging with extensions of the actuating levers of those harnesses, no hook of which was drawn. A reliable selection can be secured also by positively controlling the interaction between the hooks and the knives. In that case at least part of the rests on the hooks should be provided with curved guide faces for the flanks of the knives.

In the drawings affixed to this specification and forming part thereof an embodiment of the invention is illustrated diagrammatically by way of example. In the drawings:

Fig. 1 is a sectional elevation of the actuating mechanism of one of the harnesses in a positively

2

controlled dobby the parts being shown in the position where a needle has traced a perforation in the pattern card, while the needle associated with it has met a solid portion of the card;

Figs. 2 to 7 show schematically different working conditions of the dobby of Fig. 1.

Referring to the drawings, in shields 1, the front shield being omitted, an upper and a lower hook 2 and 3 respectively are arranged for pivotal movement about the respective ends 5 and 6 of a common rocking lever 4 for individually cooperating with an associated actuating knife 7 or 8 and a stationary knife 9 or 10. To this end the individual hooks are each provided with three rests 11, 12, 13 and 14, 15, 16 respectively, the two rests 11 and 12 on the one hand and the two rests 14 and 15 on the other hand cooperating with corresponding side faces 17 and 18 respectively of the associated actuating knives 7 or 8. The third rests 13 and 16 are provided for engagement with stationary knives 9 and 10 respectively serving for arresting the respective hooks 2 and 3 in their end positions as determined by corresponding stops 19 or 20. The actuating knives 7 and 8 are each pivoted to one of two arms of a rocking lever 23 by means of respective connecting rods 21 and 22. This rocking lever which is mounted on a stationary axle 24 carries by means of a third arm a roller 25 for engagement with an eccentrical guide groove 26 in one end face of a control disc 27.

On the side of the control disc 27 remote from the guide groove 26 is provided another eccentrical groove 28 in which tracks a roller 29 which is arranged on an arm of a three-armed lever 30. With the two other arms of the lever 30 which is mounted on an axle 31 engage by means of rods 32, 33 axles 34, 35 respectively which are displaceably guided in correlated guides 36, 37 and carry respective rockers, 38, 39. To each pair of opposed arms on said rockers needles 40, 41 and 42, 43 are pivoted. The outer ends of these fingers are guided in a manner not shown for scanning an endless pattern strip 45 traveling on a drum 44.

With the rockers 38, 39 are associated control and reversing levers 46, 47 and 48, 49 respectively which are interconnected in pairs by rods 50 and 51 respectively. The lower control lever 48 is further connected by means of another rod 52 with a control lever 53. The upper lever 46 controls the hook 2, the lower lever 53 the hook 3.

A double-armed lever 56 which is mounted on an axle 55 pivotally engages with a stud 54 mounted on the rocking lever 4. One arm of the lever 56 is connected by a link 57 with a balancing lever 58 formed with a cam slot 59 for cooperation with a roller 60 on a double-armed lever 61, the ends of the cam slot 59 extending

radially to balance the unrest of a harness 62 which is connected with a double-armed lever 61.

The other arm of the lever 56 is provided with an extension co-acting with a mating projection on a lever 64 which is mounted on a pivot 63 and coacts with an arm on a bell crank lever 66 by means of a rod 65. Lever 66 carries at its other arm a roller 67 guided in a groove 69 formed in a gear 68 and having a cam section. This gear co-acts with the control disc 27 at a ratio of gearing of 1:2.

In Fig. 1 the harness 62 is shown to be situated in the lower surface of the shed so that the upper actuating knife 7 is in the inner and the lower actuating knife 8 in the outer dead centre. The two hooks, 2, 3 are maintained out of contact with the knives 7, 8 by the change-over levers 46, 53 respectively. Since the gear 68 reduces the speed of the control disc 27 at the ratio of 1:2 and is accordingly adjusted relative to said disc, each time when one of the knives 7 or 8 arrives in the inner dead centre the raised portion of the groove 69 is rendered effective. During the time of passage of the roller 67 through the eccentrical portion of the groove 69 the hooks 2 and 3 are pressed by action of the bell crank lever 66 against the respective stops 19 or 20 by means of the rocking lever 4, the levers 56, 64 and the rod 65. By this means the hooks 2, 3 are retracted from engagement with the associated stationary knives 9, 10 and are prevented from dropping by levers 45, 53. As shown in Fig. 1, the needle 43 is faced by a perforation in the pattern card 45, while the other needle (42) of the pair has met an unperforated portion of the card. Near the end of the inward movement, now starting, of the rocker 39 its upwardly extending arm meets the lever 49 which it turns clockwise. By this turning movement of the lever the rod 51 being pulled upwardly turns the control lever 48 clockwise also. Hereby rod 52 is forced down, turning the control lever 53 anti-clockwise, whereupon this lever releases the lower hook 3.

Since at this moment the rocking lever 4 is drawn by the parts 63—69 into contact with its stationary checks 19, 20, the rest 16 of hook 3 moves away from the stationary knife 10. Under its own weight hook 3 now drops onto the knife 8 which in the meantime moved from its full-line position into the inner dead center position indicated in dot and dash lines. When the knife then starts on its outward stroke, it carries hook 3 along.

If the pattern should provide more perforations in front of the needle 40 and more unperforated portions for the needle 41, thus rendering unnecessary a displacement of the top rocker 38, the reversing lever 46 will stay in the position of rest in Fig. 1 and the hook in its position of rest.

When the bottom knife 8 moves outwardly, the lever 4 is thus rocked about its point of contact with the check 19, and in consequence of this movement the lever 56 pivoted to it at 54 rocks clockwise about its axis 55, turning the balancing lever 58 anticlockwise by way of the link 57, whereby also the double-armed lever 61 is turned anticlockwise. This movement of lever 61 carries the harness 62 into the upper shed. The position of different parts of the dobby is shown in Fig. 2.

As long as the top hook 2 remains at rest while the bottom hook 3 is reciprocated by the knife 8, the lever 4 is turned about its point of contact with the check 19. Thus the lever 56 changes from its full line position to the dot-and-dash line position (Fig. 2) and vice versa, and this also causes the harness 62 (Fig. 1) to move into the other shed.

If, in this position of the hooks 2 and 3 relative to their knives 7 and 8, the needle 42 should, near the end of the outward movement of the rocker 39, meet a perforation in the card 45, the needle 43 will be held back by an unperforated portion. The rocker 39 is then rocked anticlockwise about its axle 35 relative to the position shown in Fig. 1. That arm of rocker 39 that now extends downwardly, will during the inward movement meet that arm of lever 48 that at this moment extends upwardly to the right and will turn it anticlockwise. This causes the rod 52 to be drawn upwardly to the right and will turn it anticlockwise. This causes the rod 52 to be drawn upwardly and the lever 53 to be turned clockwise, whereby the hook 3 is lifted free of the knife 8. Thus the positions of lever 49, rod 51, lever 48, rod 52, lever 53 and hook 3 again are those shown in Fig. 1.

Assuming the needle 41 to meet a perforation in the card and needle 40 to be held up by an unperforated part, the rocker 38 will, near the end of its outward movement, be rocked about its axle 34. When the rocker 38 then moves inwardly, its long arm, which now extends downwardly to the left, will meet that arm of lever 47 that extends upwardly to the right. This causes lever 47 and, by way of the link 50, also the control lever 46 to be turned anticlockwise. As the hooks 2 and 3 are drawn by the device 63—69 against their checks 19, 20, which movement coincides with the reaching of the dead centre positions by the two knives 7 and 8, the top hook 2 is released from its stationary knife 9 and under the action of gravity drops onto the knife 7. During the outward movement of this knife the hook 2 is carried along, while the bottom hook 3 stays at rest. The lever 4 is at the same time turned about the point at which it contacts the check 20, and in consequence of this movement lever 56 is rocked clockwise about its pivot 55 and the harness 62 associated with it is carried into the upper shed.

The position now held by different parts of the machine is shown in Fig. 3.

As long as the bottom hook 3 remains at rest, only the top hook 2 being reciprocated by the knife 7, lever 4 is turned about its point of contact with check 20, and therefore lever 56 changes over from the full-line position to the dot-and-dash position (Fig. 3). In consequence thereof also the harness 62 (Fig. 1) is carried into the other shed.

If needle 40 meets a perforation in the pattern card 45, the needle 41 is held back by an unperforated portion and the rocker 38 near the end of its outward movement is rocked back into its position shown in Fig. 1. When moving inwardly again, its long upwardly extending arm meets the arm of lever 46 that extends downwardly towards the right, turning the lever clockwise, whereby it returns into the position shown in Fig. 1. The hook 2 is thereby caused to be lifted free of the knife 7 and to assume its position of rest.

Figs. 2 and 3 illustrate the position of several parts of the machine at the moment when the corresponding harness 62, either acted upon by the knife 8 and hook 3 or by knife 7 and hook 2, stands in the upper shed. The return stroke of the knife 8 (Fig. 2) or 7 (Fig. 3) into their inner dead centre positions then carries the harness into the lower shed.

Figs. 4 and 5 show the manner in which the harness is retained in the upper shed by the reciprocating knives 7 and 8. The pivot point of lever 4, in contrast to Figs. 2 and 3, here does not coincide any more with the point at which the lever contacts the checks 19 or 20, but is located in the middle of the lever 4, at the pin 54, which has been shifted in a circular path, centered in the pin 55, into its right hand end position, where it rests until, under the action of the selecting device, a change of the sheds takes place.

The shifting of pin 54 into its right hand end position is caused thereby that, starting from the position in Fig. 1, where the needle 43 is meeting a perforation, the other needle 42 of the pair is held up by a solid portion of the card, the long arm of the rocker which extends upwardly toward the left, on moving inwardly, meets the lever 49 and turns it clockwise. By this movement the rod 51 is drawn upwards and turns the lever 48 clockwise also. By the turning movement the rod 52 is forced downwards and turns the lever 53 anticlockwise so that it releases its hook 3.

As soon as the lever is drawn by means of the device 63—69 towards the checks 19, 20, the hook 3 is released by its fixed knife 10 and under gravity action drops onto the knife 8 which in the meantime has moved into its inner dead centre position, and during the next following stroke is carried along outwards by this knife. The pin 54 thereby is moved into its right hand end position, as illustrated in Figs. 4 and 5.

If now, near the end of the outwards movement of the rocker 36, also the needle 41 has met a perforation, its counterpart 40 a solid portion of the card 45, the rocker 38 is tilted about its pivot 34. On the rocker thus moving inwards, its long arm which now extends downwardly, meets the lever 47 and turns it anticlockwise. Hereby the rod 50 is drawn downwards and turns the lever 46 also anticlockwise, which causes the hook 2 to be released by the lever 46.

When the lower knife 8 moved outwards into its outer dead centre position, the hook 2 was drawn, through the lost motion between the knife 9 and check 13, towards the left against the fixed check 19. Hereby the hook is released also by the fixed knife 9 and under gravity action, when released by the lever 46, drops onto the knife 7 which stands in its inner dead centre position.

The pin 54 now remains in its right hand end position (Figs. 4 and 5) until the selecting device has brought about a change of the sheds.

Figs. 6 and 7 illustrate phases of the operation, during which through the coaction of the upper knife 7, which moves outwards and inwards, with the corresponding hook 2 the lever 56 is about to carry the harness into the upper and the lower shed, respectively. While in Fig. 6 the pivot point of lever 4 coincides with its point of contact with the fixed check 20, the lever 4 in Fig. 7 has moved from the check 20 towards the right in proportion to the lost motion existing between the stop 16 of hook 3 and the fixed knife 10.

I wish it to be understood that I do not wish to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. In a double-lift open-shed dobby, in combination with each harness mechanism for moving said harness from one shed to the other, a

double armed lever operatively connected to said harness-moving mechanism, a hook member pivoted to each end of said double armed lever, a pair of knives, one fixed and one reciprocatory, arranged for coaction with each hook member, a pair of needles associated with said pair of hook members, a pattern card controlling the movements of said needles, mechanism influenced by said needles for steering said hook members, a fixed check for each arm of said double armed lever determining one of two dead centre positions of said lever, mechanism for moving said double armed lever against its checks, and means for carrying said lever moving mechanism into its end position, whereby to disengage said hooks from the knives associated with them.

2. The combination of claim 1, in which an oscillatory lever is arranged for coaction with a part of the lever moving mechanism at the time when the knives have moved into their dead centre positions.

3. In a double-lift, open-shed dobby, in combination with each harness, an actuating lever for said harness, an extension on such harness actuating lever, two pivotal hooks associated with said harness, a movement limiting stop arranged for each hook, three rests provided on each hook, a pattern card mechanism for controlling the shedding, a reciprocatory actuating knife having two relatively opposed actuation engagement faces arranged for driving association with each hook, means for pivotally connecting said hook with said actuating knife into loosely fitting interengagement between two of said rests and said actuation engagement faces by control of said pattern card mechanism, a reciprocating lever cooperating with said extension on said actuating lever, both associated hooks whereof are not drawn at the moment corresponding to the dead centre positions of the respective actuating knives, selecting means cooperating with said mechanism for drawing the selected hooks, means for pressing the hooks, not drawn, against said stops incidental to the respective actuating knives passing through their dead centres, thereby to release the rests co-operating with the knives associated with said selected hooks for facilitating the operation of said selecting means in pivotally displacing said drawn hooks, and a stationary knife for engagement with the third hookrest in the position of said hook as determined by said stop, while said hook is disconnected from said actuating knife, for obtaining positive harness motion throughout.

GEORG WIGET.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
459,474	Wyman	Sept. 15, 1891
603,282	Oldham	May 3, 1898
1,052,768	Tellier	Feb. 11, 1913
1,100,161	Tellier	June 16, 1914
2,085,459	Wiget	June 29, 1937

FOREIGN PATENTS

Number	Country	Date
21,987	Great Britain	1908
641,751	Germany	Feb. 12, 1937