March 5, 1968 L. F. BLATT 3,371,953

GRIPPER

Filed March 16, 1967

FIG. 1

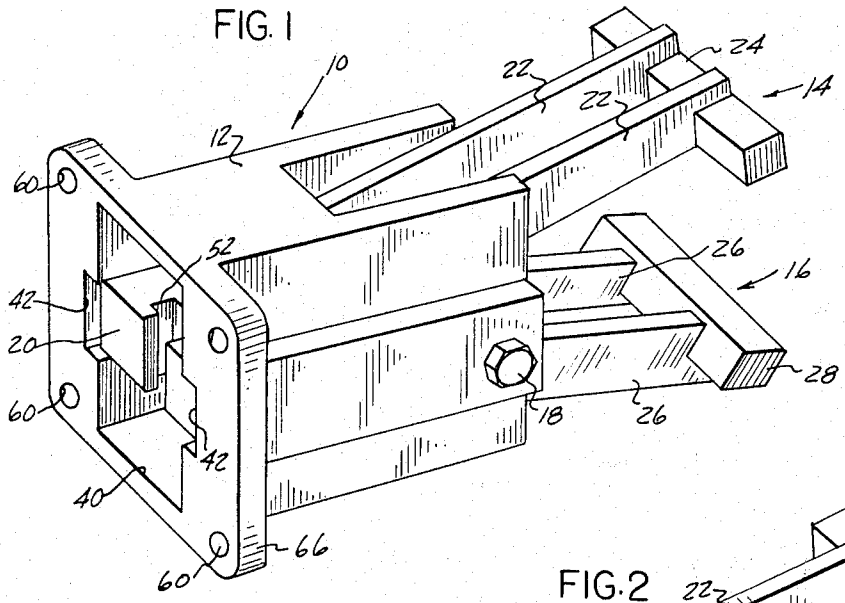
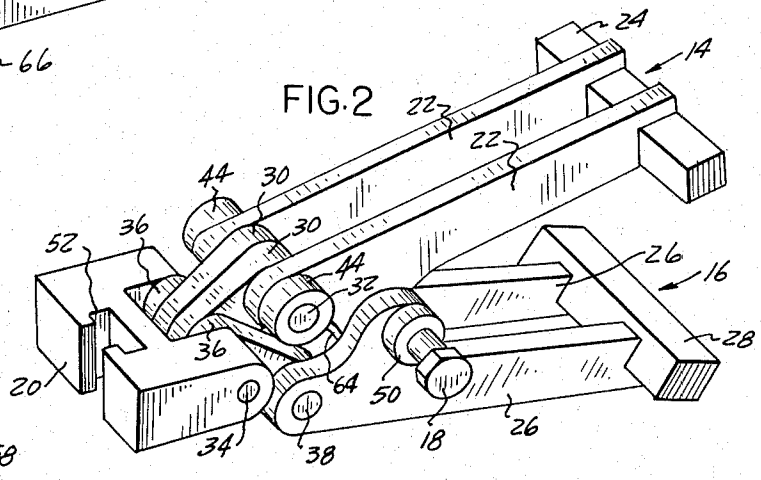


FIG. 2



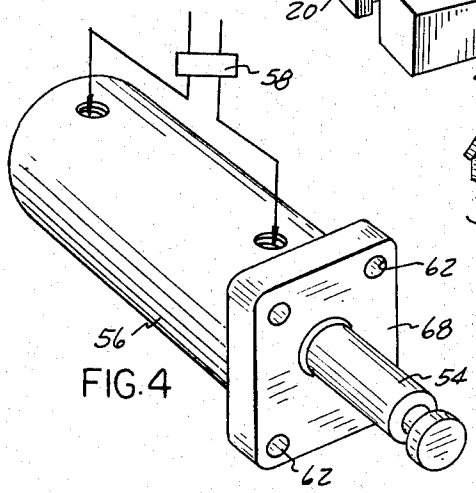


FIG. 4

3

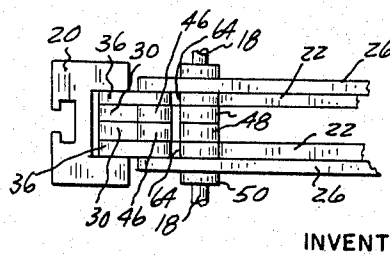


FIG. 3

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GRIPPER

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5 Claims. (Cl. 294—88)

ABSTRACT OF THE DISCLOSURE

A power cylinder-operated heavy duty jaw-type gripper is constructed to withstand and apply extremely high gripping forces by the provision of a rigid compact mechanism which is fully supported in all directions to substantially reduce stresses and deflections.

This invention relates to improvements in a gripper and is a continuation-in-part of my copending application Serial No. 550,193 filed May 16, 1966 and now abandoned.

Brief description of the drawings

FIG. 1 is a perspective view of the gripper assembly of this invention.

FIG. 2 is a perspective view, similar to FIG. 1, but with the gripper housing removed to reveal the actuating linkage.

FIG. 3 is a partially fragmented bottom view taken in the direction of arrow 3 of FIG. 2.

FIG. 4 is a perspective view of the actuating power cylinder, showing the control valve schematically.

Detailed description

Referring now to FIG. 1, gripper assembly **10** generally comprises a housing **12** in which upper and lower jaw assemblies **14**, **16** are pivotally mounted on pivot bolt **18**. Actuation of the gripper jaws is accomplished by the reciprocating movement of clevis **20**, as will be described below.

As is best illustrated in FIG. 2, upper jaw assembly **14** consists of a pair of identical parallel upper jaw arms **22** having affixed to their outer or right-hand ends a transverse upper mounting plate **24**, to which may be secured gripping contact points of any desired configuration.

Similarly, lower jaw assembly **16** comprises a pair of identical parallel lower jaw arms **26** to which is secured lower mounting plate **28**.

The reciprocating motion of clevis **20** is transmitted to the upper jaw by means of a pair of upper connecting links **30**, which are secured to upper arms **22** by pin **32** and secured to clevis **20** by pin **34**. In similar fashion, clevis **20** is connected to lower arms **26** by means of a pair of lower connecting links **36** secured to lower arm pin **38** and to clevis pin **34**.

The above described components fit within bore **40** of housing **12**. Clevis **20** is slidably mounted for reciprocating movement within the grooved portion **42** of the housing. It will be noted that upper jaw arms **22** are sandwiched between the spaced apart lower jaw arms **26**, the gap between each of the upper jaw arms **22** at pin **32** being filled by upper connecting links **30**. Connecting links **30** are similarly sandwiched between lower connecting links **36** at clevis pin **34**, links **36** being coplanar with upper jaw arms **22**.

A pair of upper spacers **44** is mounted at the outer ends of upper pin **32**, and provide lateral support for upper arms **22** within bore **40** of housing **12**. Further lateral support and rigidity is provided by a pair of spacers **46** (see FIG. 3) which are mounted on lower pin **38** between lower connecting links **36**. Similarly, spacers **48** are mounted at the middle portion of pivot bolt **18** between upper arms **22**. A pair of pivot spacers **50** are mounted on the outer portions of pivot bolt **18**, and nest into guide slots **42** of housing **12**.

It will be appreciated that guide slots **42** provide vertical support for the mechanism at both the clevis **20** and at pivot bolt spacers **50**. Full lateral or transverse support and rigidity is provided by the unique linkage configuration and spacers which provide maximum bearing surface for all the components.

A T-shaped slot **52** in the left hand portion of clevis **20** receives the end of piston rod **54** of actuating power cylinder **56**, which is controlled by control valve **58**.

Gripper assembly **10** is removably secured to power cylinder **56** by four mounting bolts which pass through holes **60** of the gripper assembly and **62** of the power cylinder. These mounting holes are arranged in a square pattern, so that gripper assembly **10** can be mounted in either of two operating planes relative to the power cylinder. For this purpose mounting flange **66** on housing **12** is in cooperative engaging registry with power cylinder end plate **68**.

It will be seen that gripper assembly **10** may be quickly and easily removed from the operating cylinder by merely removing the four mounting bolts, and then sliding the clevis transversely of cylinder rod **54** to permit the end of the rod to be withdrawn from the T-slot **52** of the clevis. This permits quick installation of a different type of gripper.

The mechanism is prevented from going over center by the abutment of lower connecting links **36** with edge face **64** of upper jaw arms **22** at the end of the jaw-closing stroke.

This invention may be further developed within the scope of the following claims. Accordingly, the above description is to be interpreted as illustrative of only a single operative embodiment of this invention, rather than in a strictly limited sense.

I now claim:

1. An improved toggle action jaw-type gripper comprising:

a housing;

a lower jaw comprising a pair of spaced apart parallel arms;

an upper jaw comprising a pair of spaced apart parallel arms sandwiched between said lower jaw arms;

said upper and lower jaw arms being pivotally mounted to said housing on a common pivot pin;

actuating means for opening and closing said jaws including a clevis mounted for reciprocating movement in a guide slot in said housing;

upper connecting link means connected at one end to said clevis and at the other end to a transverse upper connecting pin mounted on and between said upper jaw arms, said upper connecting links filling the space between said upper jaw arms at said upper connecting pin;

a pair of lower connecting links connected at one end to said clevis and at the other end to a transverse lower connecting pin mounted on and between said lower jaw arms, each of said lower connecting links being coplanar with a respective upper jaw arm;

first spacer means mounted on said lower connecting pin and filling the space thereon between said lower connecting links;

and second spacer means mounted on said pivot pin and filling the space thereon between said upper jaw arms.

2. The gripper of claim **1** wherein a portion of said upper jaw arms is contacted by said lower connecting

links at the end of the jaw-closing stroke, to thereby prevent the connecting linkage from going over center.

3. The gripper of claim 1 wherein said clevis has a T-shaped slot to receive the similarly shaped end of the piston rod of a power cylinder, to thereby permit rapid disconnection of the gripper assembly from the power cylinder.

4. In the gripper of claim 1, third spacer means on said pivot pin exteriorly of said lower jaw arms mounted for jaw supporting registry in said housing guide slot in advance of said clevis.

5. In the gripper of claim 3, said power cylinder including an apertured end plate;

and a similarly apertured mounting flange on said housadapted for securing registry therewith.

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