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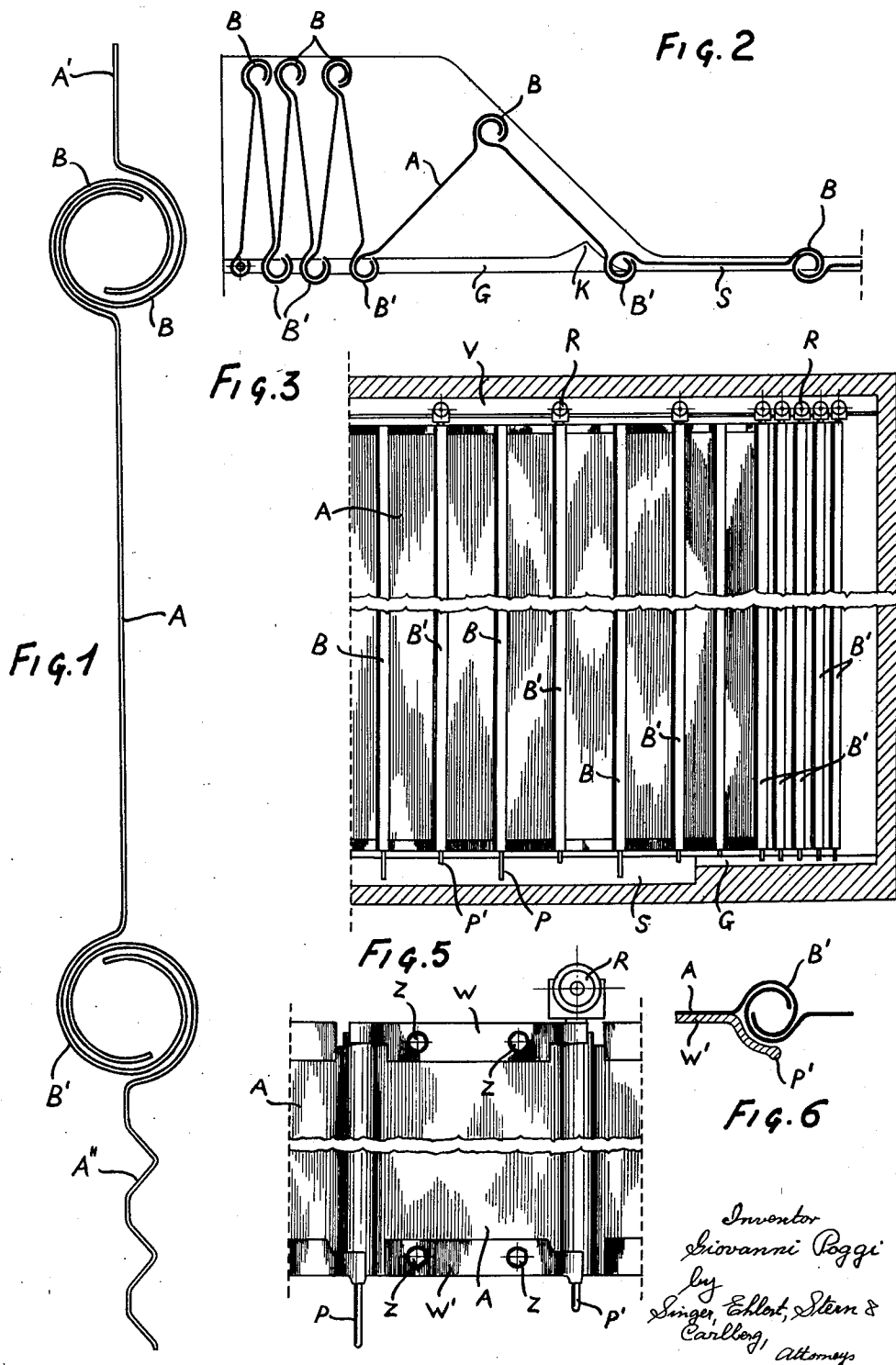
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2,586,561

FOLDER SHUTTER SLAT AND FOLDER SHUTTER MADE THEREBY

Filed Oct. 27, 1948

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

Fig. 8

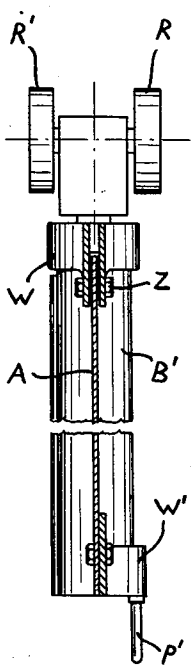


Fig. 9

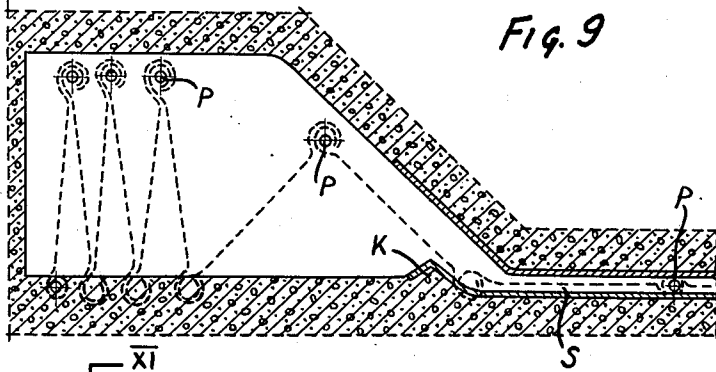


Fig. 10

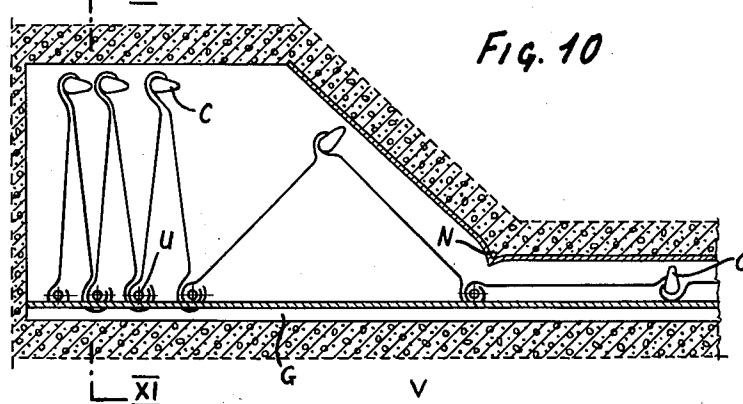


Fig. 4

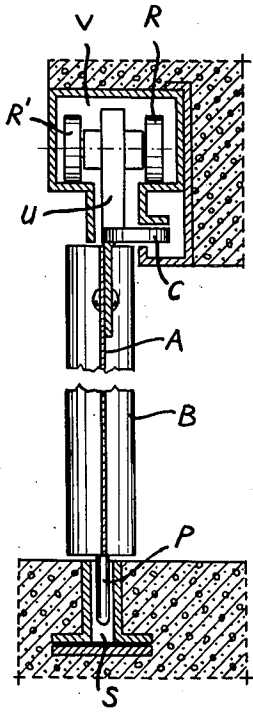


Fig. 7

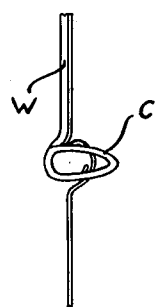
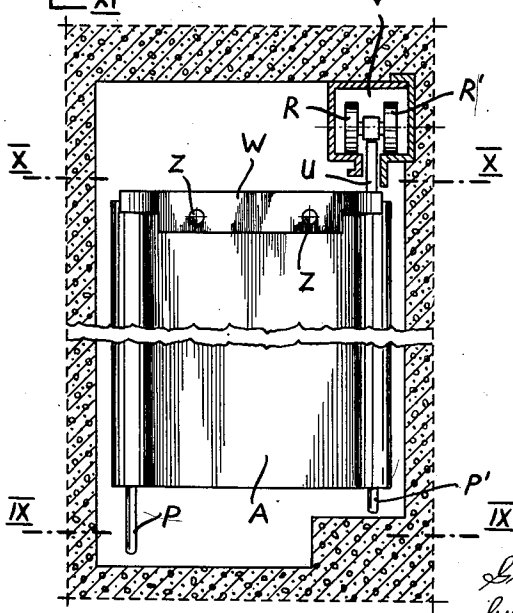


Fig. 11



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UNITED STATES PATENT OFFICE

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FOLDER SHUTTER SLAT AND FOLDER
SHUTTER MADE THEREBY

Giovanni Poggi, Bologna, Italy

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2 Claims. (Cl. 160—33)

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The present invention relates to a metallic slat adapted for the construction of folding shutters to be used as solid or lattice gate, door, railings and diaphragms.

More particularly, this invention relates to a metallic slat having two spiral rolls bent towards the same side of the slat, and particularly adapted for the construction of heavy folding shutters, and having the peculiarity that the spiral rolls on both sides of the slat are exactly alike, but rolled spirally in opposite directions, the center of the spiral lying on the extension of plane of the flat part.

Such types of shutters are notoriously adapted for closing large apertures, or also for such apertures in which it is not possible to fit rolling shutters due to lack of space above the aperture to be closed.

The principal object of the invention is to provide an improved slat which simplifies the construction of such shutters, by eliminating any intermediate connecting member between the various elements of the shutter, which are directly hinged together.

Another object of the invention is to manufacture a heavy folding shutter, whose straight parts are exactly aligned, by hinging together a number of said slats whereby each slat is hinged to two adjacent like slats, turned in opposite directions, by sliding either of its curls into either of the curls of the adjoining slat.

Still another object of the invention is to manufacture a folding shutter made up of slats such as those above referred to, which is provided with means for co-acting with fixed guide means and promoting an easy folding and unfolding of the shutter in horizontal direction, whereby in the folded shutter the slats are collected behind one side wall substantially vertically with respect to the wall.

The various objects are attained, according to the invention, by shaping sheet metal bands like slats of the known rolling shutters constituted by directly hinged slats, with the difference that the two spiral rolls instead of being bent towards opposite sides of the slats, as in usual rolling shutters, are bent towards the same side.

The adjacent slats composing the shutter are thus hinged together in opposite directions, viz, if the front side of one of the slats is that from which the convex side of the beginning of each spiral roll may be seen, the adjacent slats, when likely seen from the front side, show the concave side of the beginning of their spiral rolls.

It is apparent that the pivotal shifting of the

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slats is possible or easy only in the direction in which the two spiral rolls tend to come in parallel relation, viz, with beginning and end of the spirals close together, a shutter made up of slats, as above indicated, must be collected in zigzag formation into an appropriate casing or space.

It is to be noted that, in this specification the term "shutters" shall include not only shutters proper made of solid slats hinged together, but also lattice shutters or gates, composed of slotted or otherwise apertured slats or lattice-like rectangular members provided at their long edges with spiral rolls bent towards the same side of the slat-like members.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, in which:

Figure 1 represents by way of example a cross section through a complete slat hinged to the ends of two slats, one of which has a ribbed body.

Figure 2 is a plan view of a folder shutter obtained by the hinging of slats of the kind shown in Figure 1, seen from the part of the space in which the slats are collected in folded position.

Figure 3 shows in plan, but in reduced scale, a shutter of the kind above referred to.

Figure 4 is a vertical section, with parts broken away, through a hinge point of a shutter and through the upper and lower guide members.

Figures 5, 6, 7 and 8 are views of some constructional details.

Figure 9 is a section on line IX—IX of Fig. 11, and diagrammatically shows the co-operation of the long bolts projecting out of alternate hinge points with the lower guide, for promoting the folding.

Fig. 10 is a section on line X—X of Fig. 11 and shows the co-operation of the upper cams with the upper guide member, for promoting the folding; and, Fig. 11 is a section on line XI—XI of Fig. 10.

In Figures 1 and 2, the shutter comprises a number of like slats of sheet metal, constituted by a substantially flat portion A and A' or ribbed portion A'' of rectangular shape, whose edges terminate with two spiral rolls B, B', which can be considered as mirror images the one of the other and which usually extend through a little more than 360°, whereby the center of the spiral rolls lies approximately on the extension of the flat part of each slat.

As it is apparent from the drawing, each spiral roll B, which seen in one direction is wound or bent in clockwise direction is hinged to the spiral

roll B in the same direction of an adjacent slat, but which appears as bent in reverse direction, due to the fact that the front side of the slats A' or A'' corresponds to the back sides of the slats A.

When a shutter composed of a number of slats shown in Fig. 1 hinged together as said shutter is folded in any suitable manner, the spiral rolls hinged together will tend to roll in a direction in which they come to be approximately parallel to one another, as clearly shown in Figure 2 and therefore the rolls B on one side of the slats will result as bent in anticlockwise direction while those B' on the opposite side will be seen as bent in clockwise direction.

As it is apparent to the skilled in such shutter types, the manner in which such slats are collected depends upon the arrangement of suitable slat-guiding and shifting means, when the shutter is being folded.

As in the like shutters and as may be seen in Figures 4 and 11, the various hinged elements are suspended with corresponding alternate hinge joints to upper rollers R and R' carried by upright members U projecting from plates W fastened to slats A as by bolts Z and running in guides V while the hinges that are not directly suspended carry shifting members or cams C (see also Figs. 7 and 10) integral with plates W and which by co-acting with an abutment N (Fig. 10) provided under the guides V, near one side of the aperture to be closed. On the lower shutter side, a deep guide channel S is provided in which can slide both long bolts P, provided under the cam-carrying hinges and short bolts P' provided under the suspended hinges, this guide ends with an inclined deflecting surface K and, beyond this inclined surface, is continued by a shallow guide channel G, in which only the short bolts P' can penetrate. Bolts P and P' are carried by plates W' bolted to slats A.

From the foregoing it is apparent that the folding of the shutter, when same is shifted towards the collecting side provided with deflecting members N and K, is promoted by being deflected at the upper end by co-action of cams C with abutments N and at the lower end by co-action of long bolts P with the deflecting surface K at the end of deep guide S and at the beginning of shallow guide G.

The slats of the folded shutter are all collected behind one side wall of the door opening and lie substantially at right angles to this wall, thus leaving the door opening completely free.

From the preceding specification it is also apparent that whenever spiral rolls like B and B' are provided to the edges of rectangular member, even when these are not simple sheet metal slats, but on the contrary frame-like or lattice- or grid-like member, folding shutters may be obtained which are of lattice, slotted or trellis type, and so on, which all shall be included in the term "slat."

Thus it is apparent that the invention may be embodied in a number of different ways, all based on the above outlined principle. Thus also bolts P and P' could be provided with rollers. There-

fore, it shall be understood that the term "bolts" shall include also bolts provided with rollers or the like.

I claim:

1. A folding shutter made up of a number of metallic slats provided with spiral curls at both edges and hinged together by interengagement of said spiral curls, a number of rolling suspension means corresponding with alternate hinge points, horizontal guide means for said suspension extending beyond the aperture to be closed by the shutter, on one side thereof, cams attached to the upper end of each slat, above the hinges that are not provided with suspension means, an abutment under said roller guides, fitted in a position by one side of the aperture to be shut, and abutting against said cams to turn same and deflect the attached slat, a deep guide channel on the floor of the aperture to be shut, an inclined surface at the end of said deep guide channel and a shallow channel as an extension of said deep channel, behind one of the side walls of said aperture, long bolts attached to the slats and projecting into the deep channel corresponding with the hinges provided with cams and short bolts attached to the hinges suspended to said rollers, the long bolts being of such a length as not to penetrate into the shallow channel, but to slide upon the inclined surface at the end of the deep channel, while the short bolts can slide also within said shallow channel.

2. In a folding shutter made up of a number of metallic slats, means on said slats for directly hinging the same together, each slat comprising a substantially flat part provided at its edges with uniformly formed spiral curls extending through an angle of about 360°, the centers of said curls lying approximately on the extension of the flat part of the slat, the curls on opposite edges of each slat being wound in opposite directions, whereby the hinging of the slats is effected by sliding the curls of one slat into the curls of another slat, rolling suspension means corresponding with alternate hinge points, horizontal guide means for said suspension extending beyond the aperture to be closed by the shutter on one side thereof and shifting means in correspondence with those of the alternate hinge points which are not provided with suspension means.

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