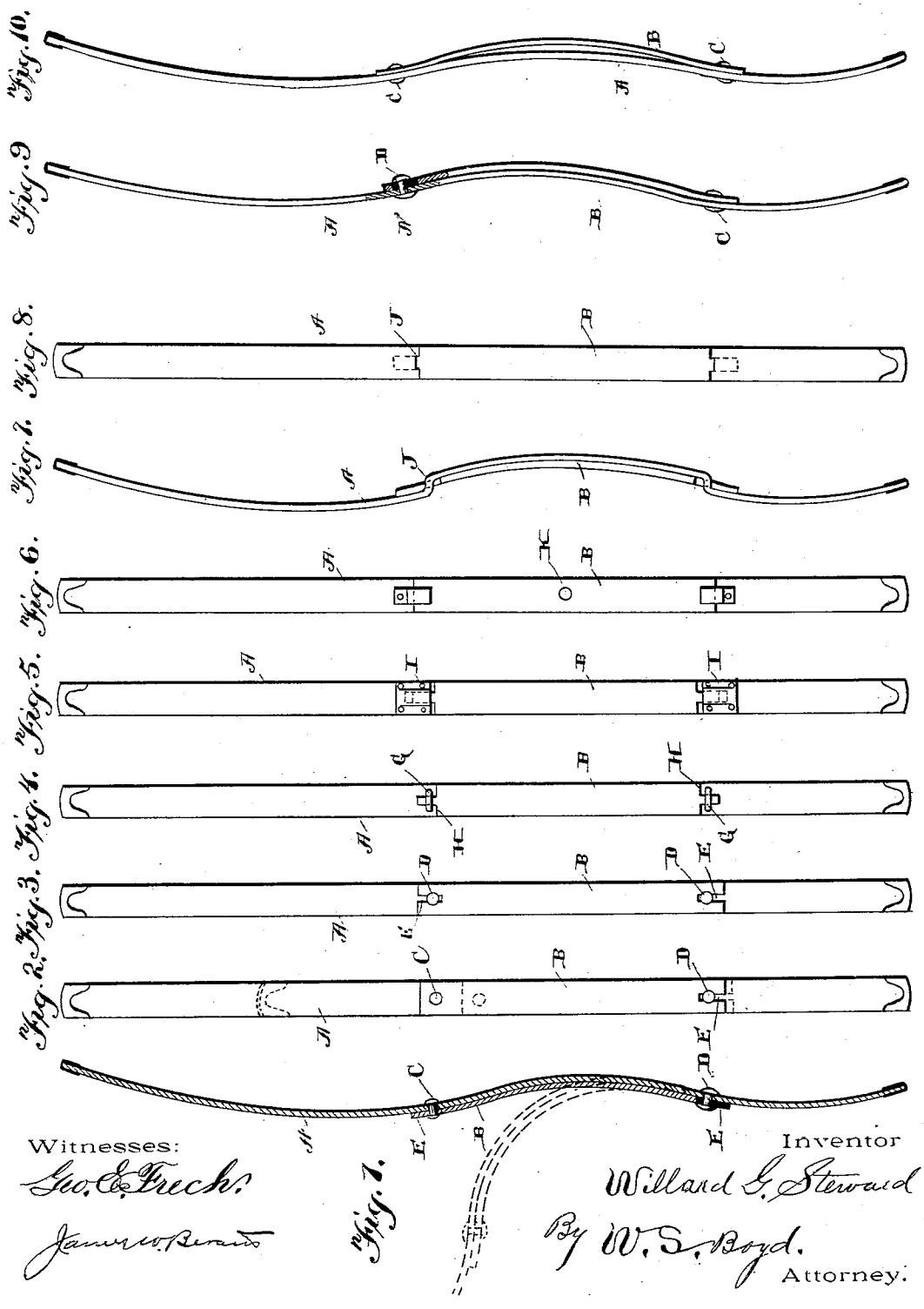
(No Model.) 2 Sheets—Sheet 1.

W. G. STEWARD.

CORSET STIFFENER.

No. 588,028. Patented Aug. 10, 1897.



Witnesses:
Geo. E. Frech.
James W. Brand

Inventor
Willard G. Steward
By W. S. Boyd.
Attorney.

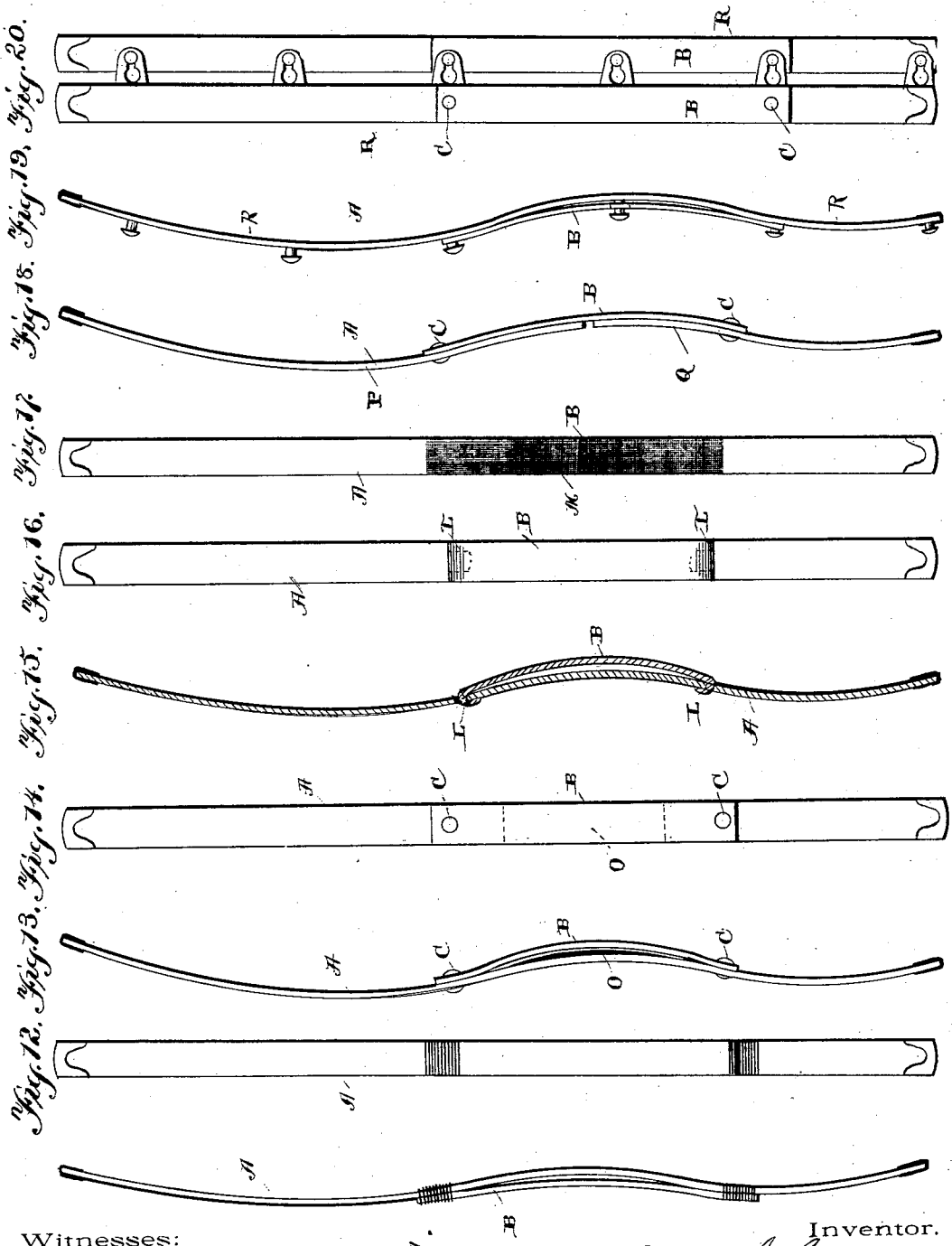
THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

W. G. STEWARD.

CORSET STIFFENER.

No. 588,028. Patented Aug. 10, 1897.



Witnesses:
Geo. E. Fuchs
James W. Berann

Inventor.
Willard G. Steward
By W. S. Boyd.
Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLARD G. STEWARD, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO CHARLES M. CAMPBELL, OF SAME PLACE.

CORSET-STIFFENER.

SPECIFICATION forming part of Letters Patent No. 588,028, dated August 10, 1897.

Application filed May 8, 1895. Serial No. 548,602. (No model.)

To all whom it may concern:

Be it known that I, WILLARD G. STEWARD, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Stays; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to stays for corsets, dresses, &c., and has for its object to provide the resilient steel or stay with a reinforce which shall be utilized only at a given position of curvature, whereby the stay is prevented from being bent so far as to be broken; also, to provide means whereby the position of curvature at which the reinforce is to be brought into play may be changed or varied to suit the wearer.

Heretofore the devices used which prevented the stays from being broken rendered them so stiff that they could not be worn with comfort, as they would have too little play and would also be too rigid to fit the form. If constructed so as to be easy and flexible to the wearer, the stays were easily bent beyond the elastic limit, thus becoming strained, set, and finally broken. Moreover, no means have been provided for regulating the action of the reinforce.

It is a well-known principle in mechanics that when two curved springs or other pieces of material are arranged side by side and are free to be bent or curved independently of each other the amount of force or pressure required to bend them to a given position of curvature is substantially the sum of the forces necessary to bend them to that position separately; but if they be secured together so as to prevent this independent movement the stress upon them is instantly changed from lateral in the direction in which they are being bent to longitudinal, whereby one of them is subjected to longitudinal strain and the other one is subjected to longitudinal compression, and the force required to bend them is increased many times over what would be required to bend them when they were free to move independently of each other. It is this principle which I have utilized by applying a reinforce to a corset-stay at a place where it is subject to the greatest strain and is most likely to be broken, with the result that the flexibility of the stay is not appreciably affected until it has reached a given position of curvature, when the reinforce is caused to engage with it in such a manner as to abruptly render the stay substantially inflexible to any further pressure that may be brought upon it by the body of the wearer.

My invention also contemplates a construction in which the action of the parts in relation to each other may be adjusted or regulated.

I attain these objects by the construction shown in the accompanying drawings, in which the same reference-letters indicate corresponding parts in each of the views in which they occur, and in which—

Figure 1 is a longitudinal sectional view of a stay embodying my invention, showing the stay in its normal position in full lines and in a curved or bent position in dotted lines. Fig. 2 is a plan view of the same. Figs. 3 to 18, inclusive, are views of different means of securing the reinforce to the stay; and Figs. 19 and 20 show the reinforce applied to a busk.

In carrying out my invention I have shown it embodied in two general forms, in one of which, as shown in Figs. 1 to 17, inclusive, the main stay is continuous or unbroken, while in the other form, as shown in Fig. 18, the stay is in two pieces with its adjacent ends adapted to abut against each other. Under the first general class there are two forms, in one of which the stay and reinforce are movable longitudinally upon each other, as shown in Figs. 1 to 9, inclusive, while in the other form, as shown in Figs. 10 to 17, the two parts are not movable longitudinally, and in both classes there are two forms, the reinforce being upon the concave side of the stay in one, where it is subject to compression, while in the other form the reinforce is on the convex side of the stay, where it is

subject to tensile strain; but in each of the above constructions the same principle is involved, that of abruptly rendering the stay practically inflexible by means of the reinforce at a given position of curvature, whereby the stay is prevented from being carried past the danger-point and thereby broken.

In the reinforces heretofore used, in some of which the means of connecting the parts together are the same as I have shown, the principle utilized by me is not even hinted at and the stays are not adapted to its utilization, since in those in which the parts move upon each other longitudinally there is no means shown or described for stopping the movement at any position of curvature to which the stay may be subjected by the body of the wearer, and since in those in which the parts are not free to move longitudinally upon each other the stay is rendered so stiff throughout its entire flexion as to be uncomfortable to the wearer, and, further, none of the above-mentioned reinforces are adjustable.

Referring more particularly to the drawings, A represents an ordinary stay, which may be of steel, whalebone, or any other suitable material and of any desired form or configuration. B indicates the reinforce, which is preferably secured thereto by means of rivets C and D, which are passed through the stay and engaged with the ends of the reinforce. As the greatest strain comes upon the stay at or near the waist, it is only necessary to provide a reinforce for that point, and the ends of the reinforce are only extended beyond the central or greatest curved portion of the stay a sufficient distance to cause the rivets to be located in a straight portion of the stay, whereby they will not weaken the stay at a vital point and the flexibility of the stay beyond the rivets is not affected.

By securing one end of the reinforce rigidly to the stay it is evident that when any pressure is brought to bear upon the stay and the reinforce to bend them they will move longitudinally upon each other, and the strength added by the reinforce equals the amount of pressure required to bend it alone. However, if this longitudinal movement be stopped at any position of curvature the two pieces are rendered, because of the stopping, the same as a single piece having the thickness of the two pieces. The power of the stay and the reinforce to resist being bent in this arrested position is increased enormously. A very convenient means for effecting this result can be achieved by providing the free end of the reinforce with a slot E, through which one of the rivets D projects and against which the end of the slot engages at a given position of curvature. In fact the resistance of the stay and the reinforce when thus united is sufficient to withstand any ordinary pressure that can be brought to bear upon them by the person of the wearer, but so soon as the pressure is removed and the parts have moved upon each other sufficiently to carry the end of the slot away from the rivet the parts resume their usual elasticity, and the corset-stay is but slightly stiffer than one without the reinforce and is as comfortable to the wearer as the ordinary stay.

Instead of rivets for connecting the reinforce to the stay a staple G and shoulders H may be employed, as shown in Fig. 4, or pockets I, as shown in Fig. 5, or slots J, as shown in Figs. 7 and 8, and instead of securing the reinforce at one end it may be secured at the center, as by a rivet K, whereby the longitudinal movement of its ends upon the stay would only be half as great as where it was secured at one end, and each end would have to be provided with a slot, pocket, or check, as shown in Fig. 6, or hooks may be used, as shown at L, Figs. 15 and 16, in which each end of the reinforce is provided with a hook which can be passed through a suitable hole in the central or bowed portion of the stay and clamped upon the opposite side, which will prevent the reinforce from becoming accidentally detached from the stay. The reinforce is longer than the distance between the holes, which causes its intermediate portion to stand out from the stay a short distance, whereby the stay may be bent to a given position of curvature before the reinforce will engage with its outer surface and prevent or check its further flexion, and instead of locating the reinforce upon the inner or concave side of the curve, as shown in Fig. 1, it may be placed on the outer or convex side, as shown in Figs. 9, 10, and 13 to 17, when it would be acted upon in the opposite direction, as will be understood. That is, it would be subjected to a pulling or tensile strain instead of compression.

In locating the reinforce upon the outer or concave side of the stay, whereby it is subject to compression, it is necessary that it be of some resilient material—as, for instance, steel or brass—so as to withstand the compression and afterward to return to its normal position, whereas by locating it upon the inner side of the stay or the convex part of the curve, where there is a pulling or tensile strain, the reinforce may be made of non-resilient and non-elastic material, as cloth, leather, &c., as shown at M in Fig. 17, whereby the resistance of the stay to flexion is not increased by the addition of the reinforce until the position of curvature is reached at which it is desired to make the stay substantially rigid. When a resilient piece of material is secured to the convex side of the curve, the end of the reinforce may be provided with a closed slot at one or both ends, as shown at N in Fig. 9, the outer end or wall of which will engage with the rivet and stop the longitudinal movement of the parts upon each other and produce the same effect as though the reinforce were located upon the concave side of the curve, or instead of providing the non-elastic reinforce with a slot it can be made a trifle longer, similar to the rigid re-

inforce shown in Fig. 10, so that the strain will not come upon it until the stay has nearly reached its limit of elasticity.

The same results may also be secured by the construction shown in Figs. 10, 11, and 12, in which the reinforce is rigidly secured to the stay at each end with its central portion at such a distance from the stay that they will not engage with each other until the stay has reached the desired position of curvature. However, as soon as they are brought in contact with each other the result is the same as in any of the other constructions and the two parts are rendered substantially the same as one. In this construction the reinforce and the portion of the stay to which it is secured are normally arcs of non-parallel curves, the difference in the curvature of which may be greater or less, whereas in the other forms the two parts are always arcs of parallel curves of but slightly-different curvature.

A solid or yielding cushion or filling, as shown at O in Figs. 13 and 14, may be inserted between the reinforce and the stay to permit of a greater or less amount of flexion of the stay before it is checked by the action of the reinforce through the cushion or filling. This cushion or filling may be made of any desired material—as, for instance, the ordinary covering of the stay. In this construction the parts act somewhat in the nature of an I beam or truss, in which the stay and the reinforce are the flanges of the beam, and the cushion or filling acts as the web of the beam.

Owing to the fact that the resistance to flexure of the stay and the reinforce under pressure is greater the farther they are held apart, provided the shorter curve remains concave, it is evident that by regulating the size of the pad or cushion which is placed between them the strength of the stay can be regulated to suit the requirements of the wearer, and the pad can also be utilized to adjust the shape of the corset to the person of the wearer. As the pocket for the stay in the corset will prevent the escape of the pad after it has been inserted all that will be necessary at any time to change the stay to suit the wearer will be to remove the stay from the pocket, make the desired change in the pad, and replace the stay.

The inner of the concaved pieces may be formed in sections with the adjacent ends at a slight distance from each other, so that as the stay is bent the ends will gradually approach each other and when they have reached a given position of curvature they will abut against each other and prevent any further movement of the parts upon each other, thus checking the further flexion of the stay in the same manner as is done by the construction in which the parts are each formed of a single piece.

In Fig. 18 the stay is shown as composed of two sections P and Q, which are riveted to the reinforce with their adjacent ends a short distance from each other. As soon as the reinforce has been bent far enough to cause the ends of the sections to engage with each other the parts will act in the same manner as though the stay were in one piece.

In Figs. 19 and 20 I have shown the reinforce applied to the busk R, in which the same principle is utilized. Although I have only shown one form applied to the busk, it is evident that the other constructions could be applied thereto as easily as to a stay.

While the above-described constructions serve to show the application and utilization of the principle set forth to the attainment of the objects of my invention, I do not confine myself to the same, since any mechanical construction achieving the same end is included herein.

Having thus described my invention, I claim—

1. A stay comprising a resilient part, a reinforce secured thereto and means for abruptly changing the flexibility of the stay and the reinforce at a given position of curvature, substantially as set forth.

2. A stay comprising a resilient part, a reinforce secured thereto at its ends and longitudinally movable thereupon for a limited distance, and means for abruptly changing the flexibility of the stay and the reinforce at a given position of curvature, substantially as set forth.

3. A stay comprising a resilient part, a reinforce rigidly secured thereto at one end and movably secured thereto at the other, and a stop at the movable end for engaging therewith and abruptly stopping the longitudinal movement of the parts upon each other, whereby the flexibility of the stay and reinforce is abruptly changed at a given position of curvature, substantially as set forth.

4. A stay comprising a resilient part, a reinforce rigidly secured thereto at one end and having its opposite end slotted longitudinally, a stop through the slot, said stop being so arranged in relation to the ends of the slot as to engage therewith and stop the movement of the reinforce upon the stay, and thereby abruptly change the flexibility of the stay and the reinforce at a given position of curvature, substantially as set forth.

5. A stay comprising a curved resilient portion, a reinforce secured at its ends to the curved portions thereof, and a cushion or filling between the portions arranged to stop the movement of the reinforce upon the stay, whereby the flexibility of the stay and the reinforce is changed at a given position of curvature, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLARD G. STEWARD.

Witnesses:
FRANK D. BLACKISTONE,
W. S. BOYD.