United States Patent [19]

Spencer

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[54] **WIRE MESH WORKING APPARATUS**

[75] Inventor: **Owen C. Spencer,** Blue Island, Ill.

[73] Assignee: **Metropolitan Chicago Baptist Association, S.B.C.,** Broadview, Ill.

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 25,970, April 6, 1970, Pat. No. 3,688,810.

[52] **U.S. Cl.** **140/107,** 72/183, 404/100

[51] **Int. Cl.** **B21f 33/00**

[58] **Field of Search** ..... 72/160, 161, 164, 183; 94/39 R; 140/1, 107; 242/55.2; 404/100

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Primary Examiner—Lowell A. Larson
Attorney, Agent, or Firm—Lester N. Arnold

[57] **ABSTRACT**

A reinforcing wire mesh working apparatus includes a frame having pairs of support wheels and a spindle for rotatably supporting a roll of wire mesh web on the frame so that the web may be unrolled and passed beneath a pair of the support wheels for decontouring the web; the frame, which may be adjustable in height or length, also carries additional decontour means and a removable bender for bending the web to desired angular configurations, the additional decontour means and the spindle may be mounted in different positions on the frame. Two manually operable embodiments of the wire mesh working apparatus are disclosed. Also disclosed is a powered wire mesh working apparatus which includes an electrically powered web feed device, and a hydraulically powered bending mechanism, web cutter and frame height-adjusting means.

32 Claims, 9 Drawing Figures

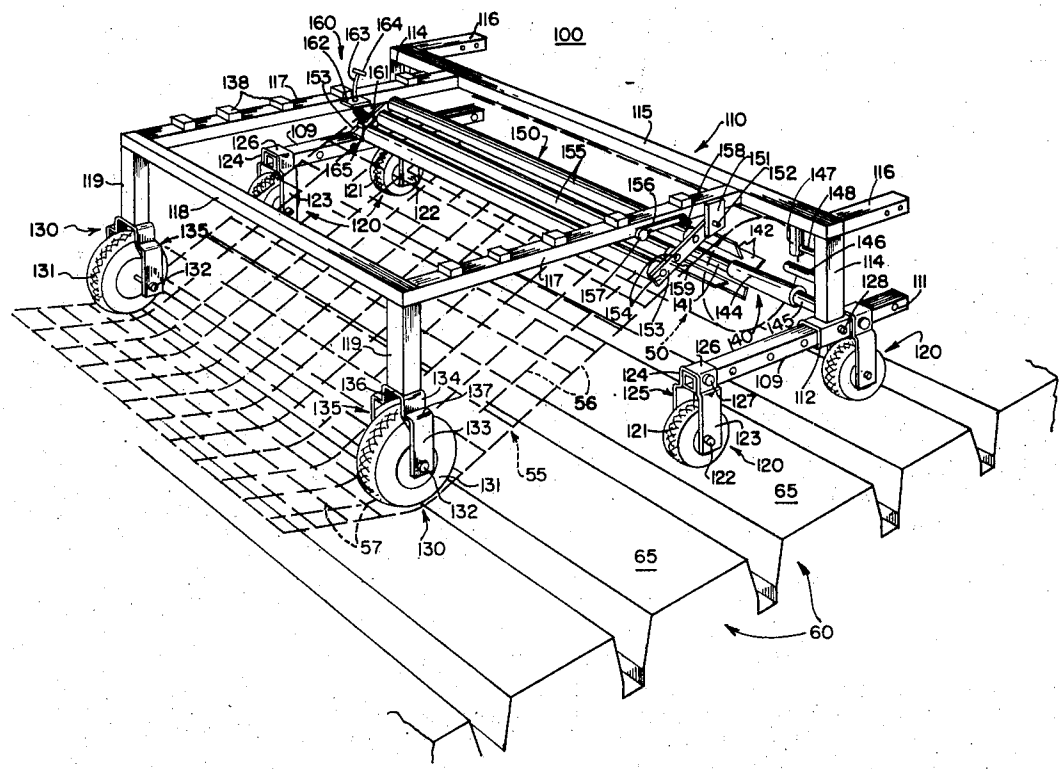
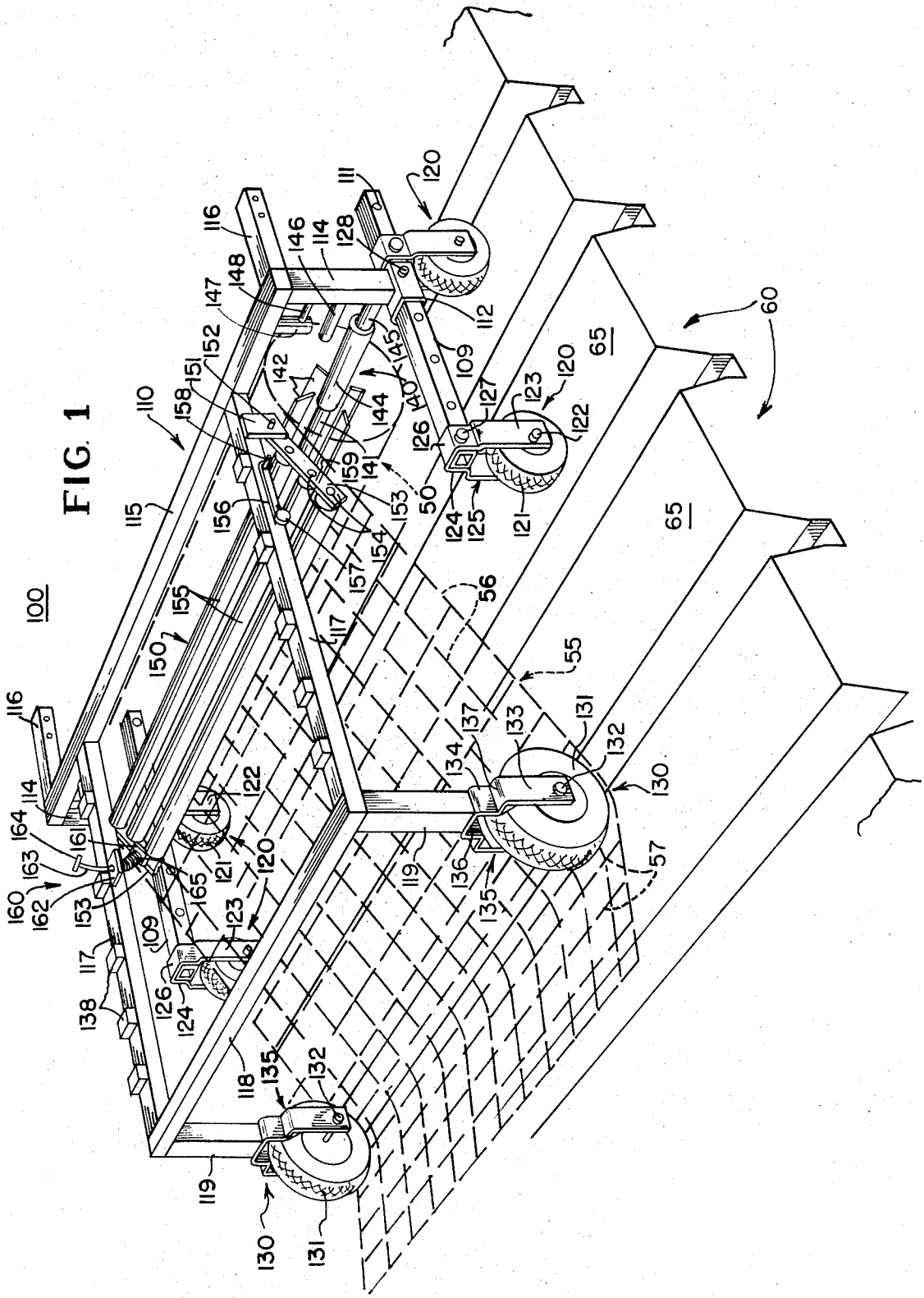


FIG. 1


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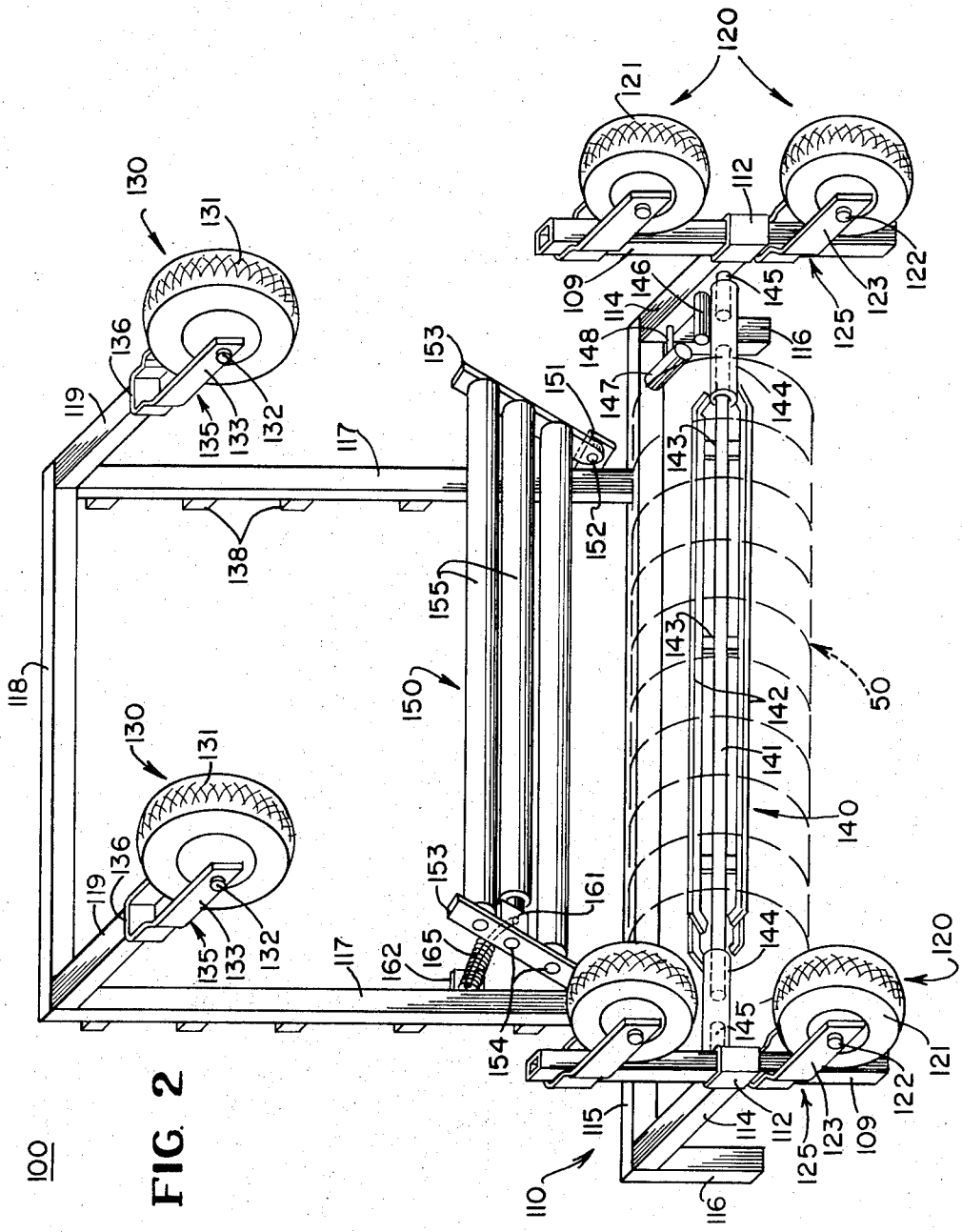

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FIG. 2

FIG. 3

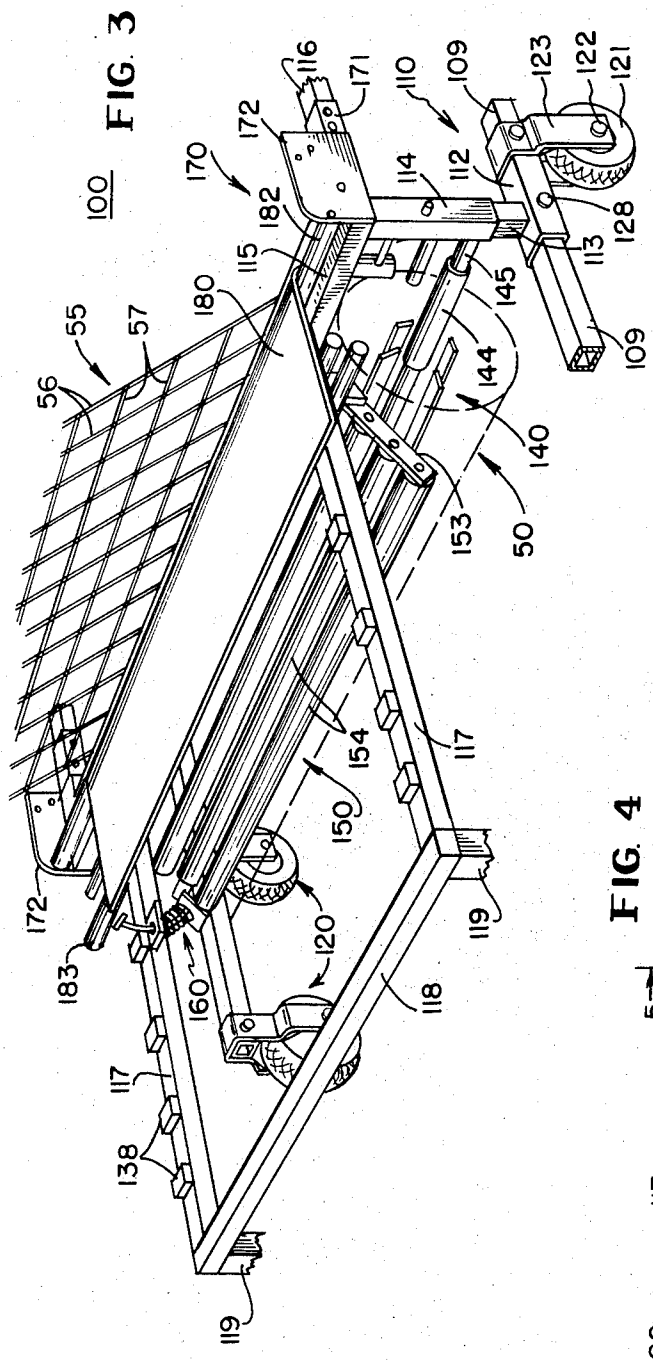


FIG. 4

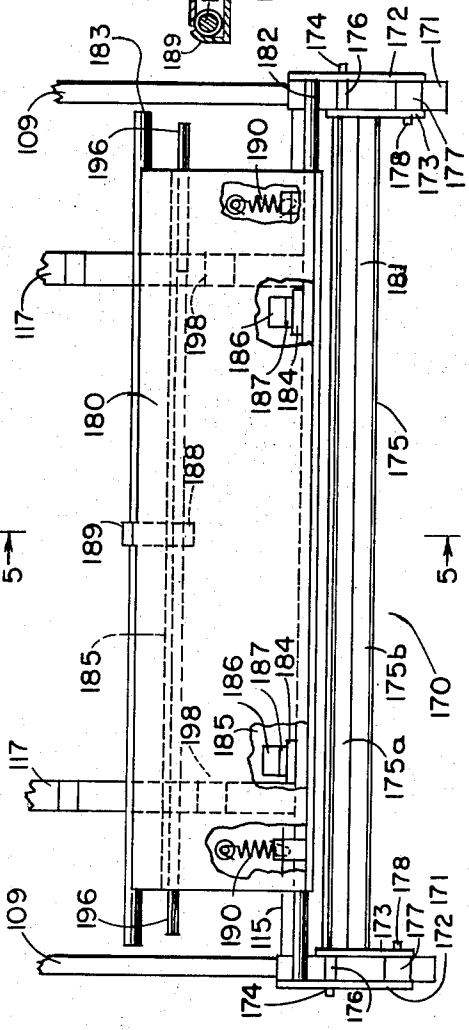
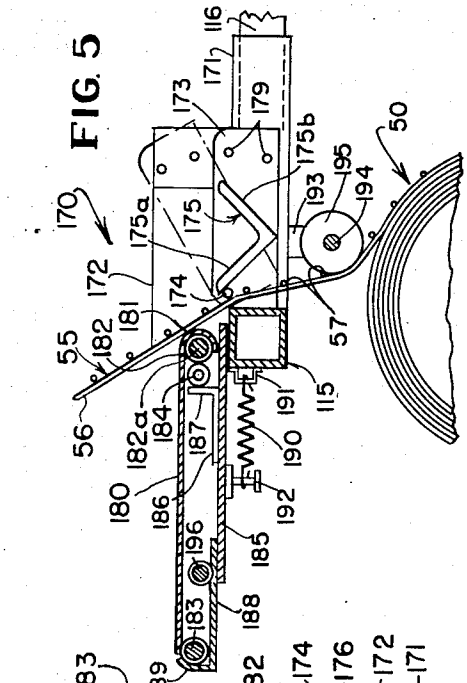


FIG. 5



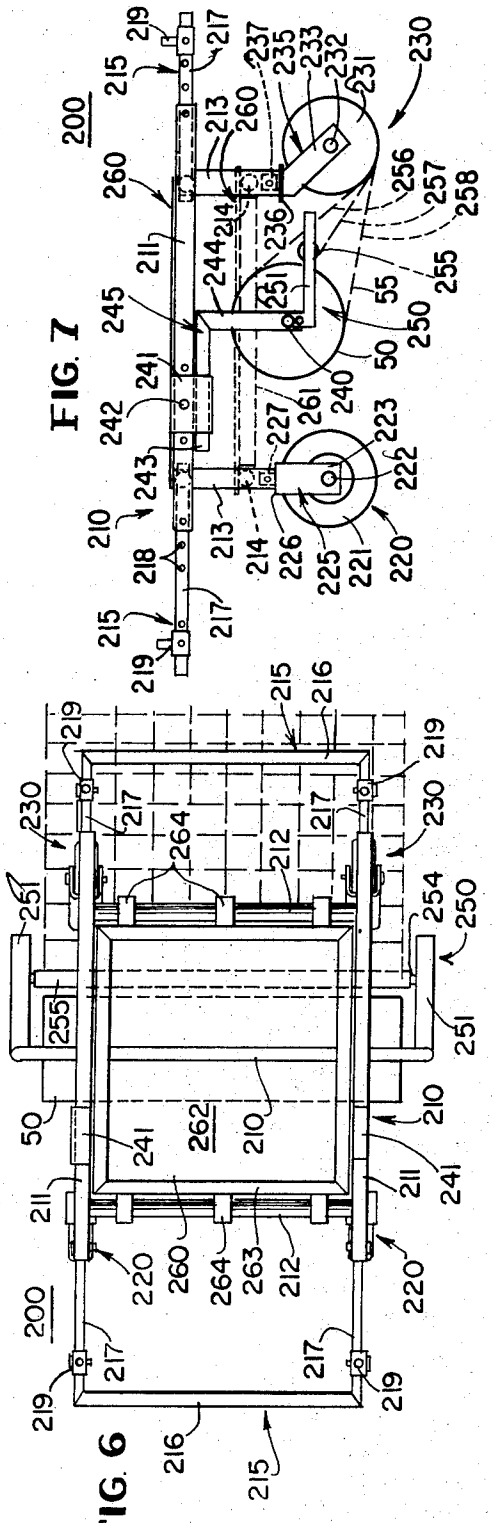


FIG. 6

FIG. 7

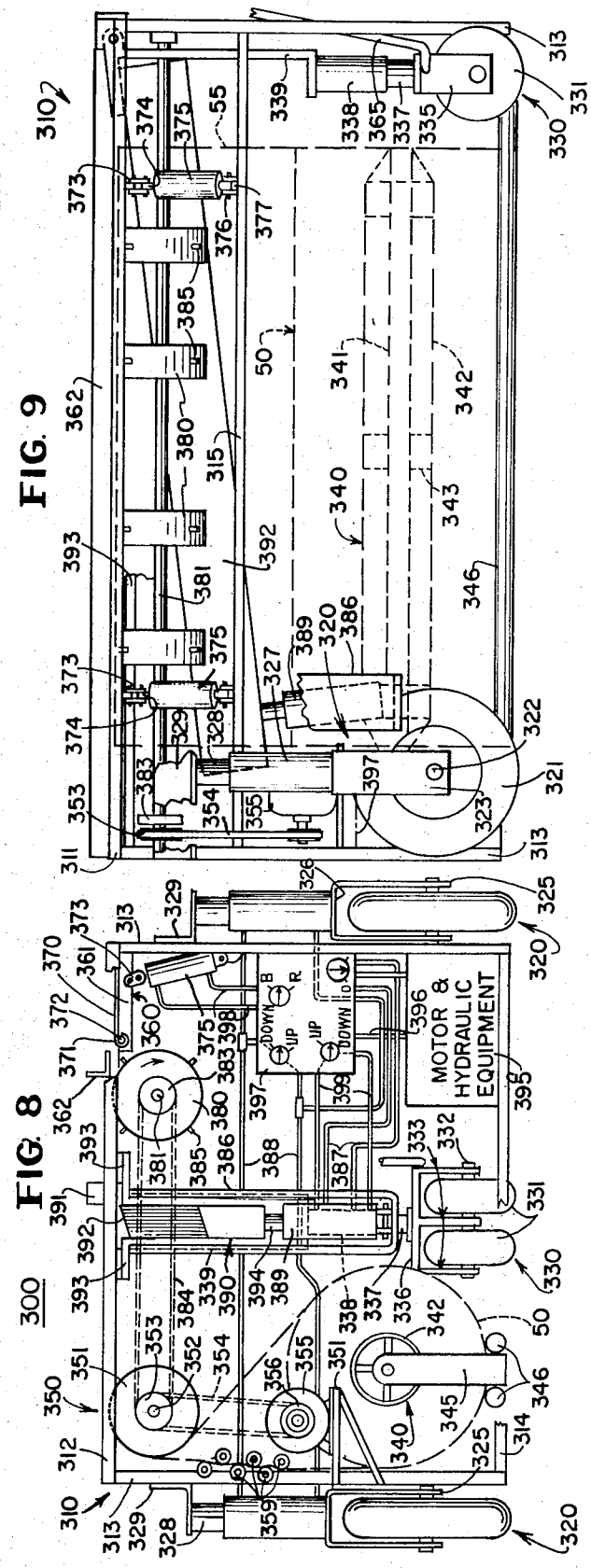


FIG. 8

FIG. 9

WIRE MESH WORKING APPARATUS

This application is a continuation-in-part of my copending U.S. application Ser. No. 25,970, filed April 6, 1970, and entitled "Wire Mesh Working Apparatus", now Pat. No. 3,688,810.

The present invention relates to the reinforcement of concrete and, more particularly, to apparatus for cutting and bending and otherwise working with webs of reinforcing wire mesh and placing the webs on an associated support surface at a construction site.

In particular, the present invention relates to mobile apparatus for unrolling a wire mesh from a roll thereof and decontouring the web as it is removed from the roll, the apparatus effecting significant savings in time and labor.

It is a general object of the present invention to provide a reinforcing wire mesh working apparatus which embodies several significant improvements over heretofore known devices of this type, the invention in particular embodying improvements of the wire mesh working apparatus disclosed in my copending U.S. application, Ser. No. 25,970, filed Apr. 6, 1970, and entitled "Wire Mesh Working Apparatus".

It is an important object of the present invention to provide a reinforcing wire mesh working apparatus comprising a frame, a plurality of support wheels rotatably coupled to the frame for rolling engagement with an associated underlying support surface to support the frame thereon, and a spindle mounted on the frame for rotatably supporting an associated roll of wire mesh web thereon to accommodate removal of the wire mesh web from the roll, the spindle and the support wheels being arranged in use to accommodate passage of the wire mesh web from the roll between the underlying support surface and selected ones of the support wheels in engagement therewith for decontouring the wire mesh web as it is removed from the roll.

In connection with the foregoing object, it is another object of the present invention to provide a reinforcing wire mesh working apparatus of the type set forth, which includes additional decontour means pivotally mounted on the frame for engagement with an unrolled portion of the wire mesh web to effect decontouring thereof, the additional decontour means being pivotally movable for following the wire mesh web as the diameter of the roll decreases to insure continuous engagement of the decontour means with the wire mesh web as it is removed from the roll.

In connection with the foregoing objects, still another object of the present invention is to provide a reinforcing wire mesh working apparatus of the type set forth, which further includes bias means resiliently urging the additional decontour means into engagement with the unrolled portion of the wire mesh web, and latch mechanism carried by the frame and engageable with the additional decontour means for holding the decontour means out of engagement with the wire mesh web against the urging of the bias means when the decontour means is not in use.

It is another object of the present invention to provide a reinforcing wire mesh working apparatus of the type set forth which additionally includes a plurality of support legs carried by frame and extending therefrom in a direction different from the direction in which the support wheels extend, the frame being disposable in a working configuration supported solely by the wheels

in rolling engagement with the underlying support surface and a loading configuration supported solely by the legs on the underlying support surface, the loading configuration facilitating the mounting and demounting of the spindle on the frame.

Another object of the present invention is to provide a reinforcing wire mesh working apparatus of the type set forth, which includes mounting means accommodating mounting of the spindle in any of a plurality of different positions on the frame.

Yet another object of the present invention is to provide a reinforcing wire mesh working apparatus of the type set forth, which includes bending mechanism removably mounted on the frame for engagement with an unrolled portion of the wire mesh web, whereby the bending mechanism may be readily removed from the frame without impairing the operation thereof when the bending mechanism is not in use.

It is another object of the present invention to provide a reinforcing wire mesh working apparatus of the type set forth, wherein the spindle is arranged to accommodate removal of the wire mesh therefrom along a predetermined path, the bending mechanism including clamping mechanism mounted on the frame and being movable between a clamping condition for holding the wire mesh web against movement along the path and a releasing condition accommodating free movement of the wire mesh web along the path, bias means resiliently urging the clamping mechanism into the clamping condition thereof, and a bending plate mounted on the frame for movement between a web passing position and a bending position, the bending plate in the web passing position thereof holding the clamping mechanism in the releasing condition thereof against the urging of the bias means, the bending plate in the bending position thereof accommodating movement of the clamping mechanism to the clamping condition thereof and cooperating therewith to bend the wire mesh to a predetermined angular configuration.

Another object of the present invention is to provide a reinforcing wire mesh working apparatus of the type set forth, which further includes feed apparatus mounted on the frame for driving engagement with the wire mesh web and operable to effect movement thereof along a predetermined path from the roll to the bending mechanism, and drive means mounted on the frame and coupled to the feed apparatus and to the bending mechanism for effecting operation thereof, and control means coupled to the drive means and being selectively operable for controlling the actuation thereof.

Still another object of the present invention is to provide reinforcing wire mesh working apparatus of the type set forth, wherein the frame includes height-adjusting means for adjusting the height of the frame above the underlying support surface.

In connection with the foregoing objects, still another object of the present invention is to provide a reinforcing wire mesh working apparatus of the type set forth, wherein the height-adjusting means is power-operated.

Further features of the invention pertain to the particular arrangement of the parts of the wire mesh working apparatus whereby the above-outlined and additional operating features thereof are attained.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to

the following specification taken in connection with the accompanying drawings, in which:

FIG. 1 is a front perspective view of a reinforcing wire mesh working apparatus constructed in accordance with and embodying the features of a first embodiment of the present invention, with the wire mesh working apparatus shown in the working configuration thereof;

FIG. 2 is a perspective view of the reinforcing wire mesh working apparatus of FIG. 1, shown disposed in the wire mesh loading configuration thereof;

FIG. 3 is a fragmentary front perspective view of the reinforcing wire mesh working apparatus of FIG. 1, shown with the frame in an elevated position and including a wire mesh bending apparatus;

FIG. 4 is a fragmentary top plan view of the bending mechanism of the reinforcing wire mesh working apparatus of FIG. 3;

FIG. 5 is an enlarged view in vertical section taken along the line 5—5 in FIG. 4;

FIG. 6 is a top plan view of a reinforcing wire mesh working apparatus costructed in accordance with and embodying the features of a second embodiment to the present invention;

FIG. 7 is a side elevational view of the wire mesh working apparatus of FIG. 6;

FIG. 8 is an end elevational view of a power-operated reinforcing wire mesh working apparatus constructed in accordance with and embodying the features of a third embodiment of the present invention; and

FIG. 9 is a side elevational view of the wire mesh working apparatus of FIG. 8.

Referring now to FIGS. 1 through 5 of the drawings, there is illustrated a wire mesh working apparatus, generally designated by the numeral **100**, constructed in accordance with and embodying the features of a first embodiment of the present invention, the wire mesh working apparatus **100** being adapted for bending, decontouring and laying in place a web **55** of reinforcing wire mesh as it is removed from a roll **50** thereof. The wire mesh web **55** typically includes a grid pattern of spaced-apart longitudinal wire strands **56** disposed at right angles to a transverse wire of spaced-apart transversewire strands **57**, the transverse strands **57** preferably being welded to the longitudinal strands **56** in a well-known manner. In use, the wire mesh working apparatus **100** moves along an underlying support surface, which may be made up of the upper surfaces **65** of a plurality of pans **60** for laying concrete, the wire mesh working apparatus **100** depositing the web **55** of wire mesh on the support surface **65** as it rolls therealong.

More particularly, the wire mesh working apparatus **100** includes a frame, generally designated by the numeral **110**, comprising a pair of parallel spaced-apart tubular outer side rails **109**, each being substantially rectangular in transverse cross-section and provided wih a plurality of longitudinally spaced-apart openings **111** in the outer side wall thereof. The side rails **109** are respectively slidably received within two relatively short tubular sleeves **112** each being substantially rectangular in transverse cross-section and being integral with a rectangular tubular inner front post **113** extending substantially vertically upwardly therefrom. Each of the inner posts **113** is telescopically received within a complementary outer front post **114** and is slidable with respect thereto, each of the inner and outer posts **113** and **114** preferably being provided with a plurality of longitudinally spaced-apart openings in the outer walls thereof for a purpose to be described more fully below.

Interconnecting the outer front posts **114** at the upper ends thereof is a rectangular tubular crossbar **115** provided at the opposite ends thereof respectively with two rectangular tubular support legs **116** extending therefrom substantially normal thereto and respectively parallel to the side rails **109** in vertical alignment therewith. Connected to the crossbar **115** at locations spaced equidistantly inwardly from the opposite ends thereof are two rectangular tubular inner side rails **117** disposed substantially parallel to each other and extending outwardly from the crossbar **115** in the direction opposite to the direction of the legs **116**, the outer ends of the rails **117** being interconnected by a rear rectangular tubular crossbar **118**. Connected to the crossbar **118** respectively at the opposite ends thereof are two rectangular tubular rear posts **119** extending downwardly therefrom substantially normal thereto and parallel to each other. Spaced apart longitudinally of each of the rails **117** and secured to the top walls thereof are a plurality of retaining lugs **138**.

The frame **110** is supported on two pairs of front wheel assemblies **120** and a pair of rear wheel assemblies **130**. The front wheel assemblies **120** are identically constructed, each including a wheel **121** mounted for rotation on an axle **122** having the opposite ends thereof journalled in complementary openings respectively formed adjacent to the distal ends of the legs **123** of a fork member, generally designated by the numeral **125**. Respectively integral with the legs **123** at the upper ends thereof and offset a short distance inwardly thereof are two upper leg portions **124** interconnected to the upper ends thereof by a bight portion **126**, the leg portions and bight portion **126** being shaped complementary to an adjacent one of the outer side rails **109** and being slidably receivable thereover, the outer one of the upper leg portions **124** having an opening therein dimensioned and arranged for alignment with a selected one of the openings **111** in the side rail **109** for receiving therethrough a complementary pin **127** to securely hold the wheel assembly **120** in place at a selected position along the side rail **109**. Each of the side rails **109** is provided with two of the front wheel assemblies **120**, one of the wheel assemblies **120** being disposed forwardly of the sleeve **112** and the other of the wheel assemblies **120** being disposed rearwardly of the sleeve **112**.

It will also be noted that a pin **128** is provided for placement in a complementary opening in the sleeve **112** and the aligned one of the openings **111** in the side rail **109** for securely holding the rail **109** and the sleeve **112** in a predetermined position with respect to each other.

The rear wheel assemblies **130** are also identically constructed, each including a wheel **131** mounted for rotation about an axle **132** having the opposite ends thereof respectively journalled in complementary openings formed adjacent to the lower ends of the legs **133** of a fork member **135**. Respectively integral with the legs **133** at the upper ends thereof are two flanges **137** extending inwardly therefrom substantially normal thereto, the flanges **137** being respectively integral at the inner ends thereof with two upwardly extending inner leg portions **134** disposed substantially parallel to

the legs **133**. The upper ends of the inner leg portions **134** are interconnected by a bight portion **136** secured by suitable means to the bottom ends of the adjacent one of the rear posts **119**. While different size wheels are shown in the drawing, it will be understood that all the wheels **121** and **131** may be the same size. Thus, for example, large wheels may be desirable for use on soft or muddy ground and small wheels on other types of surfaces.

It will be appreciated that the sliding engagement of the front wheel assemblies **120** and the sleeves **112** with the outer side rails **109** permits the longitudinal spacing between the pairs of front wheels **120** to be varied as desired. Thus, when the apparatus **110** is utilized for placing a wire mesh web **55** on a series of spaced-apart pans, as illustrated in FIG. **1**, the front wheel assemblies **120** may be so spaced as to insure that at all times at least two pairs of the wheel assemblies **120** and **130** will be in contact with the upper surfaces **65** of the pans **60** for providing secure and stable support for the apparatus **100**.

Connected to each of the front outer posts **114** and extending inwardly therefrom substantially normal thereto toward the opposite post **114** are two vertically spaced-apart mounting studs **145** and **146** for mounting a spindle **140** thereon. More particularly, the spindle **140** includes an elongated shaft **141** provided with a plurality of generally rectangular vanes equidistantly spaced circumferentially therearound and extending radially outwardly therefrom, adjacent ones of the vanes **142** being interconnected by longitudinally spaced-apart brace members **143**. Two end sleeves **144** are respectively telescopically received over the opposite ends of the shaft **141**, the sleeves **144** also being telescopically receivable over selected ones of the mounting studs **145** and **146** for mounting the spindle **140** between the front posts **114**. Thus, it will be appreciated that the spindle **140** may be mounted in a lower position, illustrated in FIG. **1**, with the sleeves **144** respectively received over the lower mounting studs **145**, or in an upper position (not shown) with the sleeves **144** respectively over the upper mounting studs **146**.

Extending vertically downwardly from the front crossbar **115** substantially normal thereto is a short guide bar **147** braced against lateral movement by a brace member **148** extending between the guide bar **147** and the adjacent front outer post. In use, the spindle **140** may be placed concentrically within a roll **50** of the wire mesh web **55** or, alternatively, the rolls of wire mesh web may be provided with spindles **140** by the manufacturer. In either event, the spindle **140**, with the roll **50** wire mesh web mounted thereon is mounted on the selected pair of mounting studs **145** and **146**, which studs are so positioned on the frame **110** that the roll **50** will clear the underlying support surface **65**. The shaft **141** is freely rotatable with respect to the sleeves **144** so as readily to accommodate unrolling of the wire mesh web **55** from the web **50**, lateral movement of the roll **50** on the spindle **140** being limited by the guide bar **147**.

Also mounted on the frame **110** is a decontour mechanism, generally designated by the numeral **150** for decontouring or straightening the wire mesh web **55** as it is removed from the roll **50**. More particularly, the decontour mechanism **150** includes a pair of end brackets **151** respectively mounted on the outer side surfaces of the upper side rails **117** adjacent to the front ends thereof, each of the end brackets **151** being provided with a pivot pin **152** for pivotally mounting an end rail **153** thereon. The end rails **153** extend downwardly from the end brackets **151** substantially parallel to each other. Extending between the end rails **153** transversely of the frame **110** are three decontour rollers **155** spaced apart longitudinally of the end rails **153**, the rollers **155** being respectively rotatably mounted on shafts **154** having the opposite ends thereof respectively connected to the end rails **153**. One of the end rails **153** is provided with a latch pin **159** extending laterally outwardly therefrom adjacent to the outer end thereof, te latch pin **159** being adapted for cooperation with a hook **156** pivotally mounted by means of a leg **157** on the adjacent inner side rail **117** in a manner to be described more fully below. A pin **158** extends laterally outwardly from the inner side rail **117** forwardly of the leg **157** for supporting the hook **156** when not in use.

The decontour mechanism **150** is provided at the opposite end thereof from the hook **156** with a tension assembly, generally designated by the numeral **160**, the tension of assembly **160** including a lower spring plate **161** secured to the adjacent end rail **153** and an upper spring plate **162** secured to the adjacent inner side rail **117**. Secured to the lower spring plate **161** and extending upwardly therefrom through a complementary opening in the upper spring plate **162** is an arcuate plunger **163** having a head **164** at the upper end thereof. Disposed between the spring plates **161** and **162** in surrounding relationship with the plunger **163** is a coil compression spring **165** for resiliently urging the decontour mechanism **150** downwardly toward rotation in a counterclockwise direction, as viewed in FIG. **1**, the head **164** being engageable with the upper spring plate **162** for limiting the downward pivot movement of the decontour mechanism **150**.

In use, the roll of wire mesh web **50** is so mounted on the apparatus **110** so that the web **55** may be unrolled from the top of the roll **50** toward the rear end of the frame **110**, as illustrated in FIG. **1**, the leading edge of the web **55** being passed beneath the decontour rollers **155** and the rear wheels **131**, the weight of the frame securely holding the web **55** between the wheels **131** and the underlying support surface **65**. When the web **55** thus extends along the path from the top of the roll **50** to beneath the rear wheels **131**, the decontour rollers **155** will be urged into engagement with the unrolled portion of the web **155** by the tension assembly **160**. Preferably, the engagement of the decontour rollers **155** with the web **55** will serve to deflect the web **55** downwardly from a straight-line path between the top of the roll **50** and the bottom of the wheels **131**, whereby the rollers **155** will tend to impart to the web **55** a slight curvature opposite to that imparted by the roll **50** so as to decontour or straighten the web **55**. Since the decontour rollers **155** are resiliently urged downwardly by the compression spring **165**, the rollers **155** will continuously engage the web **55** as the diameter of the roll **50** decreases with the continued removal therefrom with the web **55**. Thus, the decontour mechanism **150** will follow the web **55** to insure continued decontouring thereof until the roll **50** is exhausted.

It is a significant feature of the present invention that the rear wheel assemblies **130**, which are laterally spaced apart a distance slightly less than the width of the wire mesh **55**, serve to further decontour the web

55 as it is removed from the roll 50. More particularly, in normal use, an operator will walk behind the frame 110 and push upon the crossbar 118 to roll the apparatus 100 forwardly along the underlying support surface 65. As the apparatus rolls forwardly, the weight of the apparatus 100 exerted on the web 55 through the rear wheels 131 and the weight of the operator walking behind the apparatus 100 serve to securely hold the unrolled portion of the web 55 against slippage, thereby causing the continued unrolling of the web 55 from the roll 50 as the frame 110 continues its forward movement. More importantly, the passage of the web 55 downwardly beneath the rear wheels 131 serves to impart a further reverse bend to the web 55 for further straightening and decontouring the web 55 and removing therefrom the curvature imparted by roll 50. If the wire mesh web 50 is too heavy and stiff to push the frame 110 by hand, a mobile powered drive unit may be utilized to drive the frame 110 along the support surface.

It is another significant feature of the present invention that the apparatus 100 may be disposed in either a working configuration, as illustrated in FIG. 1, or a load configuration, as illustrated in FIG. 2. More particularly, when the apparatus 100 is disposed in the working configuration thereof, the frame 110 is supported solely by the wheel assemblies 120 and 130, with the legs 116 extending forwardly of the frame 110 out of contact with the underlying support surface 65. In this configuration, decontouring and placing of the wire mesh web 55, as described above, is greatly facilitated.

When the roll 50 is exhausted, and it is desired to mount a new roll of wire mesh web on the frame 110, the frame 110 may be tilted upwardly to the loaded configuration of FIG. 2, wherein the frame 110 is supported solely by the legs 116 and the side rails 109, with the wheel assemblies 120 and 130 extending rearwardly out of engagement with the support surface 65. For this purpose, it will be understood that the sleeves 112 must be positioned on the side rails 109 so that the forward ends of the rails 109 will be substantially coplanar with the forward ends of the legs 116 in order that the frame 110 may be stably supported in the loading configuration thereof without tipping. It will be observed that in this loading configuration, the mounting studs 145 and 146 are freely accessible and the loading of the spindle 140 with a full roll of wire mesh web thereon is greatly facilitated.

Referring now in particular to FIG. 3, there is illustrated a bending assembly, generally designated by the numeral 170, which may be provided on the frame 110. The bending assembly 170 includes a pair of rectangular tubular sleeves 171 respectively telescopically receivable over the legs 116, the outer side walls of the sleeves 171 preferably being provided with longitudinally spaced-apart openings therein dimensioned and arranged for alignment with like openings in the outer side walls of the legs 116 and adapted to receive an associated latch pin 178 therethrough for securely holding the sleeves 171 in position on the legs 116. Respectively secured to the outer side walls of the sleeves 171 adjacent to the rear ends thereof are two generally rectangular outer plates 172, while two generally rectangular inner plates 173 are respectively secured to the inner side walls of the sleeves 171. The inner side plates 173 are each mounted for pivotal movement between the solid line and broken line positions shown in FIG. 3 on pivot pins 174 disposed at the rear end of the plates 173 above the crossbar 115, each of the pivot pins 174 extending to the adjacent outer plate 172 and being provided with a spacer 176 in surrounding relationship therewith. It will be observed that the inner plates 173 are so mounted that the rear edges thereof are engageable with the front wall of the crossbar 115 for limiting pivotal movement of the inner side plates 173 in the clockwise direction, as viewed in FIG. 5.

Extending between the inner side plates 173 and fixedly secured thereto is an angle iron 175 having legs 175(*a*) and 175(*b*) disposed substantially perpendicular to each other, the angle iron 175 being mounted on the inner side plates 173 with the apex thereof disposed downwardly when the inner side plates 173 are abutting against the crossbar 115, as illustrated in solid line in FIG. 5. Respectively secured to the inner surface of each of the outer plates 172 adjacent to the front end thereof and extending inwardly therefrom to the inner edge of the adjacent sleeve 171 is a spacer block 177. Preferably, each of the inner side plates 173 is provided with spaced-apart openings 179 therein adjacent to the forward end thereof positioned for alignment with corresponding openings in the sleeves 171 and in the block 177 to receive a complementary latch pin 178 therein for securely holding the plates 173 in a selected position.

Extending between the outer side plates 172 directly above the crossbar 115 and parallel thereto is a pivot rod 182 provided with a freely rotatable sleeve 182A in surrounding relationship therewith, the sleeve 182A having fixedly secured thereto the arcuate inner end 181 of a flat rectangular bending plate 180. The bending plate 180 extends rearwardly of the pivot rod 182 and has a width greater than the lateral spacing between the inner side rails 117, but less than the lateral spacing between the outer side rails 109. Fixedly secured to the bottom surface of the bending plate 180 adjacent to the rear end thereof is a handlebar 183 which extends laterally outwardly beyond the side edges of the plate 180. Fixedly secured to the sleeve 182(*a*) diametrically opposite the arcuate inner end 181 of the bending plate 180 are two laterally spaced-apart wedge bars 184 for a purpose to be described below.

Spanning the inner side rails 117 and slidably supported thereon beneath the bending plate 180 substantially laterally coextensive therewith is a bottom plate 185, the front end of the bottom plate 185 overlying the top wall of the crossbar 115. Secured to the upper surface of the bottom plate 185 adjacent to the front end thereof are two laterally spaced-apart inner angle brackets 186, each provided with a vertically extending flange 187 disposed for engagement with the adjacent one of the wedge bars 184. Secured to the upper surface of the bottom plate 185 centrally of the rear end thereof and extending rearwardly therefrom is an outer angle bracket 188 provided at the distal end thereof with an upwardly extending flange 189. Secured to the rear wall of crossbar 115 are two laterally spaced-apart mounting brackets 191 to which are respectively secured the adjacent ends of two coil tension springs 190, the other ends of the springs 190 being respectively secured to two laterally spaced-apart pins 192 secured to the bottom surface of the bottom plate 185 laterally outwardly of the angle brackets 186. Preferably, the

bottom plate **185** is also provided on the bottom surface thereof with two guide pads **198** laterally spaced apart for respective engagement with the upper surfaces of the inner side rails **117** for guiding the reciprocating movement of the bottom plate **185** therealong in a manner to be described more fully below. The bottom plate **185** is also provided with a handlebar **196** adjacent to the rear end thereof and extending laterally the entire width thereof and outwardly beyond the lateral side edges of the bending plate **180,** the handlebar **196** being centrally notched to accommodate the angle bracket **188** and serving not only to facilitate manual movement of the bottom plate **185** but also to provide stiffening therefor. Extending downwardly from each of the sleeves **171** is a bracket **193** for respectively supporting the opposite ends of a shaft **194** having rotatably mounted thereon a decontour roll **195.**

Normally, the bending plate **180** is disposed in a web-passing position, illustrated in FIG. **5,** extending rearwardly from the pivot bar **182** substantially parallel to the bottom plate **185.** When the bending plate **180** is in its web-passing position, the wedge bars **184** engage the upstanding flanges **187** of the angle brackets **186,** thereby urging the bottom plate **185** rearwardly to the releasing condition indicated against the urging of the tension spring **190,** the handlebar **183** of the bending plate **180** being wedged in front of the flange **189** on the angle bracket **188** for snugly holding the bending plae **180** in the web-passing position thereof. It will, thus, be appreciated that the bending plate and the bottom plate **185** cooperate so as to hold the bending plate **180** in its web-passing position and hold the bottom plate **185** in its releasing condition shown.

When the bending plate **180** and the bottom plate **185** are disposed as shown in FIG. **5,** the wire mesh web **55** is unrolled from the roll **50** and is fed upwardly beneath the decontour roller **195** and then upwardly between the crossbar **115** and the angle iron **175** and forwardly of the bending plate **180** and the bottom plate **185,** the spacing between the angle iron **175** and the front ends of the bending plate **180** and the bottom plate **185** being sufficient to accommodate free passage of the web **55** therebetween. When the web **55** is fed along this path, the decontour roller **195** serves to straighten or decontour the web **55,** since it does not pass in contact with the primary decontour mechanism **150.**

For bending the wire mesh web **55,** the bending plate **180** is pivoted upwardly in a clockwise direction, as viewed in FIG. **5,** by means of the handlebar **183** until the bending plate **180** engages the wire mesh web **55.** As the bending plate **180** pivots upwardly from the web-passing position thereof, the wedge bars **184** move out of engagement with the angle brackets **186,** thereby releasing the bottom plate **185** and accommodating movement thereof forwardly under the urging of the tension springs **190** to a clamping condition wherein the front edge of the bottom plate **185** engages the wire mesh web **55** and cooperates with the angle brackets **175** for securely clamping the wire mesh web **55** therebetween. With the wire mesh web **55** thus held securely against movement, the bending plate **180** is further moved in the clockwise direction to a bending position, thereby bending the wire mesh web **55** to a predetermined angular configuration, the pivotal movement of the bending plate **180** being limited by engagement of the bent wire mesh web **55** with the legs of the angle iron **175.**

In this regard, it will be appreciated that by appropriate pivotal movement of the angle iron **175** about the pivot pins **174,** the position of the angle iron **175** may be varied to thereby vary the maximum angular deflection of the wire mesh web **55** by the bending plate **180.** After the bending operation is completed, the bending plate **180** is pivotally moved back to the web-passing position thereof, during which pivotal movement the wedge bars **184** engage the flanges **187** of the angle brackets **186** and move the bottom plate **185** rearwardly against the urging of the bias springs **190.** Thus, as the bending plate **180** approaches its web-passing position, the bottom plate **185** will have been moved back to the releasing condition thereof for accommodating the handlebar **183** in front of the flange **189** and latching the bending plate **180** in its web-passing position.

It will be understood that a series of such bending operations may be performed on the wire mesh web **55** so as to deform the web into any desired angular configuration, such as triangular or rectangular, for use in concrete columns or the like. Appropriate web-cutting means (not shown) may also be provided to sever the wire mesh web **55** when it has been formed to the desired configuration. Such a web-cutting device is disclosed in my aforementioned U.S. application, Ser. No. 25,970. When not in use, the bending apparatus **170** may be completely removed from the frame **110** by sliding the sleeves **171** forwardly off of the legs **116** so as not to interfere with the other operations of the apparatus **100** and to facilitate the movement thereof between the working and loading configurations thereof.

If desired, the frame **110** and the spindle **140** carried thereby may be elevated by moving the front outer posts **114** upwardly with respect to the front inner posts **113** and locking them in an elevated position by means of appropriate latch pins, as described above. Thus, the spindle **140** and the roll of wire mesh web **150** attached thereto may be elevated so as to provide sufficient clearance therebeneath to pass over objects which may be placed on the underlying support surface when the apparatus **100** is moved along the support surface from one location to another at the construction site. Further, it will be noted that the apparatus **100** may be utilized to transport rolls of the wire mesh web or other construction materials from place to place at a construction site, the rolls preferably being stacked across the inner side rails **117,** the lugs **138** serving to prevent the rolls from sliding or rolling on the side rails **117.** Also, the side rails **109** may be moved rearwardly with respect to the sleeves **112** to provide an additional lower shelf for carrying steel rods, tubing or the like extending transversely across the side rails **109.**

Referring now to FIGS. **6** and **7** of the drawings, there is shown a second embodiment of the wire mesh working apparatus of the present invention, generally designated by the numeral **200.** The apparatus **200** includes a substantially rectangular frame, generally designated by the numeral **210,** comprising a pair of spaced-apart longitudinally extending parallel tubular side rails **211,** interconnected adjacent to the opposite ends thereof by a pair of laterally extending tubular end rails **212.** Respectively extending vertically downwardly from the side rails **211** at the opposite ends of the end rails **212** are four tubular posts **213,** each laterally aligned pair

of the posts **213** being interconnected adjacent to the lower ends thereof by a tubular crossbar **214.** Preferably, the side rails **211,** the end rails **212,** the posts **213,** and the crossbars **214** are all fastened together by suitable means such as welding.

The frame **210** is also provided at the opposite ends thereof with a pair of identically constructed extension frames, generally designated by the numeral **215,** each of the extension frames **215** including a pair of elongated tubular legs **217** interconnected at one end thereof by a tubular bight member **216,** the legs **217** being spaced-apart substantially parallel to each other and dimensioned and arranged to be respectively telescopically received in the adjacent ends of the tubular side rails **211** for sliding movement with respect thereto. Preferably, each of the legs **217** is provided with a series of longitudinally spaced-apart openings **218** in the outer sides thereof in position for alignment with a corresponding opening in the outer side of the tubular side rail **211** adjacent to each end thereof. In use, the extension frame **215** is slid inwardly and outwardly with respect to the side rails **211** to the desired position, at which point complementary pins or bolts are received through the aligned openings **218** in the legs **217** and the side rails **211** for securely holding the extension frame **215** in position. Each of the legs **217** is also preferably provided with an upstanding retaining fixture or lug **219** adjacent to the outer end thereof, each fixture **219** preferably including a short tubular sleeve received over the associated leg **217** and secured thereto by suitable means and having an upstanding short tubular post securd thereto as by welding and adapted to receive upstanding extension posts (not shown) telescopically therein, for a purpose to be described more fully below.

The frame **210** is supported upon a pair of front wheel assemblies **220** connected thereto adjacent to one end thereof and a pair of rear wheel assemblies **230** connected thereto adjacent to the other end thereof. More particularly, the front wheel assemblies **220** are identically constructed and are respectively connected to the posts **213** at the adjacent end of the frame **210.** Each of the wheel assemblies **220** includes a wheel **221** mounted for rotation with respect to an axle **222,** the opposite ends of which are respectively journalled in complementary openings in the legs **223** of a fork member **225,** adjacent to the lower ends thereof.

The legs **223** are interconnected adjacent to the upper ends thereof by a bight **226** provided with a stud **227** extending upwardly therefrom and adapted to be received within the lower end of the adjacent hollow tubular post **213.** Preferably, the stud **227** is provided with an opening therein in position for alignment with a corresponding opening in the wall of the tubular post **213** for receiving a complementary stud or bolt therethrough to lock the wheel assembly **220** in place on the frame **210.**

In like manner, the rear wheel assemblies **230** are identically constructed and are respectively positioned for attachment to the two posts **213** at the other end of the frame **210.** Each of the rear wheel assemblies **230** includes a wheel **231** mounted for rotation on an axle **232,** the opposite ends of which are respectively journalled in complementary openings in the legs **233** of a fork member **235** adjacent to the bottom ends thereof. The legs **233** are interconnected adjacent to the upper ends thereof by a pivot coupling **236** provided with a stud **237** adapted to be received within the lower end of the adjacent one of the hollow tubular posts **213.** Preferably, the stud **237** and the wall of the post **213** are provided with aligned openings therein for reception therethrough of a complementary pin or bolt to lock the wheel assembly **230** in position on the frame **210,** the pivot coupling **286** accommodating turning of the wheels **231.**

Respectively secured to the side rails **211** as by mounting pins or bolts **242** are two identically constructed mounting clips **241.** The clips **241** extends downwardly below the side rails **211** and forms arcuate lower ends adapted to respectively receive therein concentrically therewith the horizontal arms **243** of two generally L-shaped mounting brackets **245,** each of the mounting brackets **245** also being provided at one end thereof with an arm **244** extending vertically downwardly from the arm **243.** Extending transversely between the arms **244** of the mounting brackets **245** is a spindle **240,** the opposite ends of which are respectively journalled in complementary openings in the arms **244** adjacent to the lower ends thereof.

Coupled to the mounting brackets **245** is a decontour assembly, generally designated by the numeral **250,** the decontour assembly **250** including a pair of brackets **251** respectively connected to the arms **244** of the brackets **245** adjacent to the lower ends thereof and extending rearwardly therefrom substantially parallel to the side rails **211.** The brackets **251** are dimensioned to extend in use radially beyond the maximum outer periphery of a roll **50** of wire mesh web **55** to be used on the apparatus **200,** the decontour assembly **250** further including a shaft **254** extending transversely between the brackets **251** adjacent to the outer ends thereof beyond the maximum outer periphery of a wire mesh roll **50.** The opposite ends of the shaft **254** are respectively journalled in complementary openings in the brackets **251,** a decontour roller **255** being rotatably mounted on the shaft **254.**

In use, a roll **50** of wire mesh web is mounted on the spindle **240,** which is then mounted in position between the arms **244** of the brackets **245,** whereby the roll **50** is freely rotatable for unrolling a wire mesh web **55** therefrom. Preferably, the wire mesh web **55** is unrolled from the top of the roll **50** toward the rear end of the frame **210** along a path **257** extending beneath the decontour roller **255** and then beneath the rear wheels **231.** It will be appreciated that as the web **55** passes beneath the decontour roller **255** in contact therewith, there is imparted to the web **255** a reverse curvature opposite to that imparted by the roll **50** for straightening or decontouring the web **55.** Similarly, as the web passes beneath the wheels **231,** there is imparted to the web an additional reverse curvature for further straightening or decontouring the web **55.** In operation, an operator will walk along behind the apparatus **200** and push it forwardly along the underlying support surface by pushing on the extension frame **215,** the weight of the operator walking on the unrolled portion of the web **55** and the weight of the apparatus **200** as exerted on the web **55** through the rear wheel assemblies **230** serving securely to hold the web **55** against slippage. Thus, as the frame **210** moves forwardly, the web **55** is unrolled from the roll **50** for placement on the underlying support surface.

If desired, the web **55** may alternatively be unrolled along a path **256** which passes over the decontouring

roller 255 and beneath the rear wheels 231. In this arrangement, the rear wheels 231 serve as the sole decontouring means for the wire mesh web 55. Furthermore, if even less decontouring is needed or desired, the roll 50 may be mounted on the spindle 240 so as to be unrolled from the bottom of the roll 50 along a path 258 so that a still lesser amount of reverse curvature will be imparted to the web 55 by the rear wheels 231.

The frame 210 is also provided with a tray 260 for carrying various construction materials on the apparatus 200 from place to place at a construction site. The tray 260 is generally rectangular in shape and includes four interconnected side walls 261 closed at the bottom ends thereof by a flat rectangular bottom wall 262. Extending laterally outwardly from the side walls 261 around the entire periphery of the tray 260 is a short lip or flange 263. The tray 260 is dimensioned to fit between the side rails 211 and the end rails 212 or between the crossbars 214 of the frame 210, tray 260 being provided at each end thereof with three mounting tabs 264 adapted to rest in use on top of the adjacent one of the end rails 212 or the crossbars 214 for supporting the tray 260 in position on the frame 210.

As illustrated in FIG. 7, it will be noted that the tray 260 may be mounted in either an upper position, illustrated in solid line in FIG. 7, wherein the tray 260 is supported on the end rails 212, or a lower position, illustrated in broken line in FIG. 7, wherein the tray 260 is supported on the crossbars 214. It will be appreciated that, when a roll 50 of wire mesh web is mounted on the frame 210, the tray 260 must be disposed in the upper position thereof so as not to interfere with the roll 50. Furthermore, it will be understood that construction materials or including additional rolls of roll 50 of wire mesh web may be placed transversely across the side rails 211 and the legs 217 of the extension frame 215 for being transported from place to place at a construction site. For this purpose, the retaining fixtures 219 will serve to prevent such construction materials from rolling off the ends of the frame 210, optional extension posts being available if it is desired to stack building materials on the frame 210.

Referring now to FIGS. 8 and 9 of the drawings, there is illustrated a power-operated embodiment of the wire mesh working apparatus of the present invention, generally designated by the numeral 300. The apparatus 300 includes a substantially box-like frame, generally designated by the numeral 310, which includes a pair of parallel spaced-apart top side rails 311 interconnected at the opposite ends thereof by a pair of top end rails 312. Respectively extending vertically downwardly from the end rails 312 at the opposite ends thereof are four corner posts 313, each end pair of corner posts 313 being interconnected at the bottom ends thereof by a corresponding bottom end rail 314. A pair of crossbars 315 respectively extend longitudinally of frame 310 on the opposite sides thereof, each of the crossbars 315 interconnecting the adjacent side pair of corner posts 313 intermediate the upper and lower ends thereof.

The frame 310 is supported upon a pair of front wheel assemblies 320 and a rear wheel assembly 330, the front wheel assemblies 320 being identically constructed and respectively disposed on opposite sides of the frame 310 adjacent to one end thereof. More particularly, each of the front wheel assemblies 320 includes a relatively large diameter wheel 321 rotatably mounted on an axle 322, the opposite ends of which are respectively journalled in complementary openings in the legs 323 of a fork member 325 adjacent to the lower ends thereof. The legs 323 are interconnected adjacent to the upper ends thereof by a bight 326 having fixedly secured thereto a hydraulic cylinder 327 extending vertically upwardly therefrom. Telescopically received within the cylinder 327 is a piston having a piston rod 328 extending vertically upwardly from the cylinder 327, the upper end of the piston rod 328 being fixedly secured to one flange of angle-mounting bracket 329, the other flange of which is secured by suitable means to the frame 310.

In like manner, the rear wheel assembly 330 includes a pair of relatively small diameter wheels 331 coaxially mounted for rotation on an axle 332. A fork member 335 includes a bight 336 and three equidistantly spaced-apart legs 333, the center one of the legs 333 being disposed between the wheels 331 and the outer ones of the legs 333 being respectively disposed on the outer sides of the wheels 331, the axle 332 being journalled in complementary openings in legs 333 adjacent to the lower ends thereof. Pivotally connected to the bight 336 and extending vertically upwardly therefrom is a piston rod 337 of a piston (not shown) which is received within a hydraulic cylinder 338. The upper end of the cylinder 338 is fixedly secured to one flange of an angle-mounting bracket 339, the other flange of which is fixedly secured to the frame 310 by any suitable means. It will be appreciated that the cylinders 327 and 338 and pistons 328 and 337 accommodate vertical movement of the frame 310 with respect to the wheels 321 and 331 for adjusting the height of the apparatus 300. A handle or tongue 365 may be pivotally connected to the fork member 335 and extend forwardly therefrom for manually turning the wheel assembly 330 and steering the machine 300, the handle 365 being shown in FIG. 9 disposed in a storage position.

Disposed within the frame 310 respectively adjacent to the opposite ends thereof are two vertically extending bearing brackets 345 secured to the frame 310 by suitable means. Mounted on the bearing brackets 345 and extending therebetween is a spindle, generally designated by the numeral 340, for supporting thereon a roll 50 of wire mesh web. More particularly, the spindle 340 includes a shaft 341 extending transversely between the bearing brackets 345 and provided at the opposite ends thereof with a pair of sleeves (not shown), respectively adapted to be received over complementary mounting stubs (not shown) which are in turn respectively secured to the bearing brackets 345 adjacent to the upper ends thereof. This mounting arrangement was more particularly described above with respect to the embodiment of FIG. 1.

Equidistantly spaced circumferentially around the shaft 341 and extending radially outwardly therefrom are a plurality of vanes 342, adjacent ones of the vanes 342 being interconnected by longitudinally spaced-apart brace members 343. Extending between the bearing brackets 345 and respectively mounted thereon on either side thereof are a pair of cradle rollers 346. In use, the roll 50 of wire mesh web is mounted on the spindle 340 in the manner described above with respect to FIG. 1, after which the spindle is then mounted on the bearing brackets 345 so that the cradle rollers 346 engage the roll 50 along the outer circumference

thereof for providing additional support therefor and facilitating rotation thereof.

Decontour mechanism, generally designated by the numeral **350**, is carried by the frame **310** for straightening the wire mesh web **55** as it is removed from the roll **50**. More particularly, the decontour mechanism **350** includes a decontour roller **351** mounted for rotation on a shaft **352** which extends longitudinally of and carried by the frame **310** adjacent to one side thereof substantially parallel to the spindle **340**. Secured to the shaft **352** at one end thereof is a sheave **353** disposed for engagement with a drive belt or chain **354** which is in turn coupled to a sheave **356** on the output shaft of an electric drive motor **355**, the motor **355** being supported on a platform **357** carried by the frame **310** outwardly of the adjacent end of the spindle **340**. Also rotatably mounted on the frame **310** and extending longitudinally thereof substantially parallel to the shaft **352** laterally outwardly thereof is a plurality of auxiliary rolls **359**.

A bending apparatus, generally designated by the numeral **360**, is mounted on the frame **310** adjacent to the side thereof opposite from the decontour mechanism **350**. The bending apparatus **360** includes a pair of generally rectangular end plates **361** respectively secured to the end rails **312** and extending downwardly therefrom substantially parallel to each other. Extending between the end rails **312** and fixedly secured thereto is an angle bar **362**, the angle bar **362** being oriented with one flange extending horizontally from the apex toward the adjacent side of the machine and with the other flange extending vertically upwardly, the apex thereof extending downwardly.

Extending longitudinally between the end plates **361** and secured thereto is a shaft **372** provided with a sleeve rotatably mounted thereon, the sleeve having secured thereto the arcuate end **371** of a generally rectangular flat bending plate **370** which extends laterally from the shaft **371** toward the adjacent side rail **311**. The bending plate **370** is centered longitudinally of the frame **310** and has a length slightly greater than the width of an associated roll **50** of wire mesh web, the under side of the base plate **370** being connected by means of a pair of couplers **373** respectively to the upper ends of two piston rods **374** having the lower ends thereof connected to pistons which are respectively received in the upper ends of two hydraulic cylinders **375**. The cylinders **375** are respectively disposed adjacent to the opposite ends of the bending plate **370** and are pivotally connected at the lower ends thereof to the adjacent one of the crossbars **315** by means of coupling brackets **377** and pivot pin **376**. The bending plate **370** is movable between a web-passing position, shown in FIG. **8**, disposed substantially horizontally below the angle iron **362** and substantially coplanar with the upper surfaces of the feed wheels **380**, and a bending position (not shown) extending substantially vertically upwardly closely adjacent to the adjacent edge of the horizontal flange of the angle iron **362**.

Extending longitudinally of the frame **310** and rotatably mounted thereon is a shaft **381** disposed immediately below the angle bar **362** and extending substantially parallel to the shaft **352**. Fixedly secured to the shaft **381** are four longitudinally spaced-apart feed wheels **380**, each provided with a plurality of studs **385** equidistantly spaced circumferentially therearound and extending radially outwardly therefrom. Fixedly secured to the shaft **381** at one end thereof is a sheave **383** which is coupled to a drive belt or chain **384** which is in turn coupled to a complementary sheave on the shaft **352**. Thus, it will be appreciated that the rotational movement of the shaft of the motor **355** is transmitted by the belt **354** to the shaft **352** and is in turn transmitted by the belt **384** to the shaft **381**.

The frame **310** is also provided with a web cutting mechanism, generally designated by the numeral **390**, which mechanism includes a stationary shear blade extending longitudinally of the frame **310** between the end rails **312** and fixedly secured thereto substantially centrally of the frame **310**. An elongated movable shear blade **392** is also provided parallel to the stationary blade **391**, the movable blade **392** being mounted for pivotal movement vertically between a pair of guide shoes **393** extending longitudinally between the end rails **312**. More particularly, the movable blade **392** is pivotally mounted at the front end of the frame **310**, the other end of the movable blade **392** being fixedly secured to the upper end of a piston rod **394**, the lower end of which is coupled to a piston received within the upper end of a hydraulic cylinder **389** mounted on the frame **310** by means of a generally U-shaped mounting bracket **386** suspended from the guide shoes **393**.

An equipment cabinet **395** is mounted on the frame **310** at the lower front end thereof, the compartment **395** containing the electrical and hydraulic equipment for controlling the apparatus **300**, including hydraulic pumps and hydraulic fluid reservoir and motor control switches. More particularly, the control panel **397** includes a rear wheel cylinder control valve connected by fluid lines **388** to the upper and lower ends of the hydraulic cylinders **327** of the front wheel assemblies **320**. In like manner, the control panel **397** includes a rear wheel control valve connected by fluid lines **399** to the upper and lower ends of the cylinder **338** of the rear wheel assembly **330**. Another control valve is connected by fluid lines **398** to the upper and lower ends of the bender control cylinder **375**, while a final control valve is connected by fluid lines **387** to the upper and lower ends of the cylinder **389** of the cutter assembly **390**.

The operation of the wire mesh working appparatus **300** will now be described in detail. Preferably, the roll **50** of wire mesh web is so mounted on the spindle **340** that web **55** may be unrolled from the right-hand side thereof, as viewed in FIG. **8**, upwardly towards the decontour roller **351**. The web **55** is wrapped around the roller **351** and then fed transversely of the frame **310** above the feed wheel **380** and thence beneath the angle bar **362** and over the bending plate **370**. When the drive motor **355** is actuated, it rotates the decontour roll **351** and the feed wheel **380** in a clockwise direction, as viewed in FIG. **8**, the studs **385** of the feed wheel **380** engaging the transverse strands **57** of the wire mesh web **55** for feeding the web **55** along the path indicated and outwardly through the bending mechanism **360**. The web **55** may then be fed downwardly to the support surface on which it is to be laid, the web being laid transversely of the support surface as the machine **300** moves longitudinally therealong. When the desired length of web has been fed from the machine **300** it is severed by the cutter **390** to produce a discrete sheet of the desired length. More particularly, the proper valve is actuated on the control panel for moving the piston rod **394** upwardly and pivoting the cut-

ting blade **392** upwardly to its cutting position for severing the web **55.** After cutting, the cutter blade **392** is retracted by operation of the control valve.

Normally, the piston rods **374** are withdrawn into the cylinders **375** for holding the bending plate **370** down in its web-passing position, as illustrated in FIG. **8.** When it is desired to bend the wire mesh web **55,** the drive motor **355** is stopped and the appropriate control valve on the control panel **397** is actuated to extend the piston rods **374** upwardly, thereby pivoting the bending plate **370** in a counterclockwise direction, as viewed in FIG. **8** to its bending position.

As the bending plate **370** continues its counterclockwise movement to its bending position, it engages the wire mesh web **55** and bends it to a predetermined angular configuration, the counterclockwise movement of the bending plate **370** being limited by engagement of the bent web **55** with the horizontal flange of the angle iron **362,** at which point the web **55** will have been bent to substantially a **90**-degree angle. After the bending operation is completed, the control valve is actuated to retract the piston rods **374,** thereby returning the bending plate **370** to its web-passing position. It will be understood that a series of these bending operations may be performed to deform the web **55** into any desired configuration, such as rectangular for use in reinforcing concrete columns and the like.

When the desired length of web **55** has been fed from the apparatus **300,** the drive motor **355** is stopped and the appropriate valve on the control panel **397** is operated for actuating the cutter cylinder **389** to move the movable cutter blade **392** upwardly to a shearing position, wherein the movable blade **392** cooperates with the fixed blade **391** for severing the wire mesh web **55.** The control valve may then be actuated for retracting the movable blade **392** to its retracted position, illustrated in FIG. **8.**

When it is desired to elevate the frame **310,** the control valves on the control panel **387** are actuated to extend the front wheel piston rods **328** upwardly and to project the rear wheel cylinder **338** upwardly to the desired elevation. In this manner, sufficient clearance may be provided beneath the frame **310** to permit it to pass freely over objects on underlying support surface as the frame **310** is moved from point to point along that surface at a construction site. In like manner, the frame **310** may be lowered to it original position by appropriate actuation of the control valve. It will also be noted that, since separate control valves are provided for the front wheel assemblies and the rear wheel assembly, the front and rear ends of the frame **310** may be elevated independently of each other.

If desired, the roll **50** of wire mesh web may be so mounted on the spindle **340** as to permit unrolling thereof upwardly from the left-hand side thereof, as viewed in FIG. **8,** in which case the web **55** is fed upwardly between the auxiliary guide rollers **359** and thence around the decontour roller **351** and to the feed wheels **380** in the manner described above. It will be appreciated that, when this alternative feed path is used, a lesser amount of decontouring or straightening force is applied to the wire mesh web **55.**

It is a significant advantage of the present invention that it affords considerable savings in time and effort in the working and laying of reinforcing wire mesh. More specifically, while by wholly manual methods it would require approximately 10½ man hours to roll out, cut, straighten, bend, transport to the work site and apply a 150-foot roll of wire mesh web, this same work could be accomplished in about 8¼ man hours with the use of the wire mesh working apparatus disclosed in my aforementioned copending U.S. application Ser. No. 25,970. By the use of the improvements embodied in the present invention, even more significant savings are effected. Thus, the working and applying of a standard 150-foot roll of wire mesh by the use of the embodiments of the invention disclosed in FIGS. **1** and **6** of the present invention may be accomplished with the expenditure of only 5 man hours of work. With the addition to the embodiment of FIG. **1** of the bending apparatus of FIG. **3,** the work time may be still further reduced to 3½ man hours. Finally, by the use of the power-operated wire mesh working apparatus of FIGS. **8** and **9,** only 2½ man hours are required to complete this same job. Accordingly, it will be appreciated that dramatic savings in time and money may be effected by the use of the present invention.

From the foregoing, it may be seen that there has been provided a novel reinforcing wire mesh working apparatus including support wheels which not only support the apparatus but also serve to decontour the wire mesh web as it is removed from a roll thereof. More particularly, two embodiments of a wire mesh working apparatus are disclosed embodying this unique feature.

There has also been provided a wire mesh working apparatus which accommodates mounting of a roll of wire mesh web thereon in any of several different mounting positions, the apparatus also including decontour means which is movable for following the wire mesh web as the diameter of the wire mesh roll decreases, regardless of the mounting position of the wire mesh roll.

In addition, there has been provided a novel bending mechanism which is mounted on the frame for easy removal when not in use.

Furthermore, there has been provided a wire mesh working apparatus which may be disposed in a working configuration for working on and placing the wire mesh web, and a loading configuration for loading the wire mesh web onto the apparatus.

Finally, there has been provided a power-driven wire mesh working apparatus which includes power-actuated web feed means, decontour mechanism, bending mechanism and web-cutting means, as well as power-driven height-adjusting means for the frame.

While there have been described what are at present considered to be the preferred embodiments of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A reinforcing wire mesh working apparatus comprising a frame, a plurality of support wheels rotatably coupled to said frame for rolling engagement with an associated underlying support surface to support said frame thereon, and a spindle mounted on said frame for rotatably supporting an associated roll of wire mesh web thereon to accommodate removal of the wire mesh web from the roll, said spindle and said support wheels being arranged in use to accommodate passage of said wire mesh web from the roll between the underlying support surface and selected ones of said support

wheels in engagement therewith for decontouring the wire mesh web as it is removed from the roll.

2. The reinforcing wire mesh working apparatus set forth in claim 1, wherein said apparatus includes a pair of front support wheels mounted on said frame adjacent to one end thereof and a pair of rear support wheels mounted on said frame adjacent to the other end thereof, said spindle being arranged in use to accommodate passage of said wire mesh web from the roll and beneath the rear support wheels in engagement therewith for decontouring the wire mesh web as it is removed from the roll while said frame moves forwardly along the underlying support surface.

3. The reinforcing wire mesh working apparatus set forth in claim 1, wherein said apparatus includes two pairs of adjustable front wheels mounted on said frame adjacent to one end thereof and a pair of rear support wheels mounted on said frame adjacent to the other end thereof, said pairs of front wheels being movable longitudinally of said frame for varying the longitudinal spacing therebetween.

4. The reinforcing wire mesh working apparatus set forth in claim 1, wherein said apparatus includes a pair of front support wheels mounted on said frame adjacent to one end thereof and a pair of rear support wheels mounted on said frame adjacent to the other end thereof, said rear support wheels being spaced apart transversely of said frame a predetermined distance less than the width of the wire mesh web.

5. A reinforcing wire mesh working apparatus comprising a frame, a plurality of support wheels rotatably coupled to said frame for rolling engagement with an associated underlying support surface to support said frame thereon, a spindle mounted on said frame for rotatably supporting an associated roll of wire mesh web thereon to accommodate removal of the wire mesh web from the roll, and decontour means pivotally mounted on said frame for engagement with an unrolled portion of the wire mesh web to effect decontouring thereof, said decontour means being pivotally movable for following the wire mesh web as the diameter of the roll decreases to insure continuous engagement of said decontour means with the wire mesh web as it is removed from the roll, said spindle and said support wheels being arranged in use to accommodate passage of said wire mesh web from the roll between the underlying support surface and selected ones of said support wheels in engagement therewith for providing additional decontouring of the wire mesh web as it is removed from the roll.

6. The reinforcing wire mesh working apparatus set forth in claim 5, wherein said decontour means includes a pair of substantially parallel mounting brackets pivotally mounted on said frame and spaced apart transversely thereof, said mounting brackets being arranged in use for pivotal movement about the longitudinal axis of said spindle and extending outwardly therefrom substantially normal thereto, and a decontouring roller rotatably mounted between said mounting brackets and disposed in use substantially parallel to the longitudinal axis of said spindle outwardly beyond the maximum outer periphery of an associated wire mesh roll mounted on said spindle, whereby said roller is adapted for engagement with the wire mesh to effect decontouring thereof as the wire mesh web is removed from the roll.

7. The reinforcing wire mesh working apparatus set forth in claim 5, wherein said frame is longitudinally extensible for varying the length thereof.

8. A reinforcing wire mesh working apparatus comprising a frame, a plurality of support wheels rotatably coupled to said frame for rolling engagement with an associated underlying support surface to support said frame thereon, a spindle mounted on said frame for rotatably supporting an associated roll of wire mesh web thereon to accommodate removal of the wire mesh web from the roll, decontour means pivotally mounted on said frame for engagement with an unrolled portion of the wire mesh web to effect decontouring thereof, bias means resiliently urging said decontour means into engagement with the unrolled portion of the wire mesh web, said decontour means being pivotally movable under the urging of said bias means for following the wire mesh web as the diameter of the roll decreases to insure continuous engagement of said decontour means with the wire mesh web as it is removed from the roll, and latch mechanism carried by said frame and engageable with said decontour means for holding said decontour means out of engagement with the wire mesh web against the urging of said bias means when said decontour means is not in use, said spindle and said support wheels being arranged in use to accommodate passage of said wire mesh web from the roll between the underlying support surface and selected ones of said support wheels in engagement therewith for providing additional decontouring of the wire mesh web as it is removed from the roll.

9. The reinforcing wire mesh working apparatus set forth in claim 8, wherein said bias means comprises a coil spring coupled to said decontour means and to said frame.

10. The reinforcing wire mesh working apparatus set forth in claim 8, wherein said decontour means includes a pair of substantially parallel mounting brackets pivotally mounted on said frame and spaced apart transversely thereof, said bias means including a compression spring coupled to said frame and to one of said mounting brackets.

11. The reinforcing wire mesh working apparatus set forth in claim 8, wherein said decontour means includes a pair of substantially parallel mounting brackets pivotally mounted on said frame and spaced apart transversely thereof, a plurality of spaced-apart parallel elongated rollers aligned longitudinally of said mounting brackets and extending therebetween, the opposite ends of each of said rollers being respectively coupled to said mounting brackets for rotation of said rollers about the longitudinal axes thereof, said spindle being adapted for removal of the wire mesh web therefrom along a predetermined path extending between said mounting brackets and perpendicular to the longitudinal axis of said rollers in engagement therewith, whereby said rollers effect decontouring of the wire mesh web as it is removed from the roll.

12. A reinforcing wire mesh working apparatus comprising a frame, a plurality of support wheels rotatably carried by said frame and extending therefrom in a first predetermined direction, a plurality of support legs carried by said frame and extending therefrom in a second predetermined direction, and a spindle removably mounted on said frame for rotatably supporting an associated roll of wire mesh web thereon to accommodate removal of the wire mesh web from the roll, said

frame having a working configuration with said support wheels disposed in rolling engagement with an associated underlying support surface for supporting said frame thereon and with said legs out of engagement with the support surface, said frame having a loading configuration with said legs disposed in engagement with the underlying support surface for supporting said frame thereon and with said support wheels disposed out of engagement with the support surface, said frame in the working configuration thereof being operable for rolling along the support surface and placing the wire mesh web thereon as it is removed from the roll, said frame in the loading configuration thereof facilitating removal of said spindle therefrom and the loading of a roll of wire mesh web onto said spindle and the remounting of said loaded spindle on said frame.

13. The reinforcing wire mesh working apparatus set forth in claim **12,** wherein said support wheels and said support legs extend from said frame in directions substantially perpendicular to each other and substantially perpendicular to the longitudinal axis of said spindle.

14. The reinforcing wire mesh working apparatus set forth in claim **12,** wherein said apparatus includes a pair of front support wheels mounted on said frame adjacent to one end thereof and spaced apart transversely thereof and extending therefrom in a first predetermined direction, and a pair of rear wheels mounting on said frame adjacent to the other end thereof and spaced apart transversely thereof and extending therefrom in said first predetermined direction, said support legs being mounted on said frame adjacent to said one end thereof and extending therefrom in a second direction substantially perpendicular to said first direction, said spindle being mounted on said frame adjacent to said one end thereof with the longitudinal axis of said spindle extending transversely of said frame substantially perpendicualr to said first and second directions.

15. A reinforcing wire mesh working apparatus comprising a frame, a spindle mounted on said frame for rotatably supporting an associated roll of wire mesh web thereon to accommodate removal of the wire mesh web from the roll, mounting means accommodating mounting of said spindle in any of a plurality of different positions on said frame, and decontour means connected to said frame for engagement with an unrolled portion of the wire mesh web to effect decontouring thereof as the web is removed from the roll.

16. The reinforcing wire mesh working apparatus set forth in claim **15,** wherein said mounting means includes a plurality of pairs of mounting studs carried by said frame, the studs of each pair of studs being spaced apart transversely of said frame and adaptable for receiving thereon one end of said spindle.

17. The reinforcing wire mesh working apparatus set forth in claim **15,** wherein said mounting means includes a pair of mounting members spaced apart transversely of said frame and coupled thereto for movement longitudinally thereof, said mounting members being adapted for receiving said spindle therebetween with the opposite ends of said spindle respectively rotatably mounted on said mounting members.

18. The reinforcing wire mesh working apparatus set forth in claim **15,** wherein said mounting means includes a pair of mounting members spaced apart transversely of said frame and coupled thereto for movement longitudinally thereof, said mounting members being adapted for receiving said spindle therebetween with the opposite ends of said spindle respectively rotatably mounted on said mounting members, and further including a tray adapted to be mounted on said frame in either of two different mounting locations for carrying associated equipment, one of said mounting locations being in mounting location of the wire mesh roll for use when the wire mesh roll is not mounted on said spindle, the other of said mounting locations being clear of the mounting location of the wire mesh roll for use when the wire mesh roll is mounted on said spindle.

19. A reinforcing wire mesh working apparatus comprising a frame, a spindle mounted on said frame for rotatably supporting an associated roll of wire mesh web thereon to accommodate removal of the wire mesh web from the roll, and bending mechanism removably mounted on said frame for engagement with an unrolled portion of the wire mesh web, said bending mechanism being selectively operable for deforming the wire mesh web to a predetermined angular configuration, whereby said bending mechanism may be readily removed from said frame without impairing the operation thereof when said bending mechanism is not in use.

20. A reinforcing wire mesh working apparatus comprising a frame, a spindle mounted on said frame for rotatably supporting an associated roll of wire mesh web thereon to accommodate removal of the wire mesh web from the roll along a predetermined path, clamping mechanism mounted on said frame and being movable between a clamping condition for holding the wire mesh web against movement along said path and a releasing condition accommodating free movement of said wire mesh web along said path, bias means resiliently urging said clamping mechanism into the clamping condition thereof, and a bending plate mounted on said frame for movement between a web passing position and a bending position, said bending plate in the web passing position thereof holding said clamping mechanism in the releasing condition thereof against the urging of said bias means, said bending plate in the bending position thereof accommodating movement of said clamping mechanism to the clamping condition thereof and cooperating therewith to bend the wire mesh web to a predetermined angular configuration.

21. The reinforcing wire mesh working apparatus set forth in claim **20,** wherein said bias means includes a coil spring coupled to said frame and to said clamping mechanism.

22. The reinforcing wire mesh working apparatus set forth in claim **20,** wherein said clamping mechanism includes a stationary member and a movable member, said movable member being movable toward and away from said stationary member for effecting movement of said clamping mechanism between the clamping condition and the releasing condition thereof.

23. The reinforcing wire mesh working apparatus set forth in claim **20,** and further including latch means carried by said clamping mechanism for releasably holding said bending plate in the web passing position thereof when said clamping mechanism is disposed in the releasing condition thereof.

24. The reinforcing wire mesh working apparatus set forth in claim **20,** wherein said bending plate is manually movable between the web passing position and the bending position thereof.

25. The reinforcing wire mesh working apparatus set forth in claim **20,** and further including drive means

carried by said frame and coupled to said bending plate for effecting movement of said bending plate between the web passing position and the bending position thereof.

26. A reinforcing wire mesh working apparatus comprising a frame, a plurality of support wheels rotatably coupled to said frame for rolling engagement with an associated underlying support surface to support said frame thereon, a spindle mounted on said frame for rotatably supporting an associated roll of wire mesh web thereto to accommodate removal of the wire mesh web from the roll, said spindle and said support wheels being arranged in use to accommodate passage of said wire mesh web between the underlying support surface and selected ones of said support wheels in engagement therewith for decontouring the wire mesh web as it is removed from the roll, and bending mechanism removably mounted on said frame for engagement with an unrolled portion of the wire mesh web, said bending mechanism being selectively operable for deforming the wire mesh web to a predetermined angular configuration, whereby said bending mechanism may be readily removed from said frame without impairing the operation thereof when said bending mechanism is not in use.

27. A reinforcing wire mesh working apparatus comprising a frame, a plurality of support wheels rotatably carried by said frame and extending therefrom in a first predetermined direction, a plurality of support legs carried by said frame and extending therefrom in a second predetermined direction, a spindle removably mounted on said frame for rotatably supporting an associated roll of wire mesh web thereon to accommodate removal of the wire mesh web from the roll, said frame having a working configuration with said support wheels disposed in rolling engagement with an associated underlying support surface for supporting said frame thereon and with said legs out of engagement with the support surface, said frame having a loading configuration with said legs disposed in engagement with the underlying support surface for supporting said frame thereon and with said support wheels disposed out of engagement with the support surface, said frame in the working configuration thereof being operable for rolling along the support surface and placing the wire mesh web thereon as it is removed from the roll, said frame in the loading configuration thereof facilitating removal of said spindle therefrom and the loading of a roll of wire mesh web onto said spindle and the remounting of said loaded spindle on said frame, and bending mechanism removably mounted on said frame for engagement with an unrolled portion of the wire mesh web, said bending mechanism being selectively operable for deforming the wire mesh web to a predetermined angular configuration, whereby said bending mechanism may be readily removed from said frame without impairing the operation thereof when said bending mechanism is not in use.

28. A reinforcing wire mesh working apparatus comprising a frame adapted to be supported on an associated underlying support surface, a spindle mounted on said frame for rotatably supporting an associated roll of wire mesh web thereon to accommodate removal of the wire mesh web from the roll, bending mechanism mounted on said frame for engagement with the unrolled portion of the wire mesh web and being selectively operable for deforming the wire mesh web to a predetermined angular configuration, feed apparatus mounted on said frame for driving engagement with the wire mesh web and operable to effect movement thereof along a predetermined path from the roll to said bending mechanism, decontour means connected to said frame for engagement with the wire mesh web along said predetermined path to effect decontouring the wire mesh web as it is removed from the roll, drive means mounted on said frame and coupled to said feed apparatus and to said bending mechanism for effecting operation thereof, and control means coupled to said drive means and being selectively operable for controlling the actuation thereof, and further including a plurality of support wheels rotatably coupled to said frame for rolling engagement with the associated underlying support surface to support said frame thereon.

29. A reinforcing wire mesh working apparatus comprising a frame adapted to be supported on an associated underlying support surface, a spindle mounted on said frame for rotatably supporting an associated roll of wire mesh web thereon to accommodate removal of the wire mesh web from the roll, decontour means connected to said frame for engagement with an unrolled portion of the wire mesh web to effect decontouring thereof as it is removed from the roll, said frame having a low-profile configuration wherein said spindle is disposed a first predetermined distance above the underlying support surface, said frame having a high-profile configuration wherein said spindle is disposed a second predetermined distance greater than said first predetermined distance above the underlying support surface, said frame including height-adjusting means accommodating shifting of said frame between the low-profile configuration and the high-profile configuration thereof.

30. The reinforcing wire mesh working apparatus set forth in claim **29**, wherein said height-adjusting means includes a pair of vertically extending members disposed in telescoping relationship and vertically movable with respect to each other.

31. The reinforcing wire mesh working apparatus set forth in claim **29**, wherein said height-adjusting means is manually operable for shifting said frame between the low-profile configuration and the high-profile configuration thereof.

32. The reinforcing wire mesh working apparatus set forth in claim **29**, wherein said height-adjusting means includes drive means for effecting movement of said height-adjusting between the low-profile configuration and the high-profile configuration thereof.

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