W. S. SOUTHWICK.

SHUTTLE AND FILLING UNIT FOR WIRE LOOMS.

APPLICATION FILED JULY 12, 1919.

1,373,268.

Patented Mar. 29, 1921.

5 SHEETS—SHEET 1.

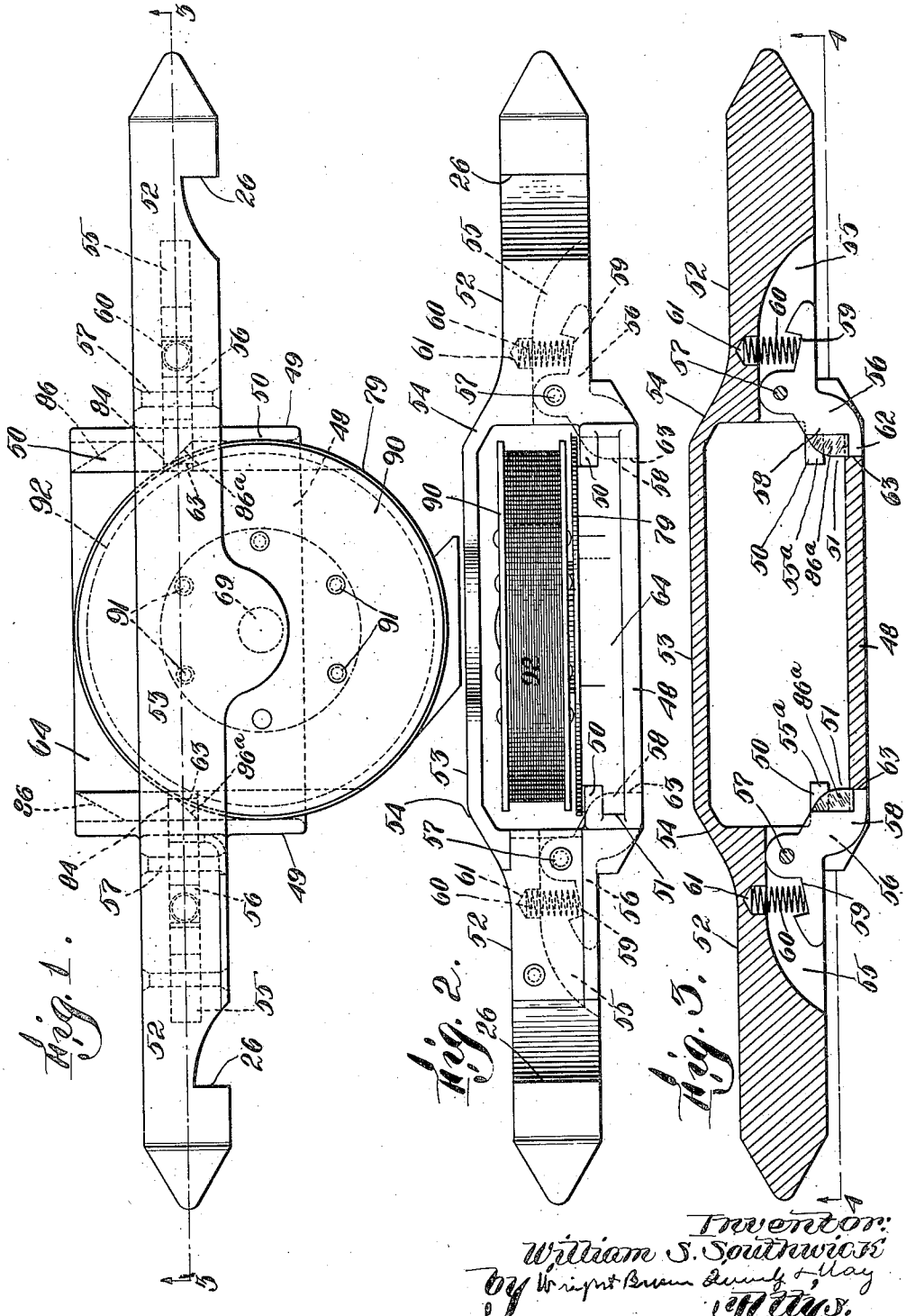


Fig. 1.

Fig. 2.

Fig. 3.

Inventor:
William S. Southwick
by Wright Brown Quinby & May
Attys.

W. S. SOUTHWICK.

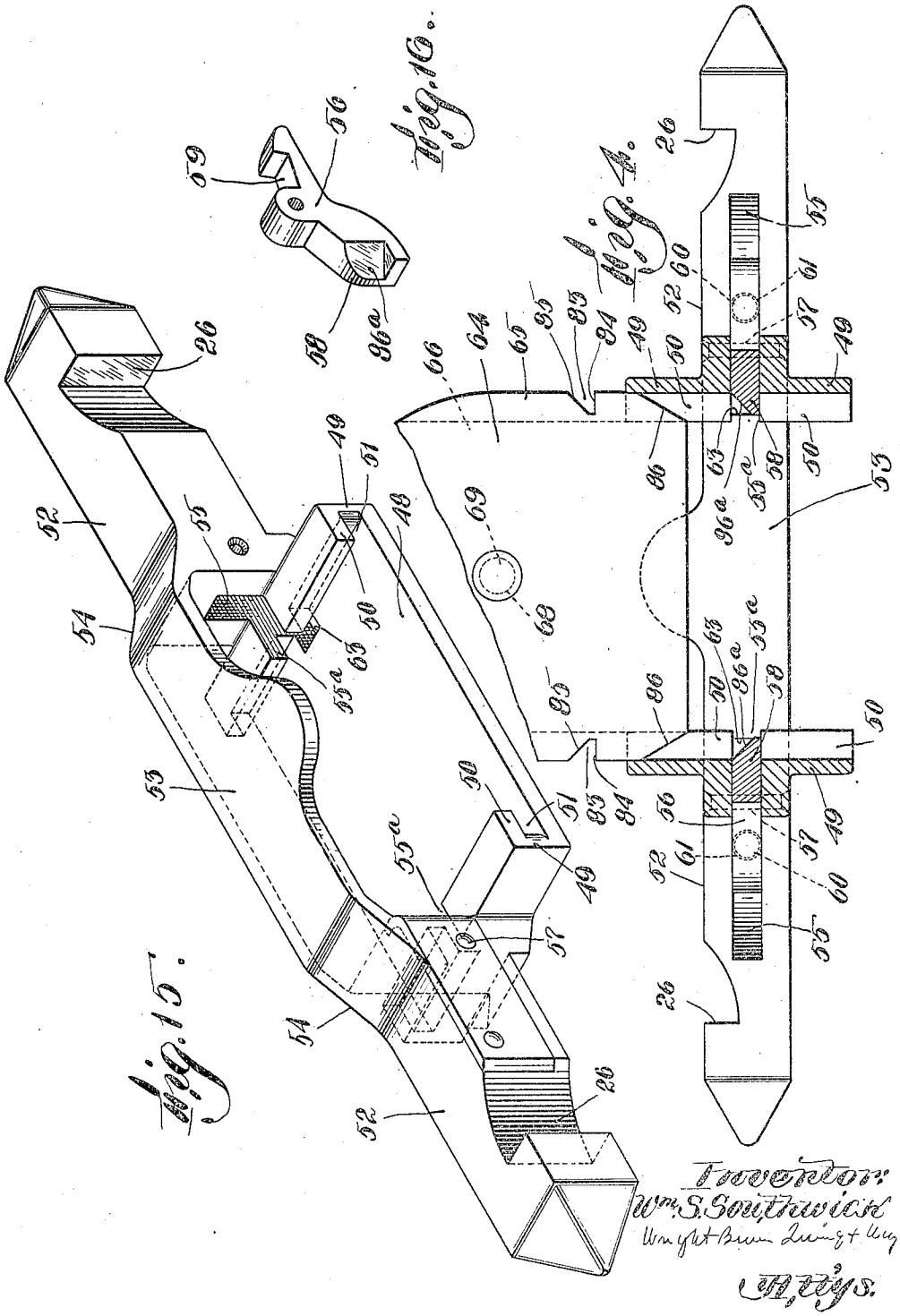
SHUTTLE AND FILLING UNIT FOR WIRE LOOMS.

APPLICATION FILED JULY 12, 1919.

1,373,268.

Patented Mar. 29, 1921.

5 SHEETS—SHEET 2.



NORRIS PETERS INC. LITHO. WASHINGTON, D. C.

W. S. SOUTHWICK.

SHUTTLE AND FILLING UNIT FOR WIRE LOOMS.

APPLICATION FILED JULY 12, 1919.

1,373,268.

Patented Mar. 29, 1921.

5 SHEETS—SHEET 3.

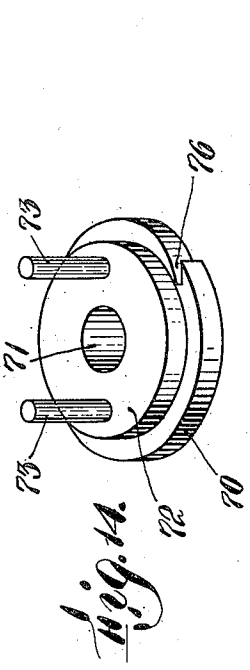


Fig. 14.

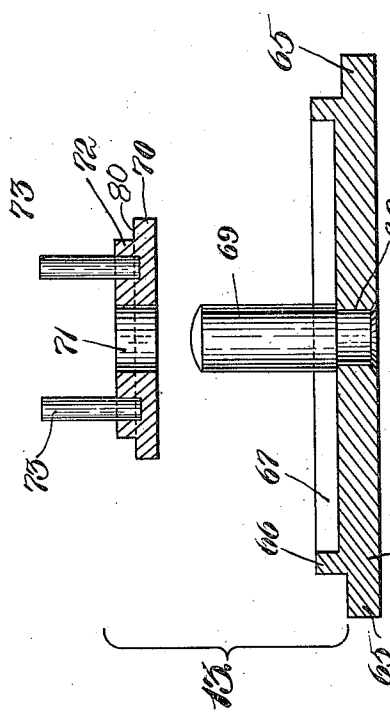


Fig. 15.

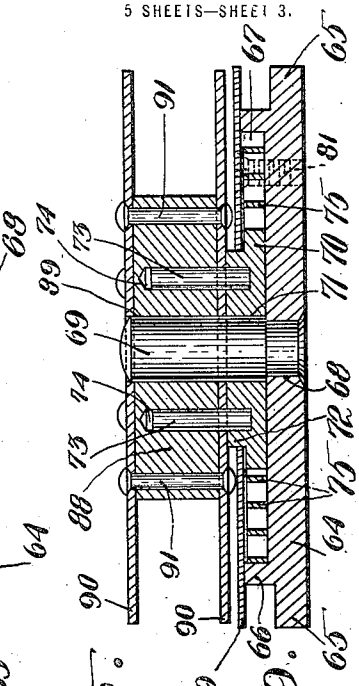


Fig. 5.

Fig. 9.

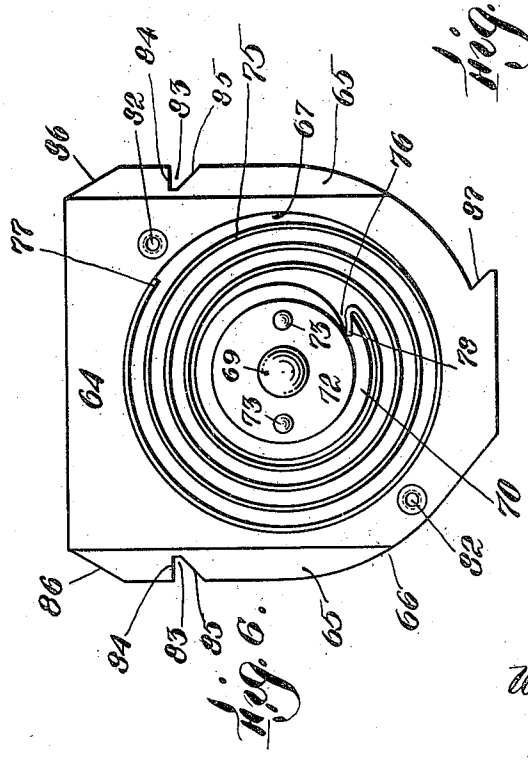
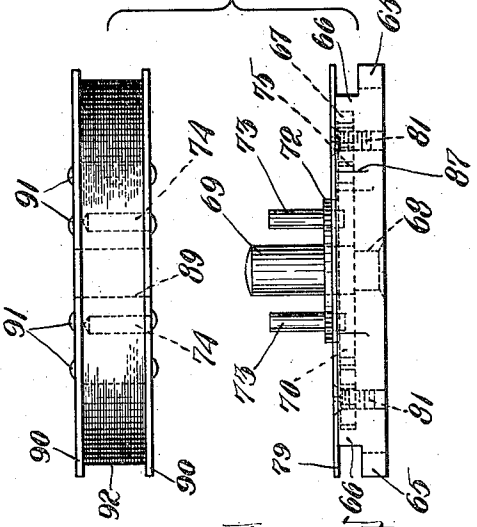


Fig. 6.



Inventor:
William S. Southwick
By Wright Brown Quinby & May
Attys.

W. S. SOUTHWICK.

SHUTTLE AND FILLING UNIT FOR WIRE LOOMS.

APPLICATION FILED JULY 12, 1919.

1,373,268.

Patented Mar. 29, 1921.

5 SHEETS—SHEET 4.

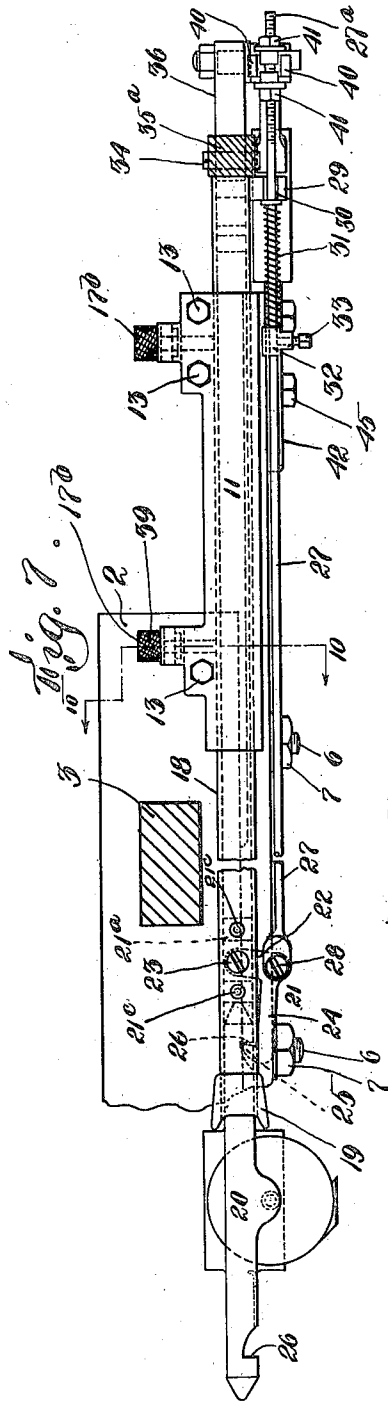


Fig. 7.

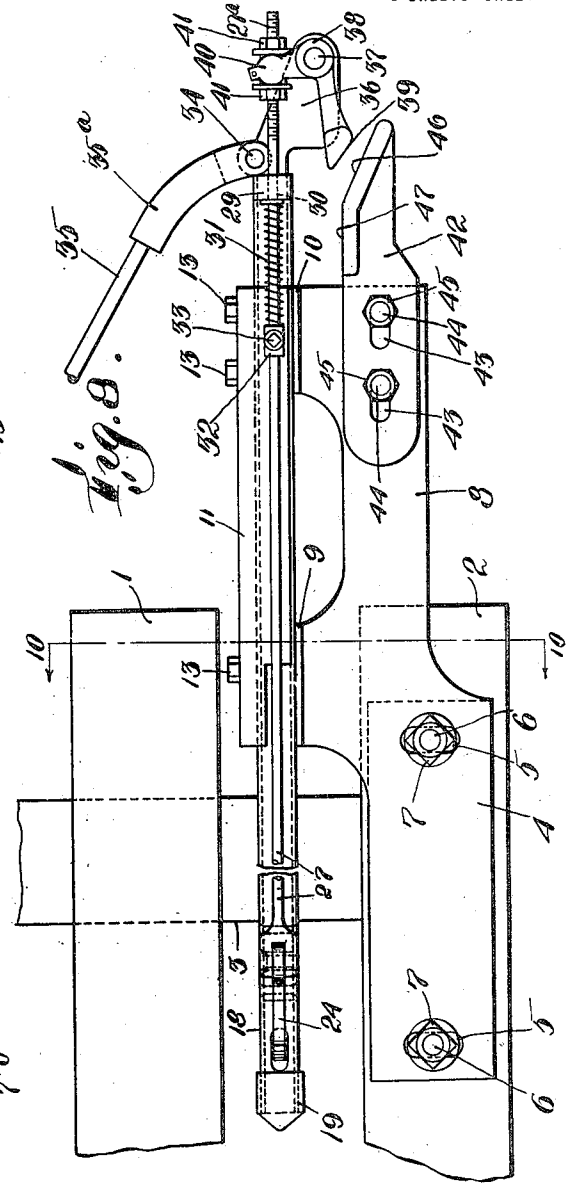


Fig. 8.

Inventor:
William S. Southwick
By Wright Brown Quinby & Woy
Atty's.

W. S. SOUTHWICK.

SHUTTLE AND FILLING UNIT FOR WIRE LOOMS.

APPLICATION FILED JULY 12, 1919.

1,373,268.

Patented Mar. 29, 1921.

5 SHEETS—SHEET 5.

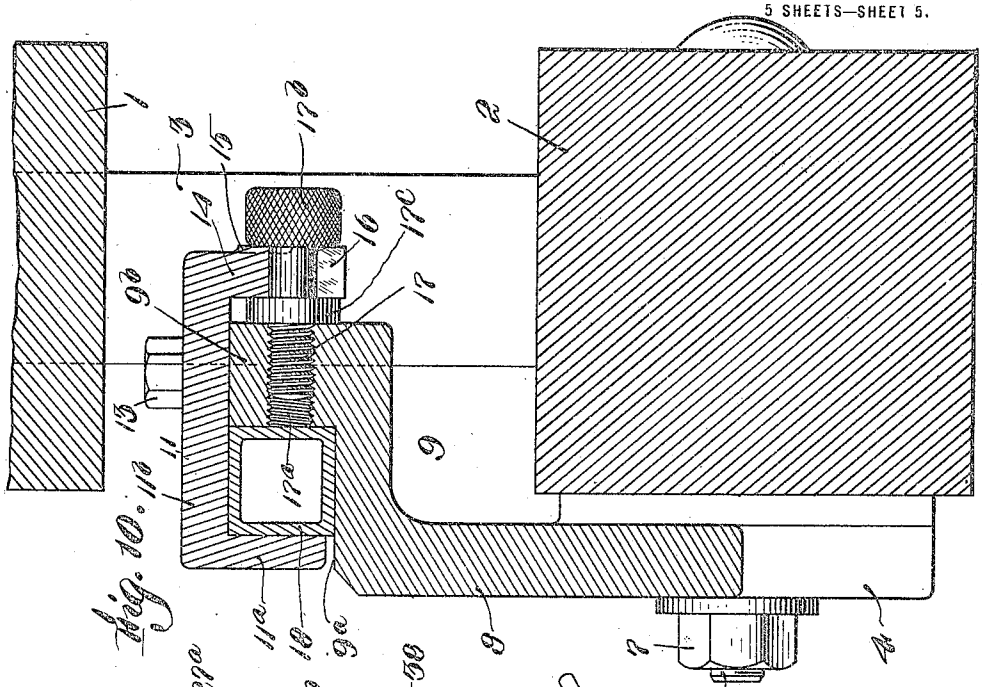


Fig. 10.

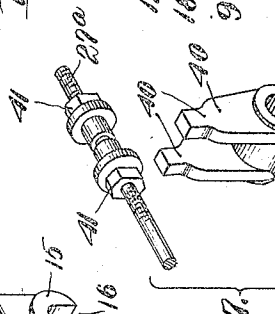


Fig. 17.

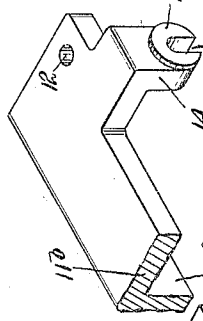


Fig. 12.

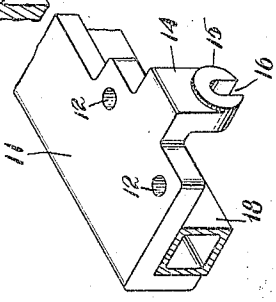
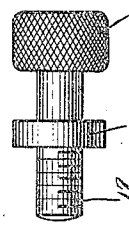


Fig. 11.



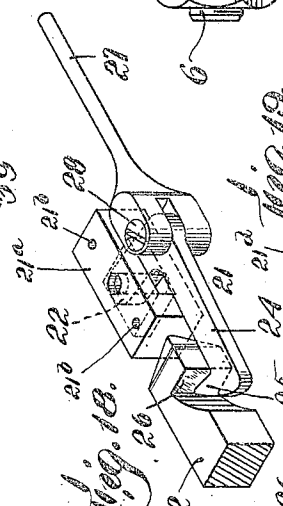


Fig. 18.

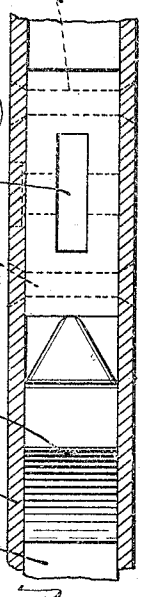


Fig. 19.

Inventor:
William S. Southwick
By Wm. pat Brown 2nd & Hay
Attys.

NORRIS PETERS, INC., LITHO., WASHINGTON, D. C

UNITED STATES PATENT OFFICE.

WILLIAM S. SOUTHWICK, OF CLINTON, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WICKWIRE SPENCER STEEL CORPORATION, A CORPORATION OF MASSACHUSETTS.

SHUTTLE AND FILLING UNIT FOR WIRE-LOOMS.

1,373,268. Specification of Letters Patent. Patented Mar. 29, 1921.

Application filed July 12, 1919. Serial No. 310,321.

To all whom it may concern:

Be it known that I, WILLIAM S. SOUTHWICK, a citizen of the United States, residing at Clinton, in the county of Worcester and State of Massachusetts, have invented Shuttles and Filling Units for Wire-Looms, of which the following is a specification.

This invention relates to a new and improved shuttle and filling unit for wire looms.

In the drawings illustrating one embodiment of my invention wherein like parts are indicated by like characters wherever they occur:—

Figure 1 in top plan view shows a shuttle and filling unit for wire looms constructed in accordance with my invention, the parts appearing in the position they occupy in the loom;

Fig. 2 in side elevation shows the parts illustrated in Fig. 1;

Fig. 3 is a longitudinal sectional view taken through the shuttle on the line 3—3 of Fig. 1 looking in the direction of the arrows, the filling unit being omitted;

Fig. 4 is a longitudinal sectional view on the line 4—4 of Fig. 3 looking in the direction of the arrows, there being represented in addition a view of a part of the under side of the filling spool at the commencement of its entry into the shuttle;

Fig. 5 is a side elevation of the spool holder and spool-carrying the filling, the spool being separated from the spool holding pins for clearness of illustration;

Fig. 6 is a top plan view of the spool holder showing at the sides flanges for engaging complemental grooves in the shuttle, the notches in the flanges for engaging with latches carried by the shuttle, also showing a central stud upon which the spool is arranged, two pins for engaging apertures in the spool and a coiled spring which serves as a tension to yieldingly resist the unwinding of the filling from the spool;

Fig. 7 in top plan view shows the combined shuttle and filling unit in operative relation with the shuttle bar mechanism by which the shuttle is operated in a wire loom;

Fig. 8 is a side elevation of the shuttle operating parts shown in Fig. 7, the shuttle being omitted;

Fig. 9 is a vertical sectional view of the spool and the spool holder in the position they occupy when assembled for being placed in the shuttle and the position they occupy while in the shuttle;

Fig. 10 is a cross sectional view on the line 10—10 of Fig. 7 looking in the direction of the arrows showing the sliding shuttle bar and the bearing or raceway therefor;

Fig. 11 is a detail view of an adjusting screw shown in Fig. 10;

Fig. 12 is a detail perspective view of the cap plate which engages the top and one side of the sliding shuttle bar as a part of the bearing or raceway for said bar, a portion of the latter being shown in position at the left hand end of the figure;

Fig. 13 is a detail sectional view of the two plates that form the base or support for the spool or filling holder, the two plates being separated to show their construction;

Fig. 14 is a detail perspective view of the upper plate shown in Fig. 13 or the plate upon which the spool or filling holder is directly mounted;

Fig. 15 is a detail perspective view of the shuttle, the shuttle latches being omitted;

Fig. 16 is a detail perspective view of a latch carried by the shuttle;

Fig. 17 is a detail perspective view of a bell crank cam lever mechanism shown at the right in Fig. 8, the parts being separated to show their construction;

Fig. 18 is a detail perspective view of the shuttle latch carried by the shuttle bar appearing at the left hand in Fig. 8, the shuttle bar being omitted;

Fig. 19 is a detail longitudinal sectional view of the shuttle bar and the lock for supporting the shuttle latch, shown in Fig. 18, the shuttle latch being omitted.

In wire looms, a bobbin so-called is not employed, so far as I am aware, as it is impractical to prepare the wire filling in the form of a cone and pull such wire filling off from the tip. The wire filling units for wire looms are prepared in one of two forms, depending upon the character of the filling; in one form, where a soft wire filling or a fine wire filling is employed, said fillings are ordinarily prepared in the form of a ball, and the filling is pulled out from

the inside of the ball; in the other form, or the form to which my invention is particularly addressed, where a large wire filling or a hard wire filling is employed, said fillings are prepared in the form of a spool and unwound from the surface like thread from an ordinary spool. With the latter form of filling, that is a hard wire filling or a large wire filling, a fly shuttle is not employed nor is a pickerstaff employed, but reciprocating bars are used which support and alternately push and pull the shuttle through the shed of the warp.

Referring to Fig. 8, there is illustrated generally a part of the mechanism of a wire loom of any preferred construction designed for positively operating the shuttle by means of a bar, the general framework of the loom being omitted as well as the parts of the loom other than the bar and a portion of the lay, because such mechanism and framework are well known.

In such looms, the lay ordinarily employed is composed of a horizontal beam, as 1, above the path of the shuttle, and a second horizontal beam, as 2, below the path of the shuttle, the two beams 1 and 2 being connected by two vertical bars, one of said bars 3 being shown in Fig. 8, the second bar would appear at the left but is not shown since the beams are broken away. 4 represents a casting formed with two vertical slots 5, 5. In each slot is arranged a bolt 6. A nut 7 on each bolt serves to clamp the casting 4 at any desired vertical adjustment on the beam 2, as well as to aline said casting. 8 represents an extension of the casting 4 formed with two bearings 9, 10. Each of these bearings 9 and 10 is made up of a horizontal wall or bearing 9^a, as shown in Fig. 10, with respect to the bearing 9 and a vertical wall 9^b. 11 represents a cap plate, see Figs. 7, 8 and 12. As shown, this cap plate has the general shape of an angle iron, one wall of which, 11^a, is vertical and the other wall, 11^b, is horizontal. As shown in Fig. 10, the walls 9^a and 9^b of the bearing 9 engage the bottom and one side of the sliding shuttle bar 18 while the walls 11^b and 11^a of the plate 11 engage the top and opposite side of the shuttle bar 18, the four walls constituting a bearing in which the shuttle bar 18 slides.

Referring to Figs. 10 and 12, the wall 11^b of the cap plate 11 is provided with holes 12, 12, 12, through which cap screws 13 pass and engage complemental screw-threaded holes in the vertical wall 9^b of the bearing 9 to rigidly secure the cap plate 11 in position. The wall 11^b of the cap plate 11 is further formed with two depending ears 14, 14, terminating in a boss 15, 15, that is finished on its outer face, while the complemental inner face of the ears 14, 14 are also finished. As shown, each boss 15 is formed with a slot 16.

Referring to Figs. 10 and 11, 17 represents an adjusting screw arranged to enter complemental screw-threaded apertures 17^a in the vertical wall 9^b. This screw 17 at its outer end is formed with a head 17^b adapted to engage the finished face of the boss 15. 17^c represents a flange fast on the screw 17 adapted to engage the inner or finished face of the depending ears 14, the latter occupying the space between the flange 17^c and the head 17^b. By this construction the wall 11^a can be adjusted to the right in Fig. 10 to secure a proper fit with the shuttle bar 18, and also to allow for wear.

Referring to Figs. 7 and 8, the left hand end of the shuttle bar 18 is formed with a mouth-piece so-called, 19, to receive one end of the shuttle 20. 21 represents a latch lever in the form of a bell-crank, pivoted at the end of one of its arms 22 by a screw 23 to the shuttle bar 18. The end of the other arm 24 is formed with a hook 25 adapted to engage a notch 26 in either end of the shuttle 20. 27 represents a rod one end of which is pivoted at 28 to the angle of the bell-crank latch lever 21. The right hand end of the shuttle bar 18 in Figs. 7 and 8 is provided with a lug 29, formed with a perforation 30, in which the rod 27 is slidingly arranged. 31 represents a coiled spring arranged on the rod 27 between the lug 29 and a collar 32, secured to the rod 27 at any desired point by a set screw 33. The spring 31 when compressed tends to throw the rod 27 to the left, in Figs. 7 and 8. 34 represents a pintle in the shuttle bar 18 upon which is arranged the forked end 35^a of a rod 35, the opposite end of which is connected to a suitable mechanism for giving to the shuttle bar its desired reciprocation. 36 represents an extension on the right hand end of the shuttle bar 18, in Figs. 7 and 8. This extension carries a stud 37 upon which is arranged a hub 38 of a bell-crank lever, the end of one arm of which is formed with a cam surface 39. The end of the other arm of this bell-crank lever is formed with forked arms 40, 40, see Fig. 7, arranged upon either side of a screw-threaded end 27^a of the rod 27, between two adjustable nuts 41, 41, see Fig. 17. The movement of the bell-crank on the stud 37 causes the forks 40, 40, by engaging the nuts 41, 41, to move the rod 27 to the right, Figs. 7 and 8, by means hereinafter described. The rod is thrown in the opposite direction by the action of the spring 31 when said rod is released from control of the forks 40, 40. 42 represents a casting, the left hand end of which is formed with horizontal slots 43, 43. 44, 44 represent two bolts carried by the extension 8 and arranged in the slots 43, 43. Nuts 45, 45 on these bolts serve to clamp the casting 42 to the extension 8 in any desired position of adjustment to the right or left in Figs. 7 and 8.

The right hand end of the casting 42 is formed with an inclined cam surface 46, terminating in a horizontal dwell surface 47. As the shuttle bar 18 is reciprocated by means of the rod 35 to the left in Fig. 8, the cam surface 39 will engage the cam surface 46, drawing the rod 27 to the right in Figs. 7 and 8, pulling the hook 25 out of the notch 26 in the shuttle, and thus releasing the shuttle from this shuttle bar. As is usual in such looms, the shuttle bar continues to push the shuttle a short distance after the latch is released and while a corresponding hook in a corresponding shuttle bar on the opposite side of the shed engages the opposite end of the shuttle. During this continued motion of the shuttle bar shown, the hook is maintained out of engagement with the notch 26 of the shuttle by means of the cam surface 39 engaging the dwell surface 47. The latter surface controls the cam 39 long enough for the shuttle bar on the opposite side of the shed to engage and draw the shuttle away from the shuttle bar under discussion. This is a common operation and need not be further described. It is of course understood, as already suggested, that in such a loom there is a shuttle bar, such as shown, upon each side of the shed, one shuttle bar pushing the shuttle half way through the shed at which point it is seized by the opposite shuttle bar and pulled through the balance of the shed. The same description applies to subsequent passages of the shuttle through the shed.

Referring to Figs. 5 to 15, my improved shuttle consists of a lower plate 48, the material of which at each end extends up to form a short vertical wall 49, then extends inwardly to form a rib 50, thus providing a groove or raceway 51, 51, upon each side of the plate. Extending from each side of the plate 48 is a tang or shuttle nose 52, 52, each of which is formed with a notch 26. The top wall of the tangs 52, 52, is extended over the plate 48 as a bridge piece 53 connecting the two tangs. The main part of the bridge piece 53 is slightly above the top surface of the tangs 52, see Fig. 15, being formed with an incline 54 at either end. 55, 55 represent slots in the inner end of the tangs 52, said slots opening into the chamber formed by the plate 48 and the bridge piece 53, and extending across at 55^a the ribs 50, 50. 56, 56 represent latches arranged in the slots 55, 55, and mounted on the pintles 57, 57. One end of the latch, as at 58, can project into the chamber through the space 55^a in the rib. The opposite end of the latch is formed with a notch 59 to receive one end of a coiled spring 60, the opposite end of the spring being arranged in a recess 61 in the tang. The action of these springs 60 is to throw the end 58 of the latch into the chamber, into the space 55^a, across the groove 51. The inner end of each slot 55, 55, is formed by an inner wall 63, 63, which engages the arm 58 of the latches 56, 56, and limits the inward movement of the end 58, 58, of the latches.

The shuttle thus far described differs from prior shuttles used in wire looms, so far as I am aware, in the provision of the latches 56, the plate 48 rigidly secured to or integral with the shuttle body, the ribs 50 and the grooves 51. The tangs 52 with their notches 26 are common to shuttles used in wire looms.

Referring to Figs. 5, 6, 13 and 14, wherein is shown my improved filling unit adapted to handle large wire fillings or hard wire fillings, 64 represents a plate formed with side flanges 65, 65, adapted to fit and slide in the grooves 51, 51 of the shuttle. On its upper surface and inside the flanges 65 this plate is cut away to form an inclosed circular space, as 67, having a bounding wall 66. In the center of the circular space 67 is an opening 68 formed in the plate 64 to receive the end of a post 69 that is rigidly secured to the plate by upsetting or otherwise. The plate 64 as described may be either cast or it may be turned down from a piece of metal to the form shown. 70, see Fig. 13, represents a circular plate formed with a central opening 71 adapted to fit loosely on the post 69, permitting the plate to rest on the bottom wall of the circular opening 67, the said plate 70 being of less diameter than the circular opening 67. 72 represents a vertical circular extension of the plate 70, but of less exterior diameter than the plate 70. This construction may be cast or turned up or may be made of two plates secured together, each having a uniform opening to take over the post 69, but the plate 70 being greater in outside diameter than its vertical extension 72. 73, 73 represent two pins secured in the plate 72 and adapted to enter corresponding holes 74, 74, in the spool hereinafter described, see Fig. 9. 75, see Figs. 5 and 6, represents a coiled spring arranged in the circular chamber 67. The inner end of this spring is loosely positioned in a notch 76 of the plate 70. The outer end of said spring 77 rests against the inner face of the wall 66, but is not attached to it, so the spring can drag along the surface of the wall of said rib. In assembling this part of the filling unit the plate 70 and its extension 72 are dropped over the post 69 and the spring 75 arranged between the plate 65 and the wall 66 with the inner end 78 of the spring arranged in the notch 76. Then a circular plate 79 formed with an opening sufficient to slide down over the edge of the extension 72 is slid in place, resting upon the wall 66 and extending over the upper wall 80 of the plate 70, but not engaging the cir-

cular extension 72. The plate 79 is secured to the wall 66 by screws 81 passing through tapped holes 82 in the wall 66. Each of the flanges 65 is formed with a notch 83, 83, having a right angle wall 84 on one side and an inclined wall 85 on the other. The flanges 65 beyond the notches 83 are beveled, as at 86, 86. The plate 64 at its opposite end is formed with a notch 87. The bevels 86, 86, are to facilitate the introduction of this plate and the parts carried thereby into the shuttle. Said inclines further serve to engage supplemental inclines 86ª, 86ª on the latches to push the latter one side until they come opposite the notches 83 when they are snapped into place in said notches by the action of the springs 60, 60. The notch 87 is designed to engage the filling outside of the shuttle to keep the filling in place when several of these filling units are stacked in a magazine. This notch has no function after the unit has been placed in the shuttle.

Referring to Fig. 9, my filling holder or spool consists of a barrel, as 88, formed with a central opening, as 89, to loosely fit on the post 69. 90, 90 represent two plates of hard steel, one arranged upon either end of the barrel 88 and secured thereto by rivets 91. The plates 90, 90 are circular and formed with openings corresponding to openings 89. These plates form the side walls of the spool, the filling 92 being wound upon the barrel 88 between the plates 90, 90. The barrel is preferably made of wood or some light material, with holes 74, 74 to receive the pins 73, 73. The spool constructed as stated with its filling is slid down upon the post 69, the pins 73 entering the holes 74. With the parts arranged as described, the spring 75 acts as a friction to yieldingly resist the unwinding motion of the spool.

When the filling in a shuttle has been exhausted from a spool at a predetermined point, another filling unit such as shown in Fig. 5 is inserted in the shuttle, pushing out the prior filling unit and at the same time the plate of the new filling unit is locked in place by the latches. This can be done by hand, but preferably automatically, as set forth in another application filed by me. In Fig. 4, the commencement of such substitution of a full unit for an exhausted unit is in part illustrated. Prior to my invention, so far as I am aware, the substitution of filling units in the shuttle of a wire loom has been done by hand. Whether such substitution be done by hand or automatically by using my improved filling unit, the action of the latter in its entry to and exit from the shuttle will be substantially the same. In either case the shape and arrangement of the walls 84 and 85 of the notches 83, combined with the shape of the operative face of the latches 56 carried by the shuttle is such that these latches are pushed back out of engagement with the notch by a continued movement of the plate in one direction, but said latches hold the plate against reverse motion.

Referring to Figs. 7 and 18, 21ª represents a block formed with holes at each end 21ᵇ. This block is arranged in the hollow shuttle bar 18 and secured in place by rivets 21ᶜ passing through the wall of the shuttle bar and the holes 21ᵇ. This block on one side is formed with a recess 21ᵈ in which is arranged the arm 22 of the latch 21 and pivotally mounted as heretofore described upon the screw 23.

Having thus explained the nature of my invention and described a way of constructing and using the same, though without attempting to set forth all of the forms in which it may be made, or all of the modes of its use, what I claim and desire to secure by Letters Patent is:—

1. A shuttle comprising two plates spaced apart to form the walls of a filling chamber, a shuttle nose connected to one side of said plates, a complemental shuttle nose connected to the opposite side of said plates, one wall of said chamber being formed with a guideway positioned crosswise of said chamber, a recess formed in the inner end of said last-mentioned shuttle nose and extending into said guide way, and a latch arranged in said recess in the shuttle nose and adapted to enter said guide way.

2. A filling unit comprising a base plate formed upon one side with a guide member, a wall on said plate inside said member forming a spring chamber, a stud having one end secured to said plate near the center of said chamber, a spring plate loosely arranged on said stud in said chamber, a spring arranged in said chamber between said wall and said spring plate, the inner end of said spring being loosely connected to said spring plate, but not connected to said wall, a circular spool supporting plate fast on the top of the spring plate and of less diameter than the latter, a central aperture formed in said two plates to loosely fit on said stud, a pin secured to the top of the spool plate on one side of said opening, a cover plate formed with a central aperture larger than that of the spool plate but less than that of the spring plate, said plate being arranged to rest on said spring plate and said wall over said spring and being secured to the wall, a filling spool having a central hub and side walls to hold the filling, said hub being formed with a central hole to loosely fit on said stud and a second hole to receive the pin in the spring plate.

3. A shuttle formed with a filling chamber open on opposite sides, a lateral guideway formed on one wall of said chamber, a

latch carried by said shuttle a filling carrier comprising a base plate provided with a guide member complemental to said guideway and a part to coact with said latch, a spool stud carried by said plate, a filling spool loosely mounted on said stud, and means carried by said plate to yieldingly resist the motion of the spool in one direction.

4. A shuttle formed with a filling chamber open on opposite sides, a plate provided with means for supporting a filling spool, and means carried by one of said parts to guide said plate in a predetermined path into and through said chamber.

5. A shuttle formed with a spool chamber and a shuttle nose at each end of said chamber, a latch carried by said shuttle a plate, means carried by said plate arranged to coact with said latch to yieldingly lock said plate in position but to permit its ejection, a stud carried by said plate, a filling spool mounted on said stud, and means carried by said plate coacting with said spool to yieldingly resist the motion of the spool in one direction.

6. A shuttle formed with a chamber open on opposite sides, said openings constituting an entrance and exit for the chamber, a locking member extending into said chamber a plate, a spool stud on said plate, a filling spool mounted on said stud, said plate being formed at the front end with a part to move the locking member of the shuttle out of operative position, means on said plate situated to the rear of its front end to coact with said member on the shuttle to yieldingly lock said plate in position in the shuttle and hold it against rearward movement, the parts being so constructed as to yield and permit a continued movement of the plate through and out of the shuttle.

7. A shuttle formed with a filling chamber open on opposite sides, combined with a plate carrying a filling spool stud, a filling spool mounted thereon, and complemental coacting members carried by said plate and said shuttle to yieldingly hold said plate in position in said chamber and to resist any reverse motion of said plate while permitting a continued forward motion of the plate for the ejectment of the plate.

8. A filling unit comprising a base plate formed with a guide member, a shuttle locking member carried by said plate, the front end of said guide member being formed with a bevel, the end of said plate opposite said bevel being provided with a filling member, a spool stud carried by said plate, and a filling spool mounted thereon.

9. A filling unit comprising a base plate formed with a guide member, the front end of said guide member being formed with an incline, a locking member carried by said guide member, a spool stud carried by said plate and a spool mounted on said stud.

10. In combination a shuttle and a filling unit comprising a bobbin and a holder therefor, said shuttle and said holder having cooperative sliding connections arranged to confine the movement of the holder in relation to the shuttle in a straight line, and said bobbin being rotatable relatively to said holder.

11. In combination a shuttle and a filling unit comprising a holder and a bobbin carried thereby, said shuttle and holder having coöperative disconnectible sliding tongue-and-groove portions extending from front to rear.

12. In combination a shuttle, a filling unit comprising a holder and a bobbin carried thereby, said shuttle and holder having coöperative rigid tongue-and-groove portions arranged to slide one in another, and means arranged to keep said holder in a predetermined position relatively to said shuttle.

13. In combination a shuttle, a bobbin holder, said shuttle and holder having cooperative portions arranged to slide one upon another, said holder being detachable from said shuttle, means arranged to keep said holder in a predetermined position relatively to said shuttle, said holder having a stud, and a bobbin arranged on said stud and adapted to rotate to let out the filling carried thereby.

In testimony whereof I have affixed my signature.

WILLIAM S. SOUTHWICK.