April 5, 1955 J. A. WAKEFIELD 2,705,600

MACHINE FOR WINDING WIRE FABRIC

Filed Oct. 3, 1951

3 Sheets-Sheet 1

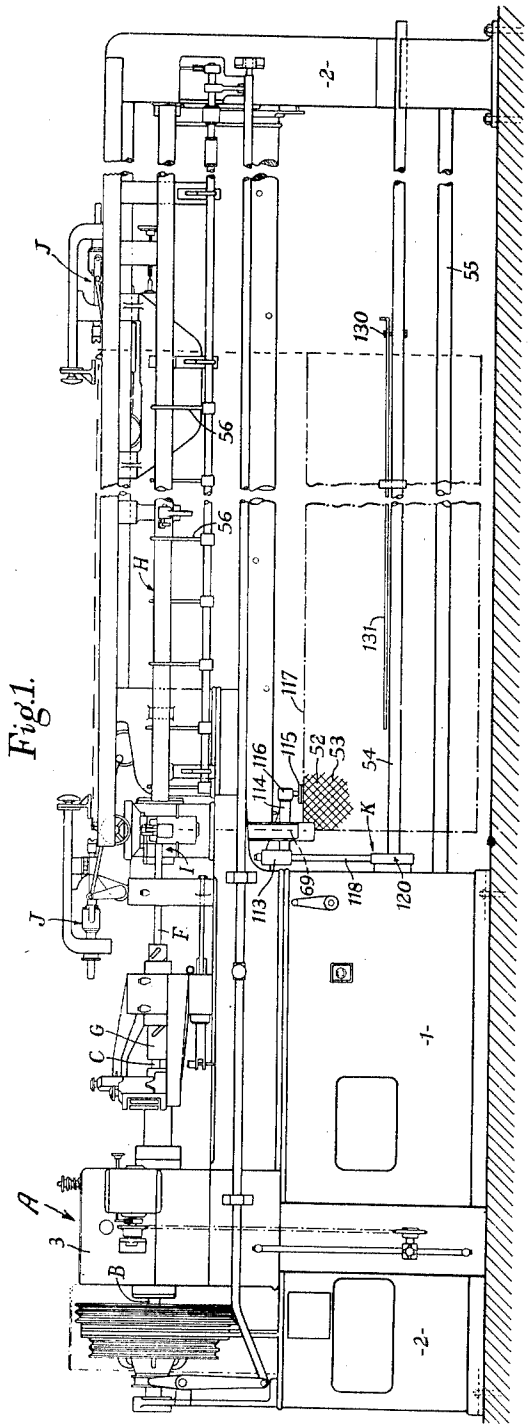


Fig. 1.

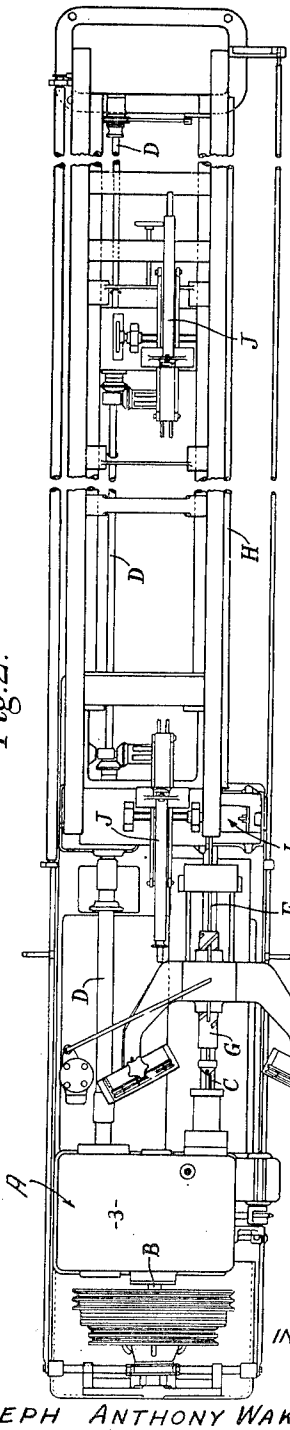


Fig. 2.

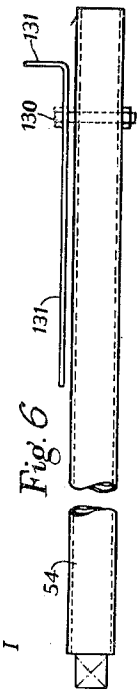


Fig. 6

INVENTOR

JOSEPH ANTHONY WAKEFIELD

BY

ATTORNEY

April 5, 1955 J. A. WAKEFIELD 2,705,600

MACHINE FOR WINDING WIRE FABRIC

Filed Oct. 3, 1951

3 Sheets-Sheet 2

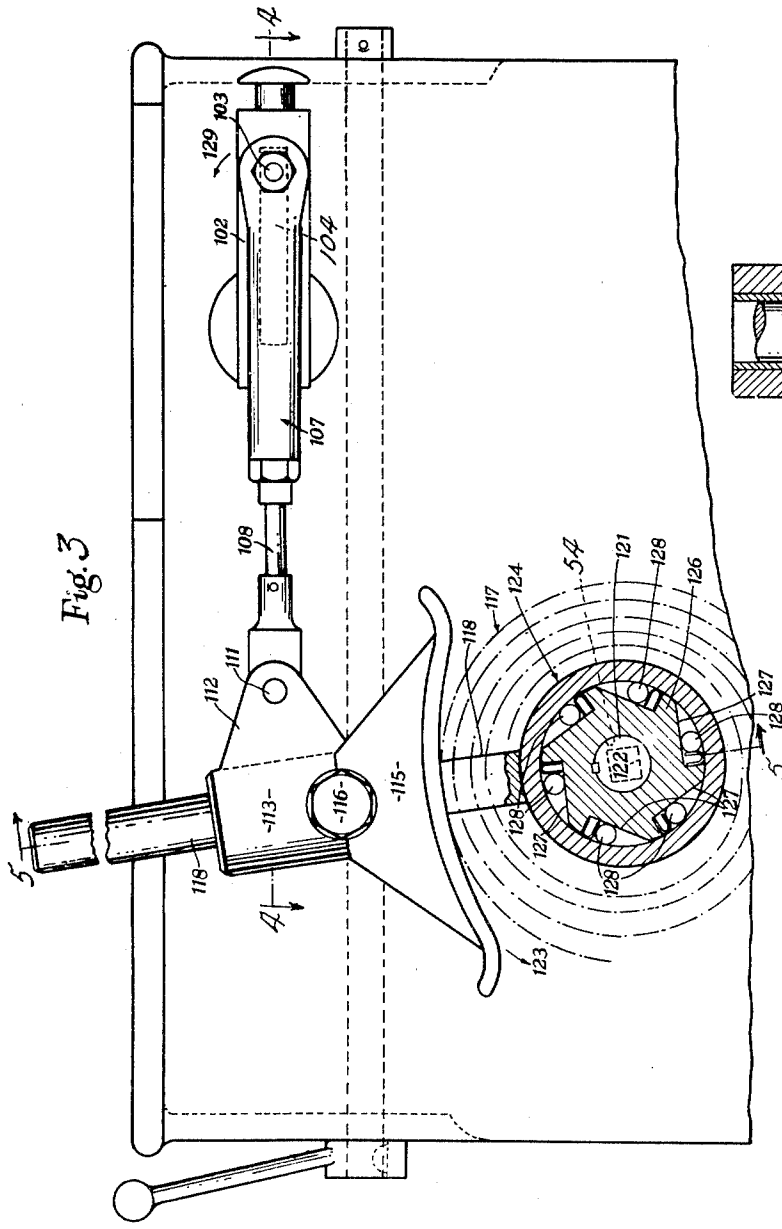


Fig. 3

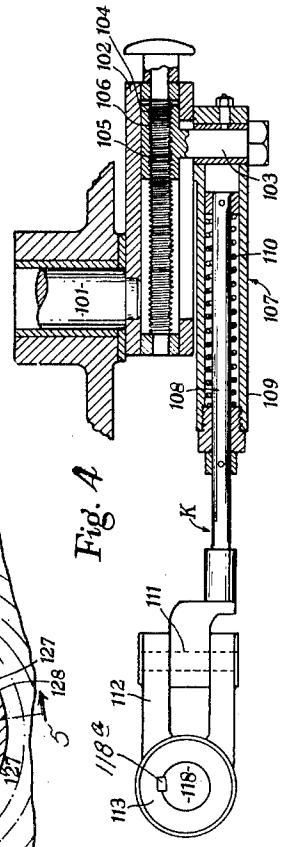


Fig. 4

INVENTOR

JOSEPH ANTHONY WAKEFIELD

BY

ATTORNEY

April 5, 1955 J. A. WAKEFIELD 2,705,600

MACHINE FOR WINDING WIRE FABRIC

Filed Oct. 3, 1951

3 Sheets-Sheet 3

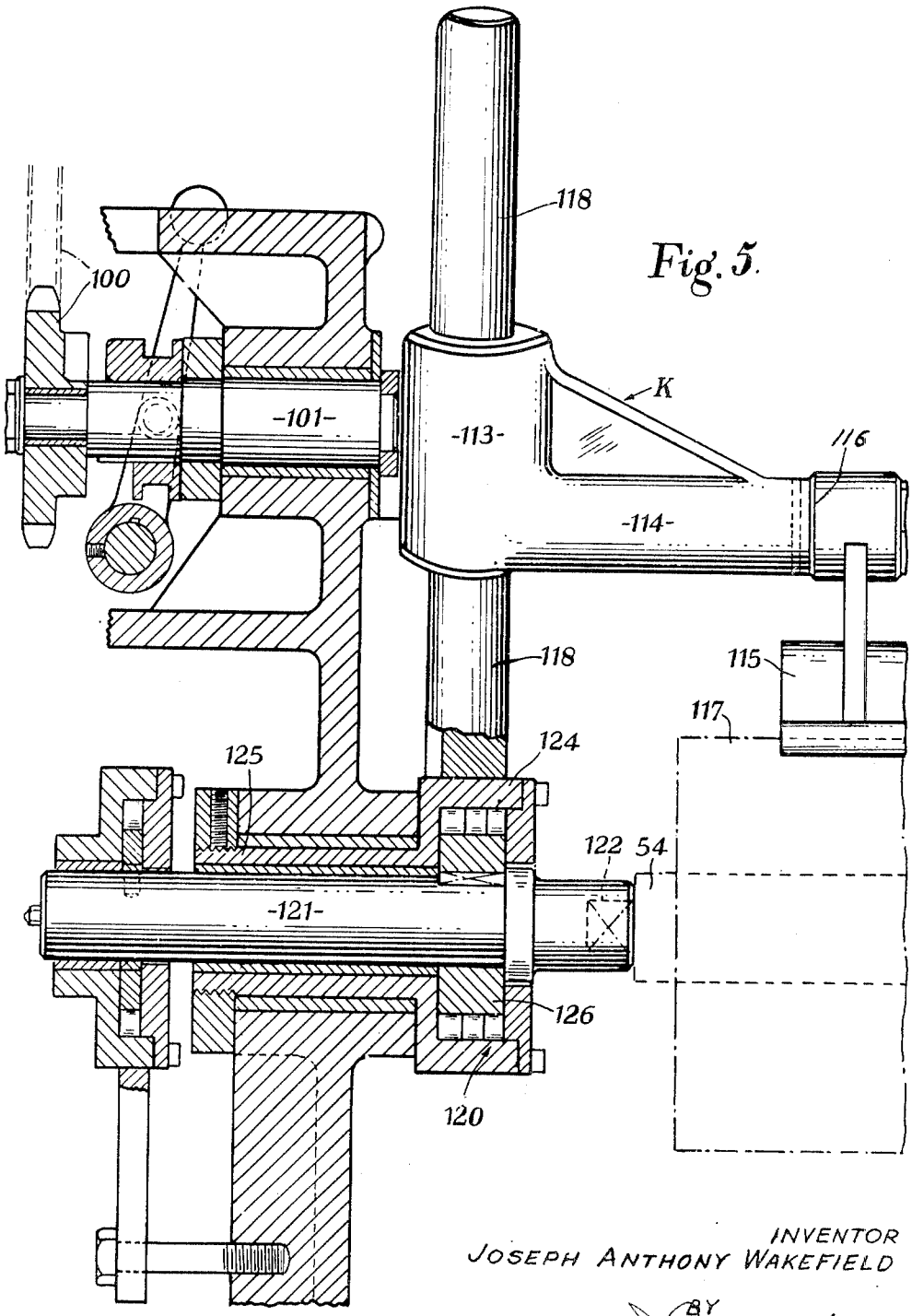


Fig. 5.

INVENTOR
JOSEPH ANTHONY WAKEFIELD

BY

ATTORNEY

United States Patent Office 2,705,600 Patented Apr. 5, 1955

2,705,600

MACHINE FOR WINDING WIRE FABRIC

Joseph Anthony Wakefield, Wrotham, England, assignor to Durafencing Limited, London, England, a registered British company

Application October 3, 1951, Serial No. 249,583

5 Claims. (Cl. 242—55)

This invention has reference to a machine for manufacturing wire fabric or so called "chain link fabric" of quadrangular or square mesh and which is particularly, although not exclusively, used for fencing.

The invention concerns a machine of the kind in which a length of wire, or two lengths of wire fed from two sources are wound into zig-zag form on a flat forming bar or blade rotating in a stationary worming coil or so called "giraffe" and the wound wire is interlinked or interlaced with the last row of the chain link fabric being made. In this machine, provision is made to stop rotary motion of said forming bar after interlacing is effected and a single revolution shaft is then brought into operation and drives mechanism adapted to sever the interlaced wire from the coiled supply and also to knuckle or turn over the sharp barbed wire ends formed by the severing operation and which are located at the side edges of the fabric. The wire fabric is advanced in a step-by-step motion and the operations of coiling and interlacing and then severing and turning over of the barbs take place in automatically controlled cycles.

An object is to provide an improved mechanism for winding the wire fabric as it is made on a spindle in order to wind automatically a predetermined amount of fabric, the winding taking place within the precincts of the fabric making machine and thus avoiding, as in the past, the rolling of the fabric at back of the machine which made it necessary for an operator not only to supervise the making of the fabric at the front of the machine, but also to attend to the taking off of the fabric at the rear of the machine, which latter, owing to the projection of the winding spindle and fabric at the back of the machine, precluded the positioning of the machine close to a factory wall.

The machine according to the invention also incorporates special features relating to the worming coil, the knuckling mechanism and the winding mechanism, which features form the subject of my concurrent applications Serial Nos. 249,584 and 249,586.

A satisfactory embodiment of a machine, according to the invention, for winding such wire fabric is illustrated by way of example on the accompanying drawings:

Fig. 1 is an elevation showing the general arrangement of the machine.

Fig. 2 is a plan of Fig. 1.

Fig. 3 is a view, partly in section, taken transversely of the machine and showing the wind-up mechanism for rolling up the wire fabric as it comes from the machine.

Fig. 4 is a section of Fig. 3 taken on the dotted line 4—4.

Fig. 5 is a section of Fig. 3 taken on the dotted line 5—5.

Fig. 6 is a detail of the winding spindle.

The machine as a whole is designed to manufacture wire fabric or so called "chain link fabric" of square or quadrangular mesh. This fabric consists of interlaced or interlinked zig-zag wires (**52**, **53**) and is of indeterminate length, whereas the width is determined by the manufacturer in relation to trade requirements; a common and satisfactory width of such fabric for use as field fencing is of approximately six feet.

The wire fabric making machine, which is comparatively long and narrow, has a frame **1** supported on pedestals **2** and comprises the following essential features:

A power transmission mechanism A having a driving shaft B; a weaving spindle C and a single revolution shaft D, the weaving spindle C being arranged at the front of the machine, the spindle C and the shaft D being adapted to be driven alternately by the mechanism A while the driving shaft B is rotating;

A control mechanism E co-operating with the mechanism A;

A flat coiling blade F driven by the weaving spindle C;

A fixed, cylindrical worming coil G in which the blade F rotates;

A bi-sectional weaving tube H, co-axial with the blade F, adapted to be opened and closed from the operation of the single revolution shaft D;

A wire cutting mechanism I operated from the single revolution shaft D;

A knuckling mechanism J operated from the single revolution shaft D;

A fabric winding mechanism K operated from the single revolution shaft D.

The winding mechanism K referred to above is arranged transversely of and under the machine for winding automatically the fabric on the winding spindle **54** arranged longitudinally under the machine. The mechanism is driven from the single revolution shaft D by a chain sprocket drive **100** to a crank shaft **101** transmitting motion to a longitudinally slotted crank arm **102** fitted with a crank pin **103**; the throw of the crank can be adjusted by mounting the crank pin **103** on a slide **104** and adjusting the slide **104** relatively to the crank arm **102** by means of a traversing screw and nut co-operation **105**, **106**. A spring loaded connecting rod **107** consisting of piston member **108**, cylinder **109** and spring **110**, is jointedly connected at **111** to a bracket **112** fast with a sleeve **113**.

The sleeve **113** has a right angled extension **114** on which a foot or shoe **115** is pivoted at **116**, this foot or shoe **115** resting on the periphery **117** of the fabric rolled on the winding spindle **54** by this mechanism. The sleeve is splined as at **118***a*, on an oscillating arm **118** having its lower end connected to one element of a one-way friction clutch **120** arranged on a stub shaft **121** which is the axis of the winding spindle **54**; an end of the shaft **121** is provided with a square socket **122** in which one end of the spindle **54** engages. The crank mechanism **102**, **103** causes the arm **118** to oscillate about the shaft **121** and the clutch **120** is arranged to drive the shaft **121** and the spindle **54** in the direction of the arrow **123** (Fig. 3) and to idle in the other direction. The friction clutch **120** comprises a hollow, cylindrical element **124** fast with the arm **118** and mounted by a sleeve **125** on the shaft **121** in combination with an inner cylindrical element **126** splined on the shaft **121**, this element **126** having several steps **127** in its periphery for accommodating rollers **128**. The crank mechanism **102**, **103** turns in an anti-clockwise direction as indicated by the arrow **129** (Fig. 3), and during its outward stroke the clutch operates and turns the shaft **121** together with the winding spindle **54** clockwise, thereby performing a fabric winding step. On the return stroke, of the said crank mechanism, the clutch **120** is ineffective so that the shoe **115** rides over the periphery of the fabric **117** without turning it. Thus, as the single revolution shaft D turns, the arm **118** completes automatically an oscillation, the first half of which restores the arm **118** from the position it was previously moved into in winding fabric on the spindle **54** so that it can again repeat the winding operation on the second half of the cycle.

The operation of automatically winding the fabric on the spindle **54** takes place on completion of the knuckling operation, the weaving tube H being automatically opened as winding is imminent and the hooks **56** being released and re-engaged with the mesh during and after completion of the winding operation.

As the diameter of the fabric progressively increases, a constant winding movement is transmitted to the winding spindle **54** so that the same amount of fabric is wound upon it, irrespective of fabric diameter. This is made possible by the upward sliding motion of the sleeve **113** on the arm **118** due to the foot or shoe **115** resting on the periphery **117** of the fabric and progressively lifting the sleeve **113**. In this way, the pivot **111** is always

maintained at a constant distance from the periphery **117** of the roll.

As the manufactured fabric increases in diameter, the sleeve **113** slides up the arm **118** and when the required diameter has been reached, the roll with the winding spindle **54** is removed from the machine, the roll being sleeved off the spindle **54** by removal of a clamping device **130** (Fig. 6) and withdrawal of a bar **131** previously clamping to the spindle **54** one or more of the initial turns of the fabric.

It will be seen, therefore, that the position the sleeve **113** occupies on the oscillating arm **118** is responsive to or controlled by the diameter of the fabric being rolled on the spindle so that the amplitude of oscillation will vary, in that with a small diameter of fabric the angular movement of the arm will be greater than when the diameter is large, although the same amount of fabric will be wound per oscillation.

What I claim is:

1. In a machine for manufacturing fabric, an automatically operating mechanism for winding the fabric as it is manufactured into a roll, comprising a winding spindle arranged longitudinally under the machine, an arm mounted for oscillation about the axis of said spindle and coupled to said spindle by a unidirectional clutch for driving said spindle stepwise, a shaft adapted to be driven by said machine, a sleeve slidably mounted on said arm, a reciprocating mechanism driven by said shaft connected to said sleeve and adapted to transmit through said sleeve periodic oscillating motion to said arm, an extension on said sleeve, said extension being arranged above said spindle and a foot mounted on said extension and adapted to rest upon said roll.

2. Machine according to claim 1, in which said sleeve has a splined connection with said arm and in which said foot is pivotally connected to said extension.

3. Machine according to claim 1, in which said clutch comprises a hollow cylindrical element fast with said arm and being carried by a co-axial clutch sleeve, a stub shaft mounting said clutch sleeve, a clutch element splined on said stub shaft, steps on said clutch element and rollers lying in said steps and adapted to effect a drive to said shaft in a single direction in response to the oscillations of said arm.

4. A machine for winding fabric into a roll comprising a winding spindle; an arm mounted for oscillation about the axis of said winding spindle and being adapted to drive said winding spindle stepwise in a single direction through a one way clutch; a sleeve slidably mounted on said arm for axial movement on said arm, a shoe mounted on said sleeve for pivotal movement about an axis perpendicular to the longitudinal axis of said arm, said shoe being adapted to engage and rest on the periphery of the roll of fabric as it is wound on the spindle; and driving means connected to said sleeve for imparting oscillating motion to said arm.

5. A machine for winding a flexible material into a roll comprising a driving shaft; a winding spindle; an arm having a longitudinal axis mounted for oscillation about the axis of said spindle, means connecting said arm to said spindle to rotate said spindle progressively in a predetermined direction as said arm is oscillated; a member slidably mounted on said arm for movement parallel to said longitudinal axis, said member having an extension disposed above said spindle; a shoe on said extension for engaging the periphery of a roll being wound on said spindle; and means connecting said member to said driving shaft for imparting oscillatory movement to said arm.

References Cited in the file of this patent

UNITED STATES PATENTS

1,351,350	Southwick	Aug. 31, 1920
1,988,284	Raiche	Jan. 15, 1935
2,055,785	Crowther	Sept. 29, 1936
2,580,717	Ballou	Jan. 1, 1952