

S. H. NORTON.
MACHINE FOR MAKING GARMENT STAYS.
APPLICATION FILED NOV. 16, 1914.

1,206,240.

Patented Nov. 28, 1916.

2 SHEETS—SHEET 1.

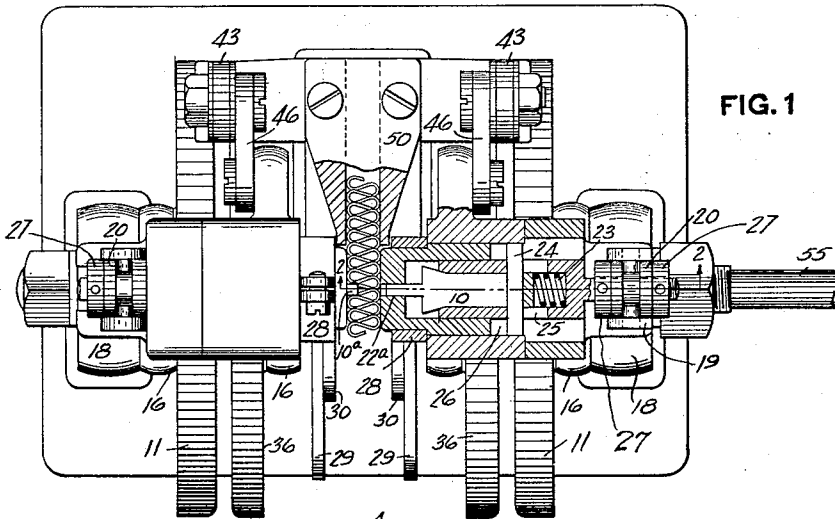


FIG. 1

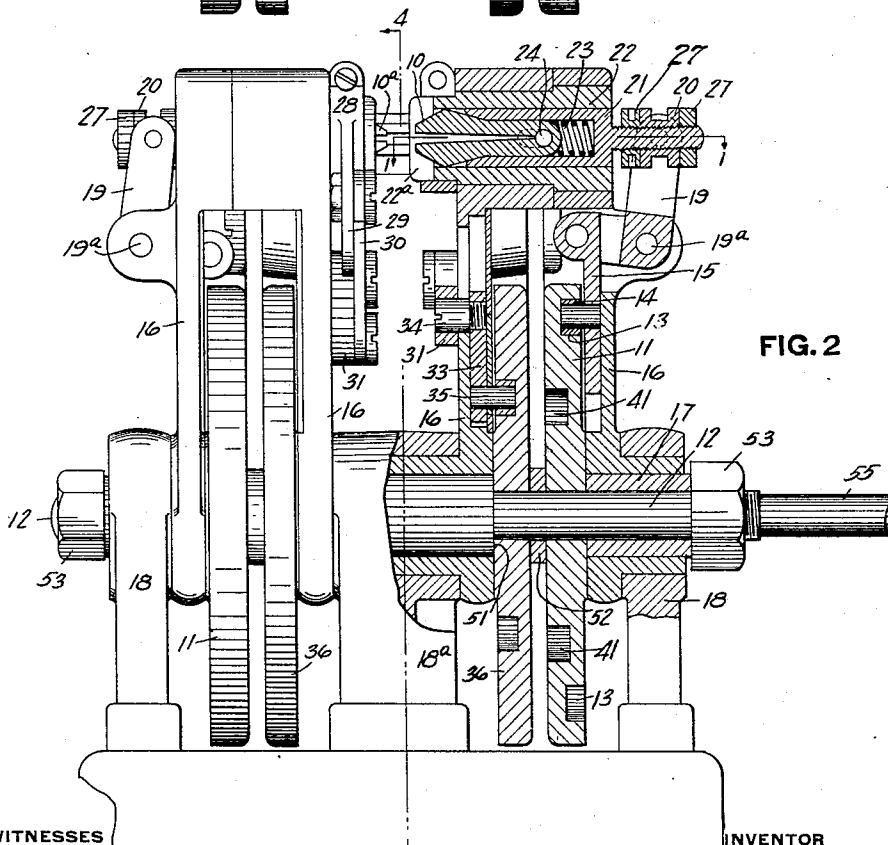


FIG. 2

WITNESSES

INVENTOR

Eldert L. Hyde
W. T. Holman

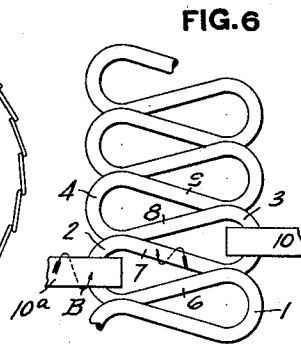
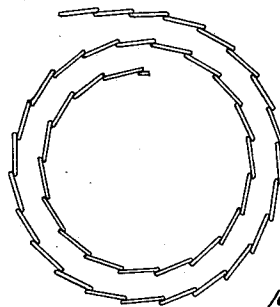
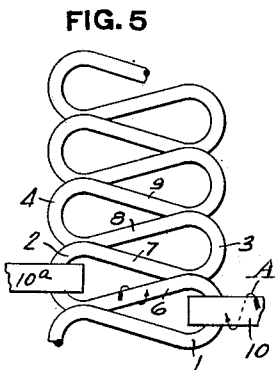
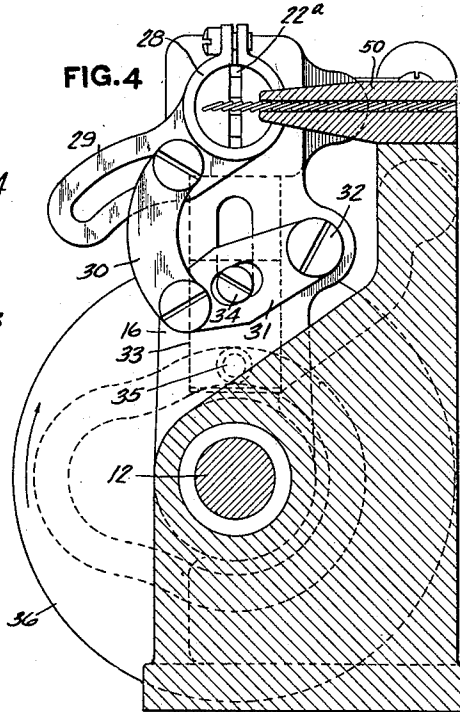
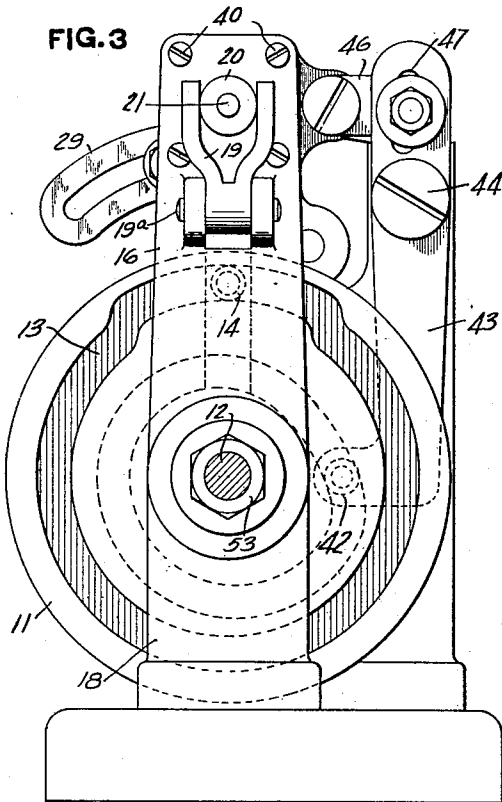
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UNITED STATES PATENT OFFICE.

SAMUEL HARRY NORTON, OF MEADVILLE, PENNSYLVANIA, ASSIGNOR TO THE SPIRELLA COMPANY, OF MEADVILLE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MACHINE FOR MAKING GARMENT-STAYS.

1,206,240.

Specification of Letters Patent.

Patented Nov. 28, 1916.

Application filed November 16, 1914. Serial No. 872,468.

To all whom it may concern:

Be it known that I, SAMUEL HARRY NORTON, a resident of Meadville, in the county of Crawford and State of Pennsylvania, have invented a new and useful Improvement in Machines for Making Garment-Stays, of which the following is a specification.

This invention relates to the manufacture of wire garment stays, and particularly to that form of stay which is made up of wire bent back and forth alternately in opposite directions to form two series of oppositely disposed loops or eyes lying along the edges of the stay and united by a series of intermediate transverse portions or crossings lying at or nearly at right angles to the length of the stay. In such stays the resistance to flatwise bending is due almost entirely to the torsional stiffness of the transverse portions or crossings. Usually such stays are subjected to much more severe bending stresses in a flatwise direction than in any other direction. It is therefore important to so form the stays that the torsional stiffness and resiliency of the transverse or crossing portions of the stay may be as great as possible.

The object of the invention is to provide apparatus for forming stays of the character described, whereby they are not only rendered stiffer in one flatwise direction as compared with the other, but also possess an increased resiliency and an increased ability to withstand short bends and avoid taking permanent bends or sets, as compared with such stays as heretofore constructed, and which mechanism is simple, is capable of being readily adjusted to produce any amount of twist in the crossings, can be used for producing stays of any size within limits, and which operates continuously and with great rapidity.

It is well known that when wire is subjected to twisting stresses sufficient to impart a permanent torsional set thereto, the torsional resistance of the wire against a short twist in the same direction is greatly increased and the elastic limit or resiliency of the wire is likewise increased. I take advantage of this characteristic of twisted wire, and the present machine is so constructed and arranged and operates in such

a manner that each crossing or transverse portion of the wire body is twisted after the wire is bent back and forth into zigzag form to form the stay to a sufficient degree to impart a permanent set thereto, the twisting operation being so performed that all of the crossings are twisted or set in the same direction relative to the body of the stay. The result is a stay which is considerably stiffer against bending in the flatwise direction which produces a further twist in the crossings or transverse portions in the same direction in which they have already been twisted, than against bending in the opposite flatwise direction and which, finally, is considerably more elastic and resilient, and therefore capable of being subjected to shorter bends without permanent distortion than otherwise would be. The machine is also arranged to feed the already formed stay past the twisting members, so that the several crossings in succession are twisted in the manner described and with great rapidity, whereby the stay can be made in large quantities in a given time. The machine operates according to the method which forms the subject matter of a patent to John F. Kitchen, granted January 5, 1915, No. 1,123,893.

In the accompanying drawings, which represent one embodiment of the invention, Figure 1 is a plan view, partly broken out and in section on the line 1—1, Fig. 2; Fig. 2 is a front elevation, the right-hand half being broken out and in section on the line 2—2, Fig. 1; Fig. 3 is a side elevation from the right in Fig. 2; Fig. 4 is a central longitudinal section on the line 4—4, Fig. 2; Figs. 5 and 6 are diagrammatic views showing the twisting operation; and Fig. 7 is a diagrammatic view illustrating the stay before twisting the same.

The stay is made up of wire bent back and forth alternately in opposite directions to form the two series of oppositely disposed loops or eyes marked on the drawings in succession 1, 2, 3, 4, lying along the two edges of the stay body and connected by the transverse portions or crossings marked in succession 6, 7, 8, 9. In the particular stay shown the eyes or loops overlap each other

so that when the stay is viewed edgewise, as in Fig. 7, it presents a shingled appearance. This overlap, however, is not essential as the stay may be produced with all the eyes or loops in the same flat plane.

The wire may be bent to the form shown by any suitable mechanism, such as that illustrated and described in the patent to M. M. Beeman, No. 1,009,823, granted November 28, 1911, or in Patent No. 1,042,756, granted October 29, 1912, to M. M. Beeman and J. F. Kitchen, or on any other suitable mechanism capable of bending wire back and forth to form the two series of oppositely disposed loops or eyes. In the formation of a stay with overlapping loops, such as shown in the drawings, by means of the machines illustrated in these patents, the stay comes from the machine bent or curled flatwise, as indicated in Fig. 7. The present machine is designed to operate upon this curled stay, as it comes from the bending machine, and not only straightens it out so that it can be cut up into convenient lengths for use in corsets or other articles of wearing apparel, but also places an initial torsional twist in each of the crossing portions of the stay in the manner before referred to, which increases the ability of the stay to resist bending in one flatwise direction more than in the other.

The twist or torsional set is imparted to the transverse or crossing portions by twisting or tilting each loop in succession with reference to the next adjacent loop, so that the transverse portion or crossing connecting the two loops is twisted. This is accomplished by grasping the two oppositely disposed loops, such as the loops 1 and 2, by suitable mechanism, such as the jaws or clutches 10, 10^a, and rotating one or both of said twisting jaws. In the present machine the jaws are rotated alternately and also have a movement toward and from the stay to engage them with and disengage them from the loops or eyes, and also a movement longitudinally of the stay to feed the same through the machine. In Fig. 5 the clutch 10 is grasping the loop 1 and clutch 10^a is holding the loop 2. In the operation of the machine clutch 10 is first twisted in the direction indicated by the arrow A to any suitable amount, say 45 degrees, which places a twist in the crossing 6. It then opens and moves away from the stay in its plane, simultaneously moving backwardly toward the next loop 3. Clutch 10^a on the other side of the machine is simultaneously advanced and since this clutch is closed it feeds the stay one step through the machine. Before the clutch 10^a reaches its advance position clutch 10 is again engaged with the stay and grasps the loop 3, whereupon clutch 10^a while still advancing is rotated or twisted in the direction of the arrow B to place a

twist in the second crossing, marked 7. Clutch 10^a then opens and moves back to grasp the loop 4 on the same side of the stay while clutch 10 advances and feeds the stay one more step, which completes the cycle, whereupon the operation begins all over again and proceeds as before.

In the machine shown in the drawings, clutch 10^a is feeding the stay forward, while clutch 10 has just completed a twisting movement and is moving back to grasp the next loop. The two clutches 10 and 10^a, on opposite sides of the center line of the machine are identical and in all particulars are operated by similar mechanism. They are merely arranged in reverse positions and the driving cams and other mechanism are spaced 180 degrees around their respective shafts, so that said clutches operate alternately in exactly the same manner. Consequently a description of one thereof will be sufficient.

Gripping operation.—Clutch 10 is opened and closed and is advanced toward and retracted from the stay by a cam 11 carried by the main driving shaft 12. Said cam on its outer face is provided with a cam track 13 to receive a pin or roller 14 on a bar 15 slidably mounted in a rocker arm 16, which carries the clutch and which is pivotally mounted upon a bushing 17 in the bearing block 18. The bar 15 is pivotally connected to a bell-crank lever 19 fulcrumed at 19^a upon said rocker arm, and one arm of which is provided with pins engaging an annular groove in a collar 20 carried by a collet 21 slidable in a sleeve 22 carried by the rocker arm. The clutch comprises two jaws having beveled faces to cooperate with the beveled front end of the collet 21 for closing said jaws upon the loops or eyes of the stay fabric. Within the collet 21 is a compression spring 23 which bears against the rear end of the clutch jaws, and said jaws are provided with a cross pin 24 whose opposite ends travel in elongated slots 25 and 26 in the collet 21 and sleeve 22 respectively. When the cam 11 lifts the bar 15 the collet 21 is moved outwardly and releases the clutch jaws so that they open and release the stay fabric. Spring 23 expands and the collet 21 moves outwardly until the pin 24 is at the inner ends of the slots 25 in the collet, when the jaws are fully opened, after which the collet and clutch jaws move outwardly together, the ends of the pin 24 traveling in the slots 26 in the sleeve 22. When the cam 11 depresses the bar 15 the first action is to move the collet 21 and clutch jaws inwardly toward the stay fabric, which motion continues until the ends of the pin 24 strike the inner ends of the slots 26 in the sleeve 22, which stops further inward movement of the clutch jaws. The inward movement of the collet 21, how-

ever, continues, the spring 23 being placed under compression, and the beveled inner end of the collet moves inwardly along the beveled back faces of the clutch jaws and closes them upon the stay fabric. The grooved collar 20 is held between two nuts 27 adjustable on a reduced extension at the outer end of the collet 21. This collar can be adjusted in order to compensate for wear on the twisting jaws and also to compensate for different sizes of wire, in other words, to produce a satisfactory gripping action with any size of stay or wire.

Twisting operation.—The twisting operation is performed by rotating each of the clutches about its longitudinal axis at a time when it is gripping one of the eyes or loops of the stay being operated upon. For this purpose the sleeve 22 is rotatably mounted in the upper end of the rocker arm 16. The clutch jaws are flat at their inner ends and pass through a rectangular slot 22^a in the inner end of the sleeve 22. This slot permits the jaws to move relatively to each other in opening and closing and also causes them to rotate with the sleeve. The inner end of said sleeve is surrounded by a split clamp or yoke 28 having a slotted arm 29 in which is adjustable one end of a link 30 connecting said arm to a lever 31 pivoted at 32 to a portion of the rocker arm. Lever 31 is oscillated back and forth to rotate the sleeve 22 and impart a twist to the crossing portions of the stay by a bar 33 sliding vertically in one of the rocker arms 16, said bar at one end having a pin 34 engaging a slot in the lever 31 and the other end being provided with a pin or roller 35 engaging a cam groove in a cam 36 carried by the main driving shaft 12. When the bar 33 rises the sleeve 22 and clutch are rotated in one direction and when said bar moves downwardly they are rotated in the other direction. By adjusting the link 30 in the slot in the arm 29 the amount of twist may be increased or diminished as desired, the adjustment being preferably such that the stay emerges from this machine perfectly flat and without any flatwise curl or roll.

Feed motion.—As before described, the clutches also have a movement longitudinally of the stay in order to grasp successive loops or eyes in turn and to also feed the stay fabric through the machine. For this purpose the sleeve 22 carrying the clutch is mounted in the upper ends of the rocker arms 16. There are two of these arms both of which are provided at their lower ends with sleeve portions journaled in fixed standards or bearing-blocks 18, 18^a, on the main frame, and one of which sleeves forms a journal for the main shaft 12. The two rocker arms are bolted or otherwise rigidly secured together at their upper ends, as at 40, so that they move together in an arc

around the axis of the driving shaft. The feed motion is produced by a cam track 41 on the inner face of the cam 11 and in which travels a pin or roller 42 on the lower end of a lever 43 pivoted at 44 to an extension of the fixed bearing-block 18^a, and which is located at the back of the machine. The upper end of said lever is connected by a link 46 to the upper end of the rocker arm 16, one end of said link being adjustable in an elongated slot 47 in said lever, so as to enable the amount of feed motion to be increased or diminished according to the dimensions of the particular stay being operated upon.

The upper extension of the bearing-block 18^a, which is located at the back of the machine between the two clutch jaws, is provided with a hollow guiding member 50 through which the stay is fed to the clutch jaws.

In the particular machine shown provision is made for adjusting the cams 11 and 36 around the driving shaft 12, in order to properly time the machine and cause the several motions to occur at the proper intervals. For this purpose the central portion of the driving shaft is larger than its end portions, thus providing a shoulder 51 against which the cam 36 abuts. The two cams are spaced apart by a washer 52 and said cams are clamped tightly together and against the shoulder 51 by a nut 53 on the end of the driving shaft, which abuts against the bushing 17 located within the sleeve portion of the outer rocker member 16. By loosening the nut 53 the cams can be rotated upon the driving shaft and can then be clamped tightly to said shaft by tightening up the nut. One end of the driving shaft may be extended, as at 55, to receive a pulley or other driving means, as will be readily understood.

The machine described is very simple and operates rapidly upon stays of any size and with any amount of curl therein. It straightens the stay and also places an initial torsional twist in each of the crossing portions thereof, so that the ability of the stay to withstand flatwise bending stresses in one direction more than in the other is increased. The machine is also adjustable for different sizes of stay, to put any amount of twist in the wire and to compensate for wear on the parts.

What I claim is:—

1. In a machine for forming wire garment stays, means for gripping adjacent loops or eyes along opposite edges of the stay, and means for producing relative rotation between said gripping means to twist a crossing portion of the wire.

2. In a machine for forming wire garment stays, means for gripping adjacent loops or eyes along opposite edges of the stay, and

means for rotating one of said gripping means to twist a crossing portion of the wire.

3. In a machine for forming wire garment stays, means for gripping adjacent loops or eyes along opposite edges of the stay, and means for rotating one of said gripping means about an axis in the plane of the stay and transverse to the length thereof to twist a crossing portion of the wire.

4. In a machine for forming wire garment stays, means for gripping adjacent loops or eyes along opposite edges of the stay, means for producing relative rotation between said gripping means to twist a crossing portion of the wire, and means for operating said gripping means to feed the stay fabric through the machine.

5. In a machine for forming wire garment stays, means for gripping adjacent loops or eyes along opposite edges of the stay, means for rotating one of said gripping means to twist a crossing portion of the wire, and means for operating said gripping means to feed the stay fabric through the machine.

6. In a machine for forming wire garment stays, means for gripping adjacent loops or eyes along opposite edges of the stay, means for rotating one of said gripping means about an axis in the plane of the stay and transverse to the length thereof to twist a crossing portion of the wire, and means for operating said gripping means to feed the stay fabric through the machine.

7. In a machine for forming wire garment stays, two clutches located respectively at opposite edges of the stay, means for causing said clutches to grip adjacent loops or eyes along opposite edges of the stay, and means for producing relative rotation between said clutches to twist a crossing portion of the wire.

8. In a machine for forming wire garment stays, two clutches located respectively at opposite edges of the stay, means for causing said clutches to grip adjacent loops or eyes along opposite edges of the stay, and means for rotating one of said clutches to twist a crossing portion of the wire.

9. In a machine for forming wire garment stays, two clutches located respectively at opposite edges of the stay, means for causing said clutches to grip adjacent loops or eyes along opposite edges of the stay, and means for rotating one of said clutches about an axis in the plane of the stay and transverse to the length thereof to twist a crossing portion of the wire.

10. In a machine for forming wire garment stays, two clutches located respectively at opposite edges of the stay, means for causing said clutches to grip adjacent loops or eyes along opposite edges of the stay, means for producing relative rotation between said clutches to twist a crossing por-

tion of the wire, and means for operating said clutches to feed the stay fabric through the machine.

11. In a machine for forming wire garment stays, two clutches located respectively at opposite edges of the stay, means for causing said clutches to grip adjacent loops or eyes along opposite edges of the stay, means for rotating one of said clutches to twist a crossing portion of the wire, and means for operating said clutches to feed the stay fabric through the machine.

12. In a machine for forming wire garment stays, two clutches located respectively at opposite edges of the stay, means for causing said clutches to grip adjacent loops or eyes along opposite edges of the stay, means for rotating one of said clutches about an axis in the plane of the stay and transverse to the length thereof, to twist a crossing portion of the wire, and means for operating said clutches to feed the stay fabric through the machine.

13. In a machine for forming wire garment stays, two clutches located respectively at opposite edges of the stay, means for moving said clutches toward and from the stay to engage them with and disengage them from the stay fabric, and means for producing relative rotation between said clutches to twist a crossing portion of the wire.

14. In a machine for forming wire garment stays, two clutches located respectively at opposite edges of the stay, means for moving said clutches toward and from the stay to engage them with and disengage them from the stay fabric, and means for rotating one of said clutches to twist a crossing portion of the wire.

15. In a machine for forming wire garment stays, two clutches located respectively at opposite edges of the stay, means for moving said clutches toward and from the stay to engage them with and disengage them from the stay fabric, and means for rotating one of said clutches about an axis in the plane of the stay and transverse to the length thereof to twist a crossing portion of the wire.

16. In a machine for forming wire garment stays, two clutches located respectively at opposite edges of the stay, means for moving said clutches toward and from the stay to engage them with and disengage them from the stay fabric, means for producing relative rotation between said clutches to twist a crossing portion of the wire, and means for reciprocating said clutches longitudinally of the stay to feed the stay through the machine.

17. In a machine for forming wire garment stays, two clutches located respectively at opposite edges of the stay, means for moving said clutches toward and from the stay to engage them with and disengage

them from the stay fabric, means for rotating one of said clutches to twist a crossing portion of the wire, and means for reciprocating said clutches longitudinally of the stay to feed the stay through the machine.

18. In a machine for forming wire garment stays, two clutches located respectively at opposite edges of the stay, means for moving said clutches toward and from the stay to engage them with and disengage them from the stay fabric, means for rotating one of said clutches about an axis in the plane of

the stay and transverse to the length thereof to twist a crossing portion of the wire, and means for reciprocating said clutches longitudinally of the stay to feed the stay through the machine.

In testimony whereof, I have hereunto set my hand.

SAMUEL HARRY NORTON.

Witnesses:

T. F. CHARLTON,
W. S. SMITH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."