July 19, 1955 J. F. MUENCHOW 2,713,220

SLOPING ATTACHMENT FOR GRADERS

Filed Nov. 6, 1950 2 Sheets-Sheet 1

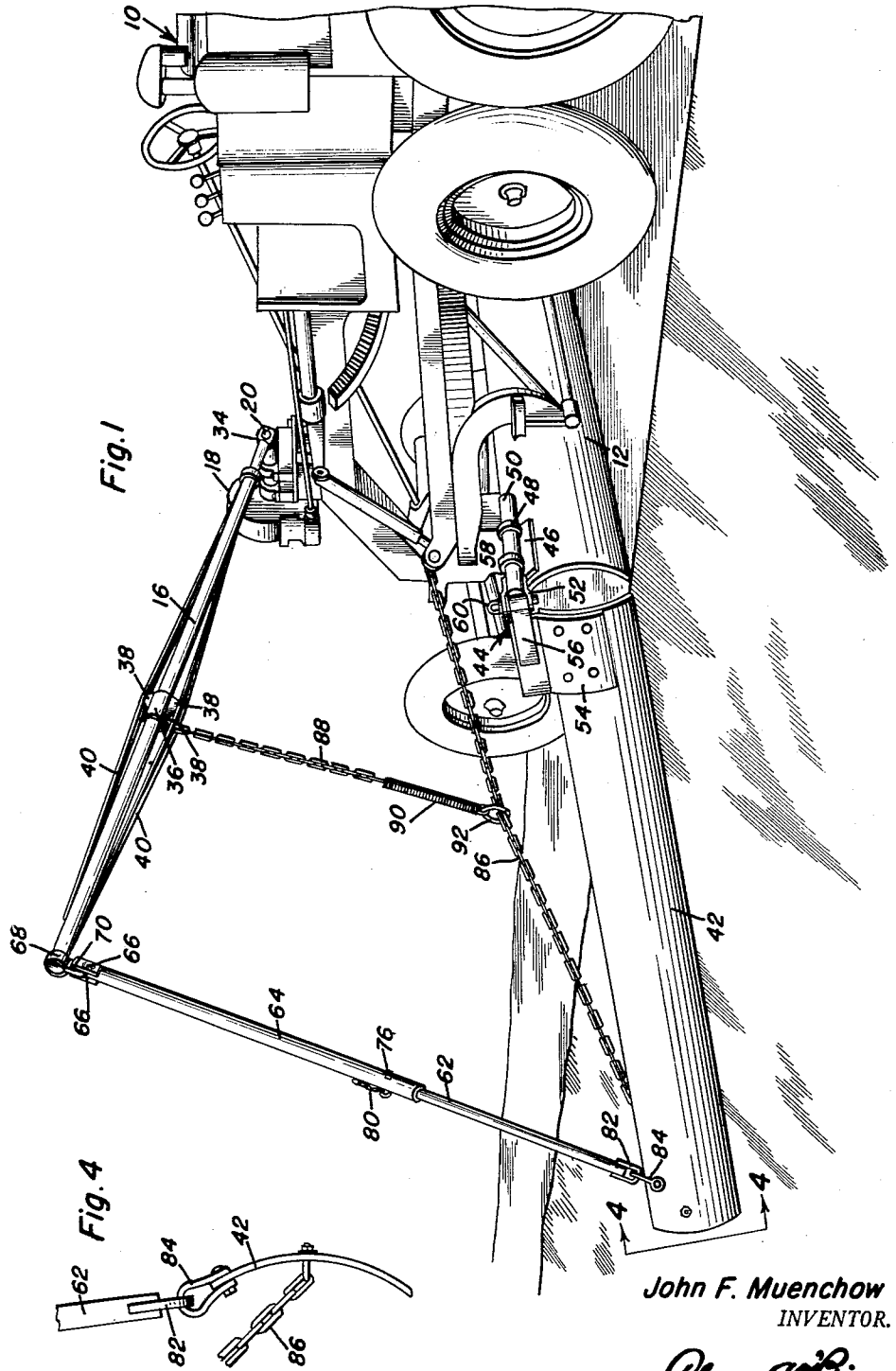


Fig. 1

Fig. 4

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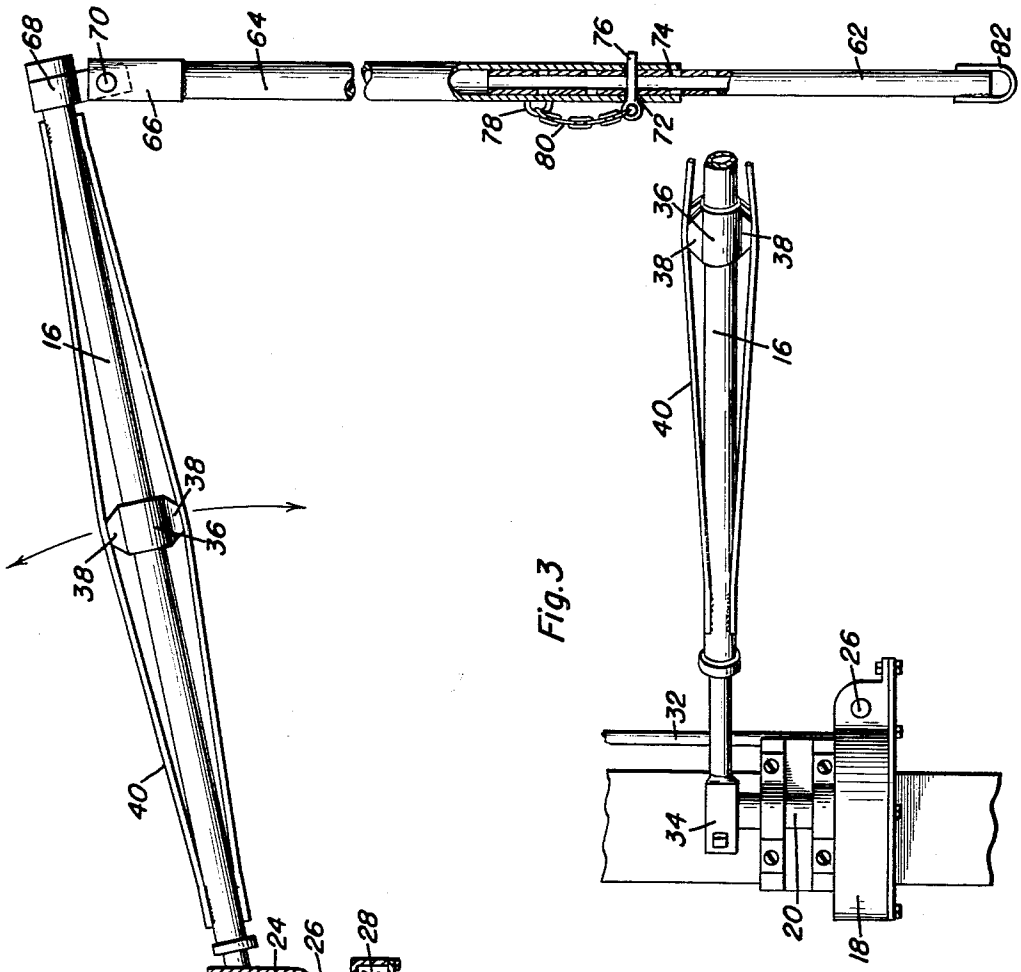


Fig. 2

Fig. 3

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SLOPING ATTACHMENT FOR GRADERS

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6 Claims. (Cl. 37—155)

This invention relates to new and useful improvements in road graders and the primary object of the present invention is to provide a sloping attachment for graders to permit the sloping of road banks and shoulders during the normal road grading operation.

Another important object of the present invention is to provide a sloping blade attachment for graders with a boom for raising and lowering the sloping blade and a novel and improved connecting and bracing means between the sloping blade and the boom and the grader frame.

A further object of the present invention is to provide a sloping blade that is connected at one end to the earth moving blade of a grader by a universal joint, a boom attached to the sloping blade for selectively raising and lowering the sloping blade, a flexible bracing member connecting the sloping blade to the frame of a grader, and a resilient hanger means between the boom and the flexible member to retain the flexible member tensioned or taut.

A still further aim of the present invention is to provide a device of the aforementioned character that is quickly and readily applied to and removed from a grader in a convenient manner and which is extremely strong and reliable in use, and efficient and durable in operation.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, references being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a perspective view of the present invention mounted on a grader;

Figure 2 is an elevational view of the boom, the raising and lowering means for the boom and the telescoped connector for forming the boom with a sloping blade, and with parts of the raising and lowering means and the connector broken away for the convenience of explanation;

Figure 3 is a plan view of Figure 2; and,

Figure 4 is a view taken substantially on the plane of section line 4—4 of Figure 1.

Referring now to the drawings in detail, wherein for the purpose of illustration, there is disclosed a preferred embodiment of the present invention, the numeral **10** represents a well known type of road grader having the usual earth moving blade **12** and the necessary means for angling and rotating the blade **12**.

A mechanism **14** is mounted on the grader frame for selectively raising and lowering a boom **16**. The mechanism **14** includes a housing **18** that rotatably supports a horizontally disposed driven shaft **20** on which there is mounted a gear **22**. The gear **22** meshes with a worm **24** mounted on a vertically disposed idler shaft **26** supported by the housing **18**. The shaft **26** supports a gear **28** that meshes with a worm **30** on a horizontally disposed power driven shaft **32**. A suitable clutch is operatively connected to the shaft **32** whereby the operation of the shaft **32** may be manually controlled to permit rotation of the shaft **20** clockwise or counterclockwise by the power plant of the grader.

One end of the boom **16** supports a clamp **34** that is clamped about the outwardly projecting end of the shaft **20**. A spider-like member **36** is fixed to the boom **16** intermediate the ends of the boom **16**. The radially projecting arms **38** of the member are fixed by welding or the like to the central portions of a plurality of elongated bracing and reinforcing rods **40** whose ends are fixed by welding or the like to the ends of the boom **16**.

The inner end of a sloping blade **42** is connected to one end of the earth moving blade **12** by a universal joint **44** more specifically disclosed in U. S. Patent No. 2,284,463 issued May 26, 1942. This joint **44** consists of a plate **46** welded to the blade **12** and supporting a pair of vertical bearing rings **48** that support a bar **50** having a bifurcated end **52**. Another plate **54** welded to the inner end of the blade **42** supports an arm **56** having an eye end **58** that enters the bifurcated end **52** and the ends **52** and **58** are joined by a vertical pin **60**.

A telescoped connector is provided between the outer end of the boom **16** and the outer end of the blade **42**. This connector consists of inner and outer slidably connected tubes **62** and **64**. The upper end of the tube **64** supports a pair of arms **66** that receive therebetween the ends of a split clamp **68**. The clamp **68** is disposed about the outer end of the boom **16** and the ends of the clamp **68** are secured to the arms **66** by a horizontal pivot **70**. The tube **64** is provided with an opening **72** for registering with one of a plurality of longitudinally spaced openings **74** in the tube **62** and a pin **76**, attached to an eye **78** on the tube **64** by a chain **80**, is extended through the opening **72** and a selected one of the openings **74** to adjust the tubes **62** and **64** longitudinally of each other.

The lower end of the tube **62** supports a rigid loop **84** attached to the outer end of the blade **42**. Through this construction, the outer end of the blade **42** may be selectively raised and lowered with respect to the outer end of the boom **16**.

Means is provided for connecting and bracing the blade **42** to the grader frame and to the boom and this means comprises a chain **86** that is terminally attached to the outer end of the blade **42** and to a forward portion of the grader **10**. A hanger chain **88** depends from the spider-like member **36** and its lower end is attached to the upper end of a coil spring **90** whose lower end supports a ring **92** that slidably receives the chain **86**.

It should be noted that the chain **86** takes the strain of the moldboard **12** and the chain **88** is for the purpose of taking slack out of chain **86** when the patrol is backing. The spring **90** assists in relieving the slack in chain **86** and the spring **90** is expanded or stretched when the patrol is moving forward whereas the spring **90** contracts when the patrol is moving rearwardly to keep chain **86** clear of the front wheel of the patrol. Chains **86** and **88** also relieve stress on blade **42**.

The downward swing of blade **42** is controlled by boom arm **64** and the further the boom arm **64** is extended, the further blade **42** is pulled forward by chain **86**. This is true unless chain **86** is adjusted on the patrol by lengthening chain **86** which would permit blade **42** to recede.

Housing **18** is a conventional part of the grader, however, the mechanism in housing **18** is altered to adapt it for the purpose disclosed. The mechanism in housing **18** normally controls the fifth wheel of the grader which changes the position of blade **12** from the horizontal to vertical and back. When the mechanism in housing **18** is rebuilt, as shown in the drawings, it will selectively raise and lower the boom **16**.

Having described the invention, what is claimed as new is:

1. In a grader including an earth moving blade, a bank sloper comprising a sloping blade having inner

and outer ends, a universal connection between the inner end of said sloping blade and one end of said earth moving blade, a vertically swingable boom mounted on the grader frame and overlying the sloping blade, an adjustable connection between said boom and the outer end of said sloping blade, a flexible connector between the sloping blade and the grader frame, means on the grader and operatively connected to the boom for selectively raising and lowering the boom, and a resilient connecting means between the flexible connector and the boom, said connecting means being slidably received on the flexible connector.

2. In a grader including an earth moving blade, a bank sloper comprising a sloping blade having inner and outer ends, a universal connection between the inner end of said sloping blade and one end of said earth moving blade, a vertically swingable boom mounted on the grader frame and overlying the sloping blade, an adjustable connection between said boom and the outer end of said sloping blade, a flexible connector between the sloping blade and the grader frame, means on the grader and operatively connected to the boom for selectively raising and lowering the boom, a flexible hanger depending from the boom, and a coil spring having an upper end attached to said hanger and a lower end slidably engaged with said flexible connector.

3. The combination of claim 1 wherein said adjustable connection includes a pair of slidably and adjustably connected tubes, means swiveling one of the tubes to the outer end of the sloping blade and means pivotally attaching the other tube to the boom.

4. In a road grader including a vertically movable boom and an earth moving blade; a sloping blade, a universal conection between one end of the sloping blade and the earth moving blade, a chain terminally attached to the sloping blade and the grader frame, a resilient connector between the boom and the chain preventing the chain from becoming slacked, and a telescoped connection between the sloping blade and the boom.

5. In a road grader including a vertically movable boom and an earth moving blade; a sloping blade, a universal connection between one end of the sloping blade and the earth moving blade, a chain terminally attached to the sloping blade and the grader frame, a resilient connector between the boom and the chain and slidably engaged with the chain, said resilient connector preventing the chain from becoming slacked, inner and outer slidably connected tubes, means swiveling the inner tube to the sloping blade, means pivotally attaching the outer tube to the boom, and means adjusting the tubes longitudinally of each other.

6. In a road grading apparatus including a frame, a vertically movable boom on the frame, an earth moving blade supported on the frame, a sloping blade, a universal connection between the earth moving blade and one end of the sloping blade, a chain terminally attached to the other end of the sloping blade and the frame, and a connection between the boom and the said other end of said sloping blade; the improvement of which comprises a hanger chain having an upper end secured to the boom, a coil spring having an upper end secured to the lower end of said hanger chain, and a ring element secured to the lower end of said spring slidably engaged about the first named chain.

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