United States Patent

Phillips

[15] **3,643,845**

[45] **Feb. 22, 1972**

[54] APPARATUS FOR FEEDING STRIP STOCK

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[73] Assignee: **Phillips Industries, Inc.**, Frankfurt, Ind.

[22] Filed: **Dec. 18, 1969**

[21] Appl. No.: **886,186**

[52] **U.S. Cl.**.....**226/145**, 226/150, 226/162

[51] **Int. Cl.**.....**B65h 17/36**

[58] **Field of Search**.....226/162, 150, 145, 179, 17, 226/198, 199; 271/49, 59

[56] **References Cited**

UNITED STATES PATENTS

3,123,270 3/1964 Olson.....226/162 X

3,289,507 12/1966 Grewe.....226/162 X

Primary Examiner—Allen N. Knowles

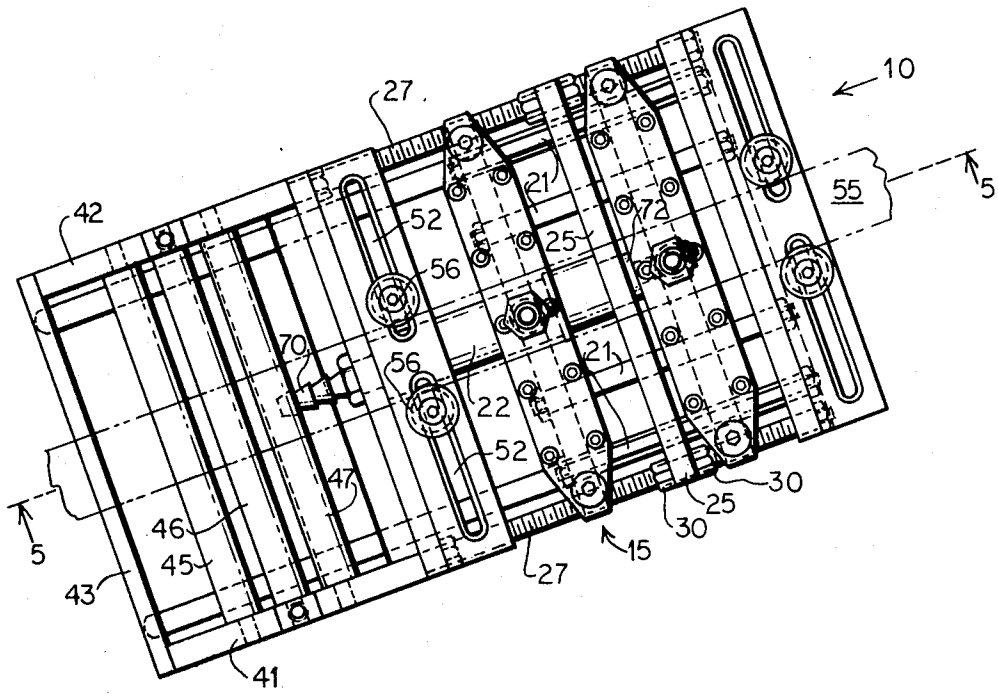
Assistant Examiner—Gene A. Church

Attorney—Woodard, Weikart, Emhardt and Naughton

[57] **ABSTRACT**

Strip stock feeding apparatus including a pair of diaphragm operated clamps, one movable and one stationary. A fluid cylinder is arranged to move the movable clamp back and forth. The two clamps are alternately actuated at the same time as the fluid cylinder so as to hold the stock in position while the movable clamp moves in one direction and so as to move the stock with the movable clamp as it moves in the opposite direction. Coil straightening rollers and guiding rollers are also provided.

4 Claims, 7 Drawing Figures



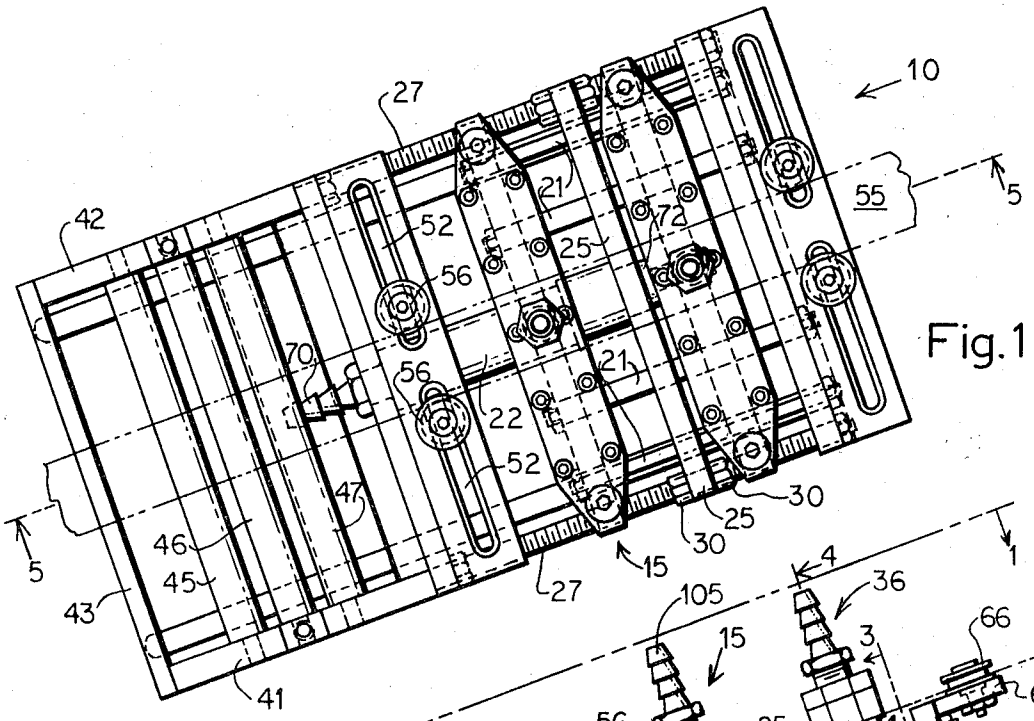


Fig. 1

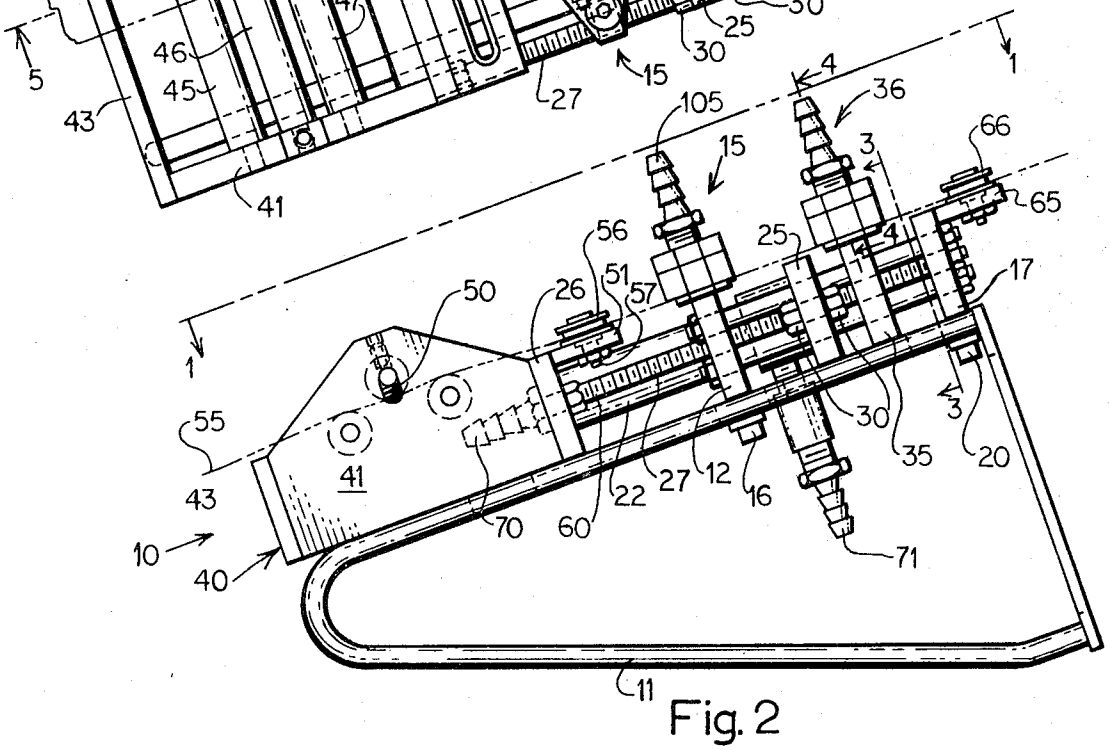


Fig. 2

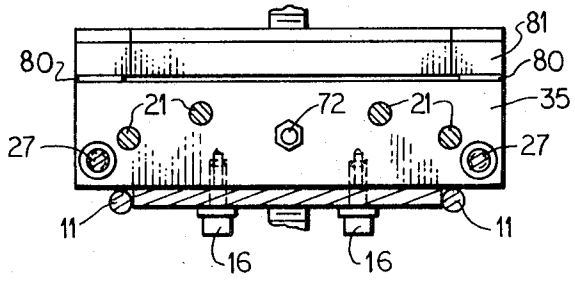


Fig. 3

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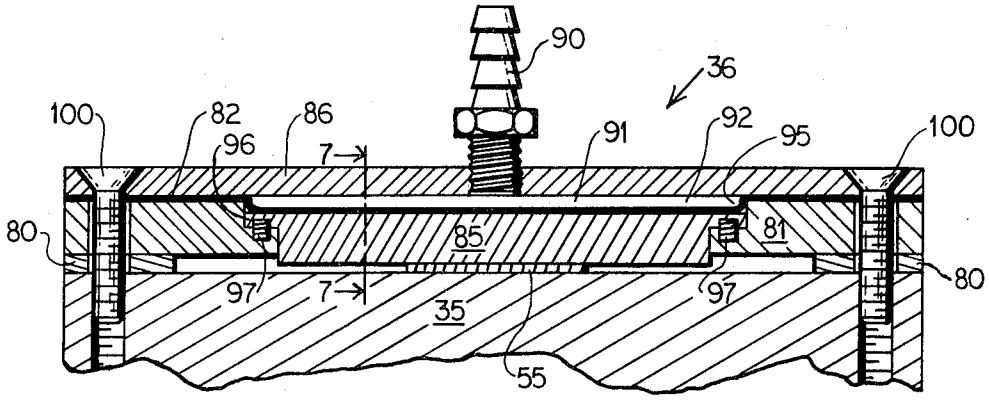


Fig. 4

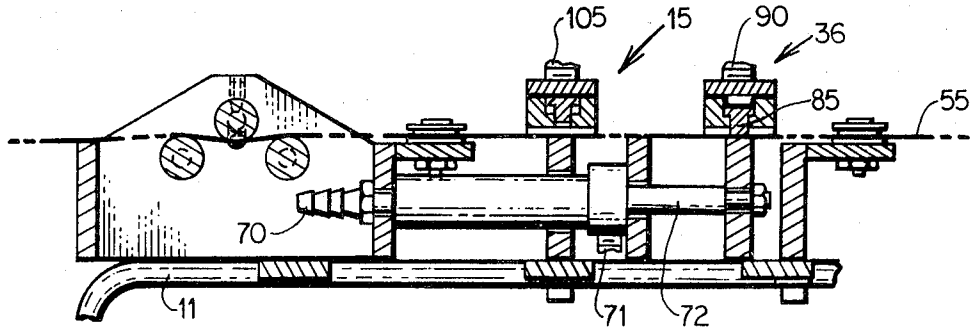


Fig. 5

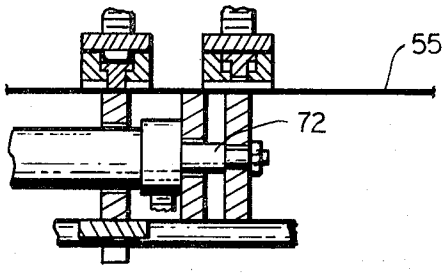


Fig. 6

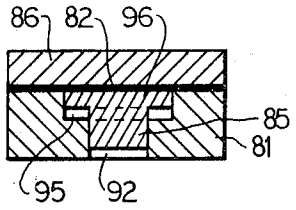


Fig. 7

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APPARATUS FOR FEEDING STRIP STOCK

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to strip stock feeding apparatus for use with a punch press or the like.

2. Description of the Prior Art

Examples of the prior art are disclosed in the following U.S. Pats. to Irmscher No. 2,003,364; to Holmbeck No. 2,342,049; to King No. 2,353,405; to Gilbert No. 2,468,620; to Simpson No. 2,480,781; to Revelle No. 2,722,276; to Bertram No. 2,918,971; to Cooley No. 3,052,143; to Mosher No. 3,137,190; and to Jensen No. 3,229,556.

SUMMARY OF THE INVENTION

One embodiment of the invention might include a strip stock feeding apparatus for feeding strip stock to a punch press or the like comprising a frame; a first clamping assembly fixedly mounted on said frame; a second clamping assembly movably mounted on said frame; a first hydraulic cylinder motor having a piston connected to said second clamping assembly and a cylinder connected to said frame; said first clamping assembly comprising a base, spacer means, a guide member, a flexible diaphragm, a clamp member and a top member; means mounting said top member on said base with said spacer means, guide member and flexible diaphragm in that order therebetween; said spacer means being positioned so as to provide a space between said guide member and said base within which space the strip stock is received; said clamp member having an enlarged head thereon; said guide member having an opening therethrough which is complementary in configuration to said clamp member and includes a recess to receive said enlarged head; said recess extending a sufficient distance through said guide member to permit said clamp member to project out of said guide member toward said base into said space; means for moving fluid to a location between said top member and said diaphragm so as to cause said diaphragm to expand into said opening and force said clamp member to project out of said guide member into said space; and spring means acting between said guide member and said clamp member and tending to retract said clamp member into said guide member.

Objects of this invention are to provide an improved strip stock feeder and to provide a strip stock feeder which firmly and evenly engages the strip stock for movement thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a strip stock feeding apparatus of the present invention;

FIG. 2 is a side elevation of the structure of FIG. 1;

FIG. 3 is a section taken along the line 3—3 of FIG. 2 in the direction of the arrows;

FIG. 4 is an enlarged section taken along the line 4—4 of FIG. 2 in the direction of the arrows;

FIG. 5 is a vertical section taken along the line 5—5 of FIG. 1 in the direction of the arrows;

FIG. 6 is a fragmentary view similar to FIG. 5 but showing a different operating position of the apparatus; and

FIG. 7 is a section taken along the line 7—7 of FIG. 4 showing the apparatus in a different operating position from FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now more particularly to the drawings, there is illustrated strip stock feeding apparatus **10** which includes a frame **11**. A base member **12** forming a part of a first clamping assembly **15** is fixedly mounted to the frame **11** by screws **16**. A further base member **17** is fixed to the frame **11** by screws **20**. Four shoulder bolts **21** extend between and are affixed to the base members **12** and **17** and maintain them in a fixed spaced parallel relationship.

A fluid cylinder **22** extends through and is carried by the base member **12** and is fixed to a locating member **25**. The

rearward end of the fluid cylinder **22** is fixed to a further base member **26**. Threaded members **27** are fixed to the base member **26** and are adjustably fixed to the locating member **25**. The threaded members **27** extend through the locating member **25** and are fixed at their ends to the base member **17**.

By releasing and repositioning the nuts **30**, the locating member **25** can be repositioned so as to reposition the fluid cylinder **22**. Such repositioning causes a change in one end of the stroke of the base **35** which forms part of the clamping assembly **36**.

Not only does the base member **26** support the fluid cylinder **22** but it also forms a part of a structure for straightening coil stock coming into the strip-feeding apparatus. The coil stock straightener **40** additionally includes sideplates **41** and **42** and end plates **43**, the end plate **43** being fixed to the sideplates **42** and the sideplates **42** being fixed to the base member **26**. Three rollers **45**, **46** and **47** are rotatively mounted upon the sideplates **42** and **41**. The roller **46** is spring biased by compression spring means **50** which act between the roller **46** and the sideplates **41** and **42**. Integral with the baseplate **26** is a horizontally extending plate **51** which has slots **52** formed therein. The slots **52** extend perpendicularly of the direction of movement of the strip stock **55**. Rollers **56** which rotate on fixed elements **57** are provided for guiding the strip stock out of the straightening apparatus **40** and into the strip stock moving apparatus. The rollers **56** have concave peripheries adapted to receive the sideward edges of the strip stock **55**. A nut **60** is provided for each of the threaded fixed elements **57** for fixing the respective rollers **56** at any desired location along the length of respective slots **52** depending upon the desired location and size of the strip stock **55**. The base member **17** has a similar member **65** integral therewith which has similarly mounted and shaped rollers **66** mounted thereon, the rollers **66** also being horizontally adjustable perpendicularly to the direction of movement of the tape **55**.

The fluid cylinder **22** has two conduits **70** and **71** which function to provide means for providing fluid pressure into the cylinder. The conduit **70** is adapted to receive fluid pressure for projecting the piston **72** of the fluid cylinder while the conduit **71** is adapted to receive fluid under pressure for retracting the piston **72**.

Referring now more particularly to FIGS. **3**, **4** and **7**, the details of a representative one of the clamping assemblies **15** and **36** is illustrated. Both clamping assemblies **15** and **36** are identical and consequently the description of the clamping assembly **36** also applies to the clamping assembly **15**. As illustrated, there is provided the base **35**, spacer means **80**, a guide member **81**, a flexible diaphragm **82**, a clamp member **85** and a top member **86**. Threaded into the top member **86** is a conduit **90** which provides a port into the space **91** between the diaphragm **82** and the top member **86**. Supplying fluid through the conduit **90** causes the diaphragm **82** to be forced downwardly into and ballooned against the clamp member **85**. As illustrated, such pressure forces the clamp member **85** downwardly so that it engages and clamps the strip stock **55** against the base **35**. The clamp member **85** has a configuration which is complementary to the opening **92** through the guide member **81**. This opening is generally elongated with rounded ends but also includes a recess **95** which is proportioned to slidingly fit an enlarged head **96** on the clamp member **85**. Positioned between the clamp member **85**, and the guide member **81** are compression springs **97** which are received in suitable recesses in the two members which act to normally hold the clamp member **85** in an upward position away from the strip stock **55**. It will be noted that flat head screws **100** hold the top member **86** and the member **35** together and also hold together the various parts sandwiched between the top member **86** and the base member **35**.

Referring to FIGS. **5** and **6**, two operating positions of the apparatus are shown. In FIG. **5**, the piston **72** is shown projected and the clamping member **85** is shown in clamping relation engaging the strip stock **55** so that the strip stock is moved rightwardly to the illustrated position and beyond to a position

wherein the piston **72** has moved through its complete stroke and the clamping assembly **36** is in its far rightward position. When the apparatus reaches that position, the fluid being placed into the apparatus through the conduit **70** and the conduit **90** is cut off and fluid is fed into the conduit **71** and the conduit **105**. This causes the clamping member of the clamping assembly **15** to engage the strip stock and to hold it stationary. The springs **97** retract the clamping member **85** of the clamping assembly **36** and the clamping assembly **36** is moved leftwardly to the far leftward position as shown in FIG. **5** while the strip stock **55** is held stationary. This operation is repeated to move the strip stock rightwardly in an intermittent stepping motion. The fluid being supplied to the various conduits **70**, **71**, **90** and **105** is also supplied to the punch press so as to cause it to operate in synchronism with the feeding thereof.

I claim:

1. A strip stock feeding apparatus for feeding strip stock to a punch press or the like comprising a frame; a first clamping assembly fixedly mounted on said frame; a second clamping assembly movably mounted on said frame; a first fluid cylinder motor having a piston connected to said second clamping assembly and a cylinder connected to said frame; said first clamping assembly comprising a base, spacer means, a guide member, a flexible diaphragm, a clamp member and a top member; means mounting said top member on said base with said spacer means immediately adjacent said base, said guide member positioned immediately atop and adjacent said spacer means and said flexible diaphragm positioned between and adjacent said top member and said guide so as to provide a space between said guide member and said base within which space the strip stock is received; said clamp member having an enlarged head thereon; said guide member having an opening therethrough which is complementary in configuration to said clamp member and includes a recess to receive said enlarged head; said recess extending a sufficient distance through said guide member to permit said clamp member to project out of said guide member toward said base into said space; means for moving fluid to a location between said top member and said diaphragm so as to cause said diaphragm to expand into said opening and force said clamp member to project out of said guide member into said space, and spring means acting between said guide member and said clamp member and tending to retract said clamp member into said guide member.

2. The apparatus of claim **1** additionally comprising a first pair of rollers mounted on said frame and along side one another, said rollers being arranged to rotate about parallel axes and having concave outer peripheries adapted to receive the side edges of strip stock, said rollers being aligned with said space, said second clamping assembly also including a base, guide member and spacer means with said base and guide member defining a space therebetween in alignment with said rollers and first-mentioned space, a second pair of rollers mounted on said frame and along side one another, said second pair of rollers being arranged to rotate about parallel axes and having concave outer peripheries adapted to receive the side edges of strip stock, said second pair of rollers being aligned with said first pair of rollers and with said spaces, said rollers being out board of said spaces.

3. The apparatus of claim **2** wherein there are provided roller mounting members mounting said rollers on said frame, said roller mounting members having slots which extend in the direction of spacing apart of said rollers, releasable means adjustably mounting said rollers on said roller mounting members for adjustment of said rollers away from one another or toward one another, said releasable means including screws extending through said slots, and nuts on said screws.

4. The apparatus of claim **3** additionally comprising:

a pair of rotatably mounted cylinders connected to said frame and positioned in front of said first clamping assembly; and,

an upper rotatably mounted cylinder connected to said frame and spring biased toward said pair being positioned therebetween and cooperatively with said pair flattening and aligning said strip stock with said space of said first clamping assembly and said second clamping assembly.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,643,845 Dated February 22, 1972

Inventor(s) Odis L. Phillips

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the designation of the Assignee,

"Frankfurt" should be changed to--Frankfort--

Signed and sealed this 25th day of July 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

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