Feb. 28, 1939. O. GOLDSCHMID ET AL 2,148,938

SHUTTLE

Filed Feb. 23, 1938

Fig. 1

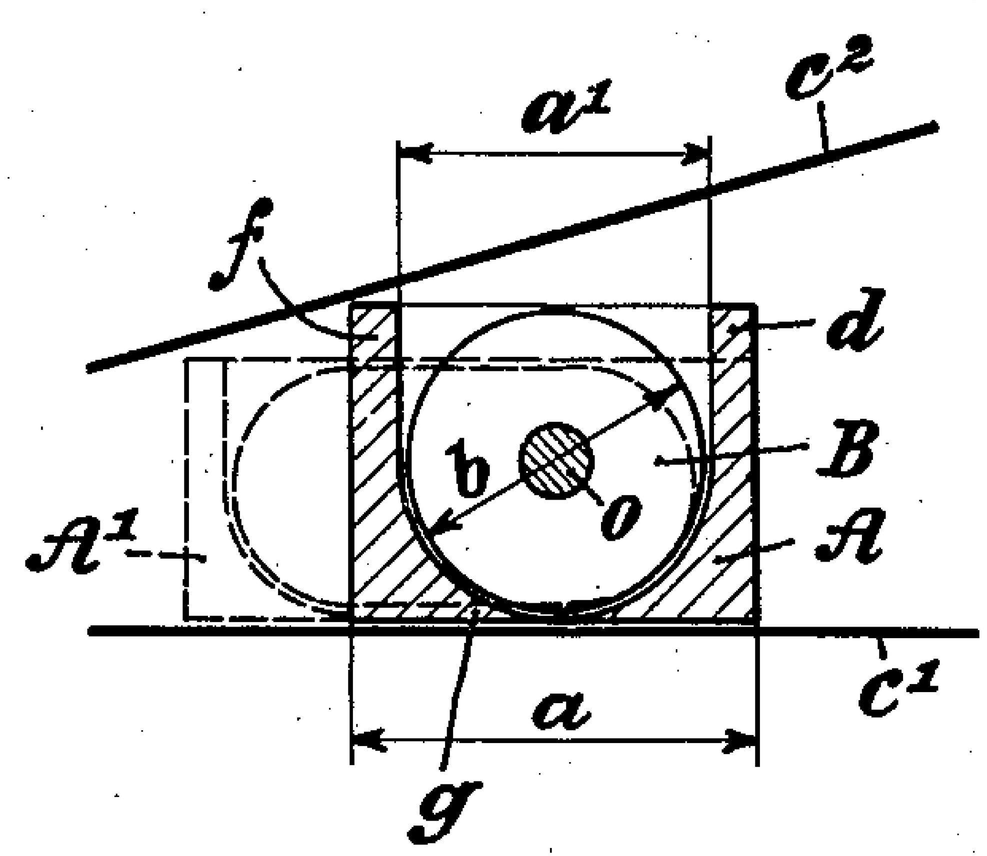


Fig. 2

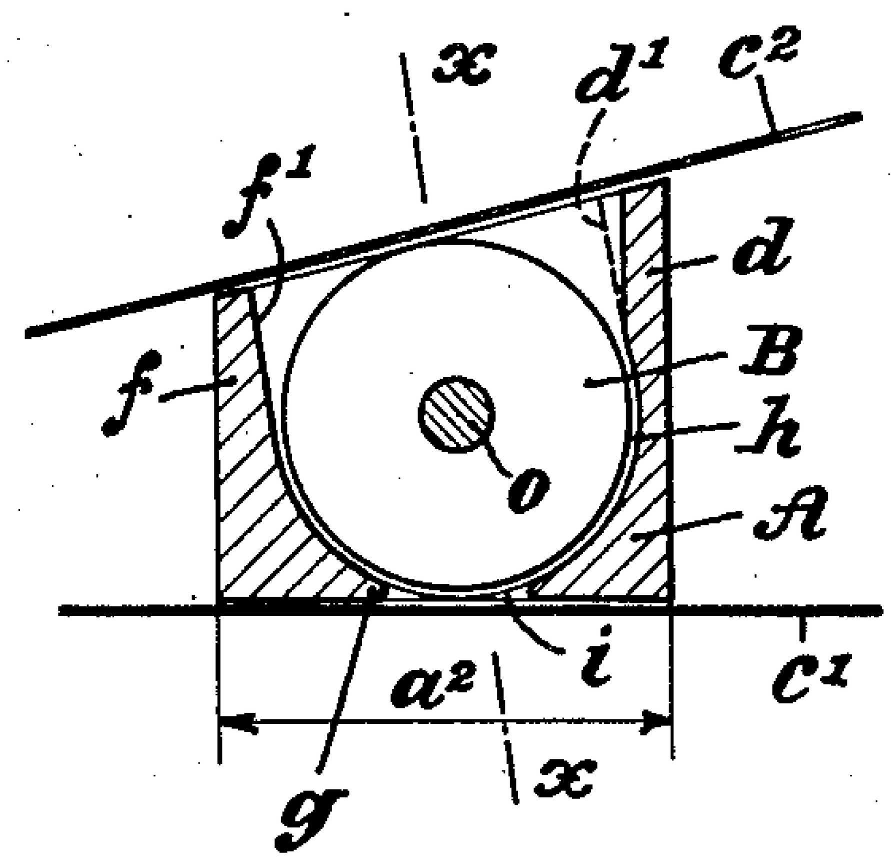


Fig. 3

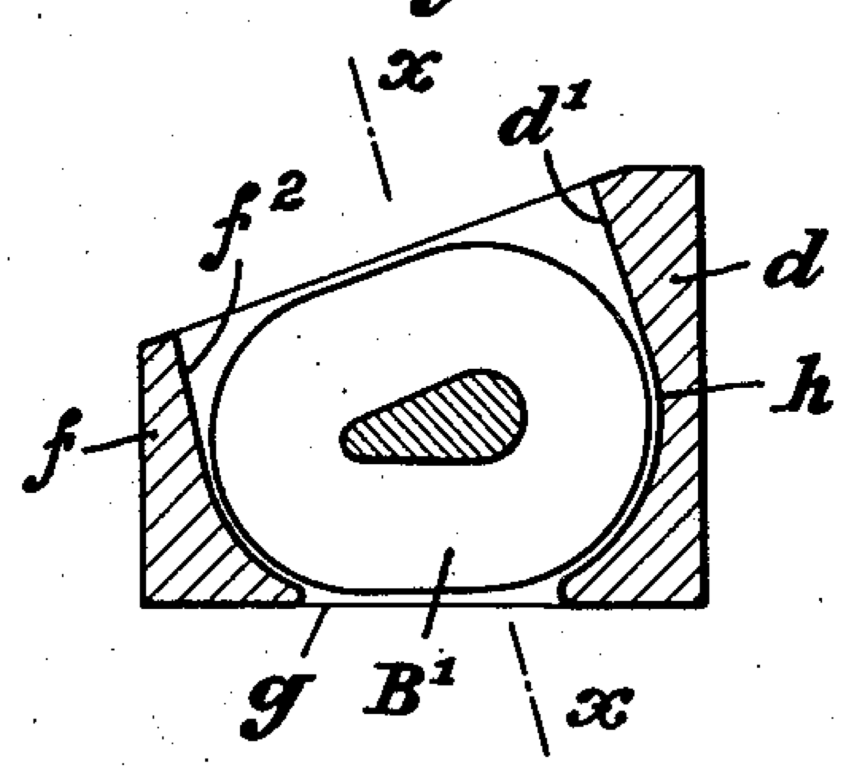


Fig. 4

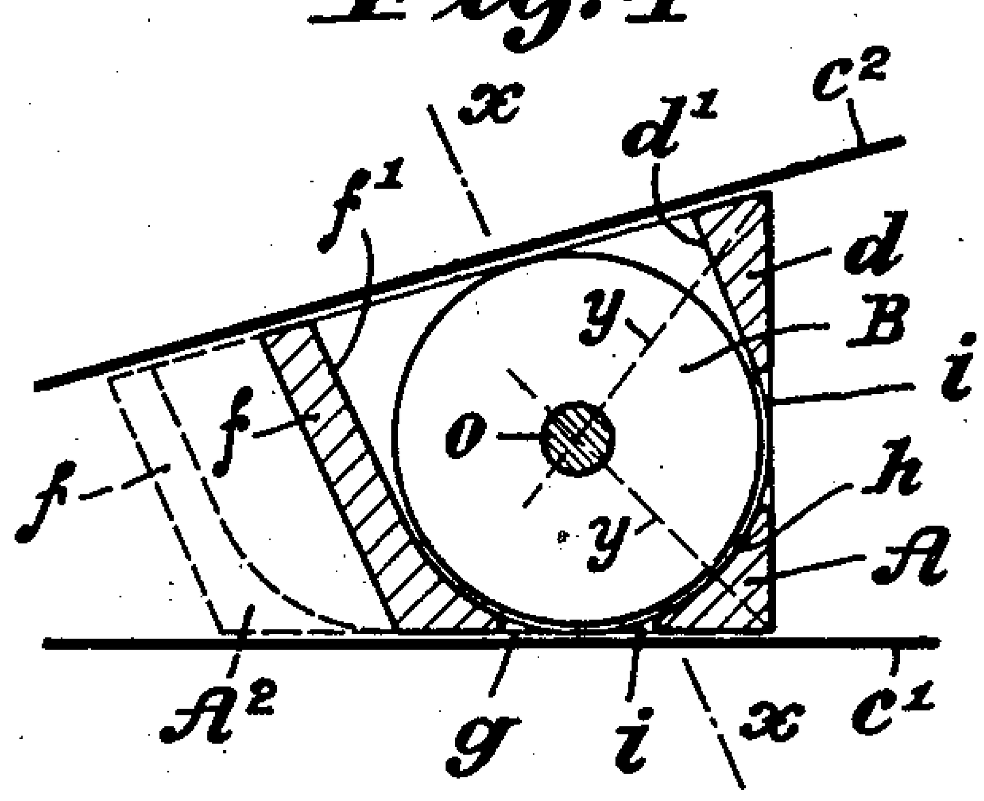
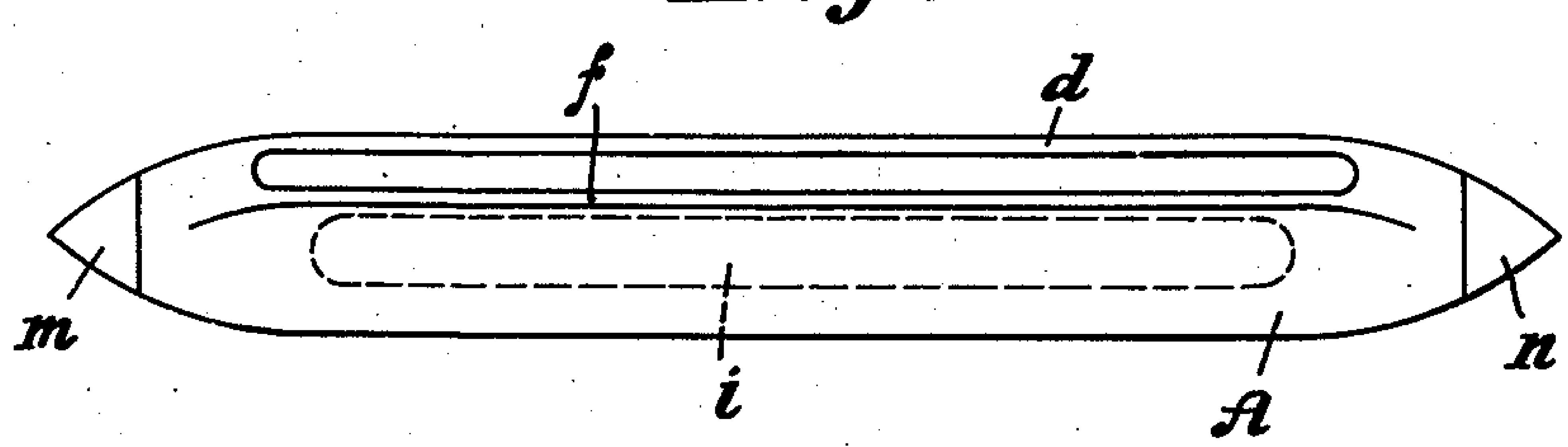


Fig. 5



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UNITED STATES PATENT OFFICE

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SHUTTLE

Otto Goldschmid and Kurt Goldschmid, Vienna, Austria

Application February 23, 1938, Serial No. 192,173
In Austria February 26, 1937

5 Claims. (Cl. 139—196)

This invention relates to a weaver's shuttle which under otherwise the same conditions, that is to say above all with the same length of shuttle and the same height of shed, enables a larger quantity of weft yarn to be stowed therein than in the hitherto known types of weavers' shuttles. This advantage is secured both with the use of round spools and also of flat spools. The invention consists essentially in making the rear wall of the shuttle, that is to say the side bearing against the reed, higher than the front side, to an extent approximately corresponding to the mutual inclination of the warp threads forming the shed, and in inclining towards the front, relatively to the running surface of the shuttle, the upper part of the inner side surface of the front side wall of the shuttle and accordingly also the longitudinal mid plane of the shuttle cavity. In the case of shuttles with hinged peg this peg is made capable of being hinged up and down in the longitudinal mid plane which is inclined at an angle to the running surface of the shuttle.

The invention will now be described in greater detail with reference to the accompanying drawing in which:

Fig. 1 shows, for a certain shed, the hitherto usual type of shuttle for round and flat spools, in transverse section.

Figs. 2 and 3 show two forms of construction of the present invention for a shed of the same height and pitch.

Fig. 4 shows a form of construction in which the quantity of yarn capable of being stowed in the form of a round spool attains the maximum.

Fig. 5 shows the weaver's shuttle according to Fig. 3, in side elevation.

In the case of shuttles A for round pirns, as shown in full lines in Fig. 1, the upper limit of the internal width a^1 of the shuttle, and therefore also of the diameter b of the weft spool B capable of being stowed, is dependent on the so-called shed, that is to say on the angle formed between the upwardly and downwardly drawn warp threads c^1, c^2, as also on the extent to which the warp threads c^1 and c^2 are drawn downwards and upwards, respectively. As is known, the angle of inclination and the height of the shed formed by the threads c^1 and c^2 is determined by the nature of the warp thread or yarn to be woven. For the purpose of increasing the capacity of the usual shuttles there is provided in the bottom thereof a window g through which the peripheral surface of the weft spool B may extend up to within a very short distance of the lower warp threads c^1.

For a certain pitch and height of shed it has hitherto only been possible to increase the capacity of the shuttle by using flat spools B^1. The shuttles suitable for the reception of such spools B^1 have the shape, in cross-section, of a relatively low rectangle, as indicated by the broken lines A^1 in Fig. 1.

In accordance with the invention the rear wall of the shuttle, that is to say the side d thereof bearing against the reed, is made considerably higher than the front wall f, so that the top and bottom faces of the shuttle are inclined at an angle to each other approximately corresponding to the pitch of the warp threads c^1, c^2. At the same time the inner surface f^1 of the front side wall f is inclined forwards, so that the longitudinal mid plane x—x of the cavity in the shuttle A is no longer at right angles to the running surface of the same, but inclined slightly forwards (see Fig. 2). The insertion of the weft spool B and the hinging up and down of the peg (not shown in the drawing) of the shuttle is thus effected along this inclined plane x—x.

In the case of ordinary weavers' shuttles (Fig. 1) enlargement of the external and internal breadth a and a^1, respectively, of the shuttle A would result in a still further reduction in the diameter b of the weft spool B capable of being introduced into the shuttle. On the other hand in the case of shuttles made in accordance with the present invention, since the mean height of the shuttle has become greater and the introducing of the weft spool is effected in the inclined longitudinal mid plane x—x, a round section spool B of larger diameter can be accommodated as a result of increasing the breadth a^1. For this purpose the internal width a^1 of the shuttle A may be increased by providing a furrow-like recess h in the rear wall d. In this manner the longitudinal axis o of the shuttle cavity is also displaced slightly towards the rear wall d. To this altered position of the longitudinal axis o there corresponds of course a greater mean height of the shuttle cavity, so that round section spools can be introduced the diameter of which is increased by the depth of the recess h. The breadth a of the shuttle A itself may, however, also be increased, as may be seen from a comparison of Figs. 1 and 2, and finally it is also possible both to increase the breadth a of the shuttle and also to provide the furrow-like recess h (Fig. 2). In this manner it becomes possible to accommodate round section spools B of which, other things being equal, the quantity of yarn is very considerably increased (by 40% and more).

The recess h (Fig. 2) in the wall d may be made so deep that the thickness of material left in the middle thereof is sufficiently slight to give rise to the danger of splintering under the strain imposed by the strokes of the shuttle. For this reason, in the form of construction shown in Figs. 4 and 5, the material is completely removed in the middle portion of the recess h, so that a window or aperture i is formed as in the bottom of the shuttle. Above the aperture i the inner surface d^1 of the side wall d is inclined at an angle to the running surface of the shuttle; the thickness of the wall d thus increases upwards, and in this manner the necessary strength is obtained. In the same manner the inner surface d^1 of the side wall d may also in the form of construction shown in Fig. 2 be inclined forwards, as shown by the broken line d^1.

By providing the recess h in the rear wall d, of such a depth as to form an aperture i, the capacity of shuttles destined to take round section spools may be increased to the maximum theoretically possible. For a particular shed it is merely necessary to draw the lines bisecting the two angles formed between the upper and lower warp threads c^1, c^2, and the surface of the reed. In the point of intersection of these two bisecting lines y (Fig. 4) lies the geometrical axis o of the weft pirn or shuttle peg, and the centre of the largest circle capable of being inscribed within the shed. About a circle described with this point as centre, and with a radius corresponding to the shuttle cavity, the material is so distributed that the shuttle acquires the requisite strength (Fig. 4).

To the distribution of the material of the shuttle conditioned by the construction according to the invention there corresponds the position of the centre of gravity of the shuttle; the tips m, n of the shuttle (Fig. 5) are so arranged, in a manner known per se, that from the position of the centre of gravity and the frictional resistance between the shuttle and its track the pressing up against the reed requisite for reliable shuttle guidance in weaving is obtained.

The form of construction shown in Figs. 2 and 4 for round section spools may also be used for flat spool shuttles, as shown in Fig. 3 and as indicated by the broken lines A^2 in Fig. 4. In this case the weft spool B^1 (Fig. 3) must be of roughly oval cross-section corresponding to the shape of the receiving cavity.

In all the forms of construction the inclination of the top to the running surface may of course be equal to or somewhat less than that of the shed c^1, c^2.

We claim:

1. A weaver's shuttle including front and rear walls, the rear wall being higher than said front wall, a cavity in said shuttle lying between said front and rear walls, the inner surfaces of said walls being inclined forwardly relative to the running surface of said shuttle, whereby the longitudinal mid-plane of said cavity is inclined forwardly.

2. A weaver's shuttle as claimed in claim 1 including a shuttle spindle in said cavity mounted on an axis inclined toward the running surface of said shuttle and adapted to be swung in a forwardly inclined plane.

3. A weaver's shuttle as claimed in claim 1 wherein the lower portion of the inner surface of said rear wall is recessed to form an aperture in the back wall of said shuttle.

4. A weaver's shuttle as claimed in claim 1 including a shuttle spindle in said cavity, the positioning of said spindle being determined by the intersection of the planes of symmetry of the angles formed by the outer surfaces of the rear wall and the running surface of the shuttle.

5. A weaver's shuttle including front and rear walls, the rear wall being higher than said front wall, a cavity in said shuttle lying between said front and rear walls, the inner surface of said front wall being inclined forwardly relative to the running surface of said shuttle, and a longitudinal recess in the rear wall adjacent its lower end, whereby the longitudinal mid-plane of said cavity is inclined forwardly to increase its weft capacity.

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