March 19, 1968 W. M. RECORDS 3,373,571

APPARATUS FOR HANDLING STEEL FORMS IN TUNNELS

Filed Jan. 6, 1966 2 Sheets-Sheet 1

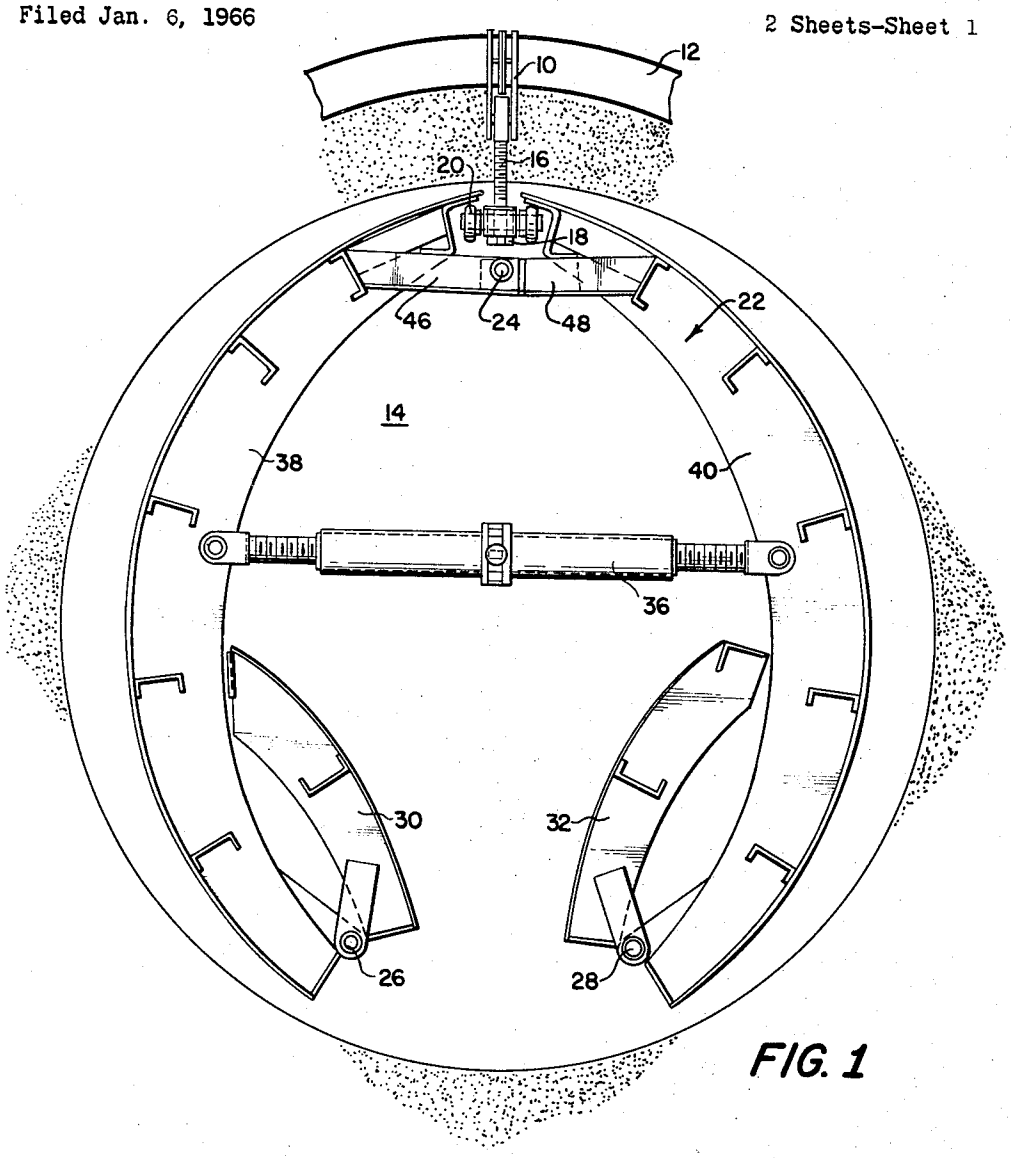


FIG. 1

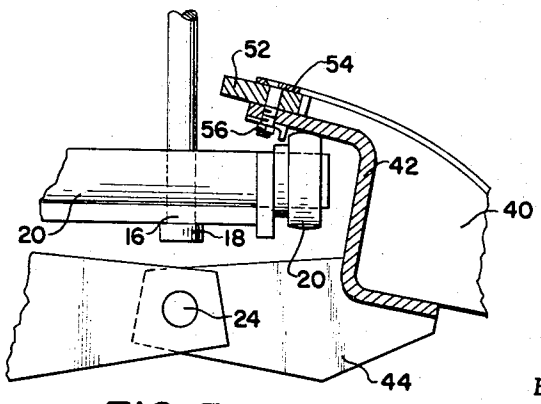


FIG. 3

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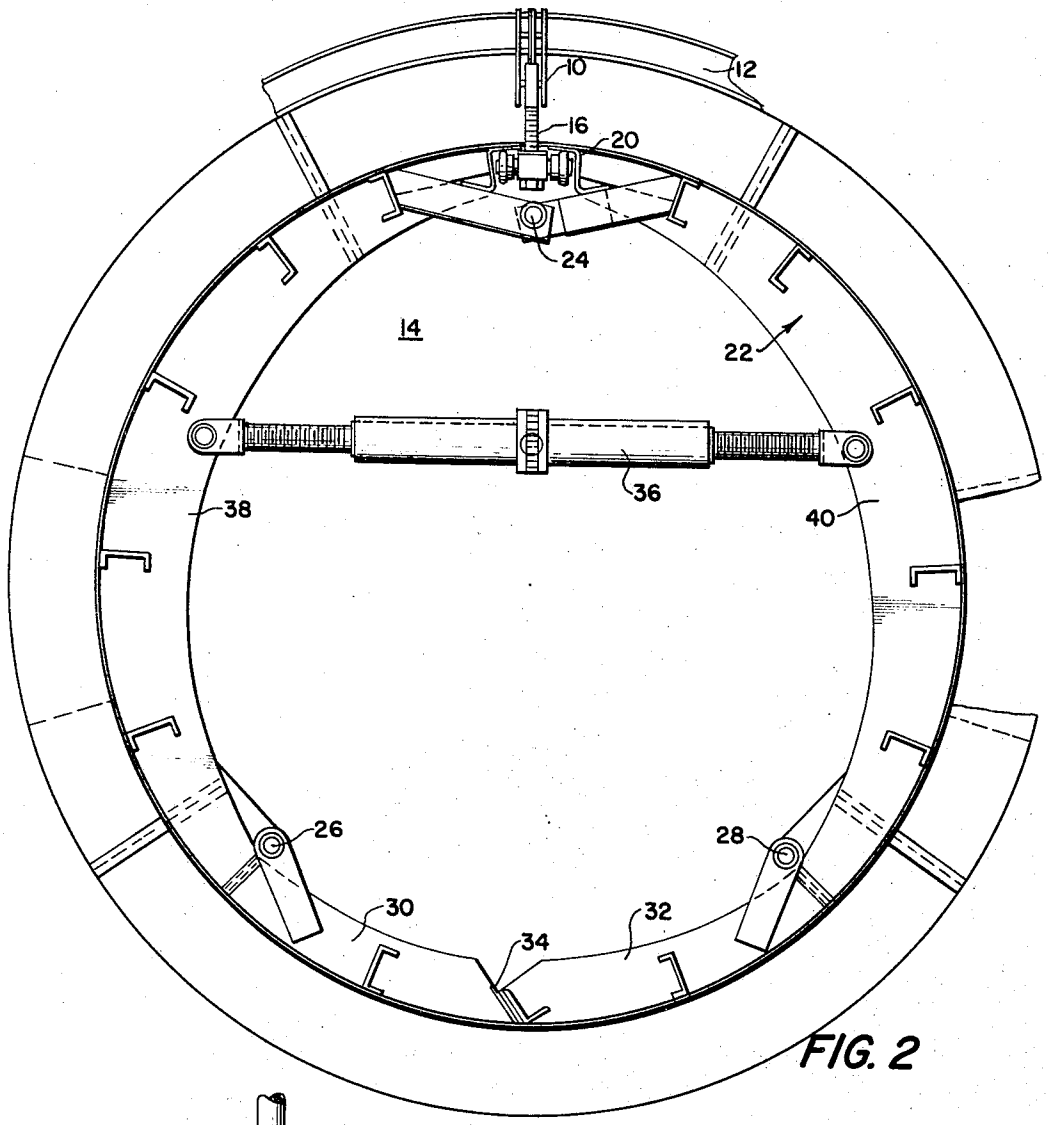


FIG. 2

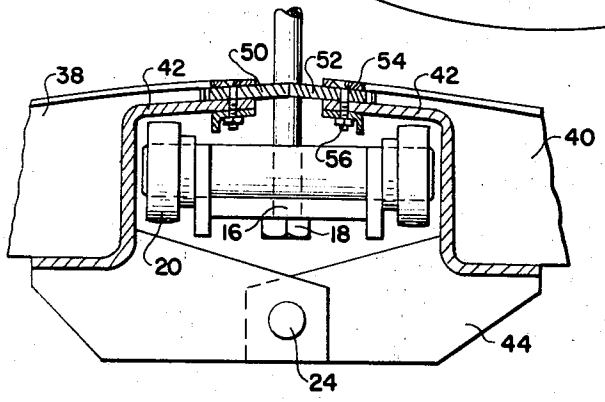


FIG. 4

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APPARATUS FOR HANDLING STEEL FORMS IN TUNNELS

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1 Claim. (Cl. 61—84)

ABSTRACT OF THE DISCLOSURE

Concrete forms, particularly collapsible steel forms movable longitudinally upon rollers in tunnel construction.

Summary of the invention

A system for moving and setting steel forms in a tunnel, utilizing minimum peripheral space and enabling longitudinal movement of the collapsed forms upon rollers. The system includes a vertically extending hanger suspended from the top of the tunnel and supporting a plurality of rollers upon which the collapsible forms are suspended and a stripping ratchet interconnecting the form elements so as to radially expand the elements for pouring of concrete and to radially inwardly collapse the forms for stripping. As the forms are collapsed they engage the roller assemblies and upon which they are moved longitudinally within the tunnel for re-setting.

The present invention relates generally to the handling of steel forms in tunnels and particularly to an apparatus capable of moving and setting steel forms while utilizing minimum tunnel space.

Numerous inventors, such as Wolfe (Patent No. 1,292,203), O'Rourke (Patent No. 1,382,668), Jessen (Patent No. 2,547,946), Bossner (Patent No. 2,870,518), Card (Patent No. 3,022,562), Clark (Patent No. 3,075,359) and Cunningham (Patent No. 3,169,376), have addressed themselves to the problem of moving and setting steel forms in tunnels and aqueducts. Conventionally, a carriage or traveler equipped with wheels which run on rails laid on invert or on finished concrete is used, which collapses the forms and moves them to their new position. The primary disadvantage of such wheeled carriage arrangements is the amount of room or space taken up in tunnel which, of course, is always at a premium. With the present invention, considerable room for the passage of men and material through the concrete forms remains.

Accordingly, it is an object of the present invention to permit the moving and setting of steel forms in tunnels with a construction characterized by its simplicity in construction.

Another object of the present invention is to permit the moving and setting of steel forms with a construction designed to minimize space requirements.

Still a further object of the present invention is to support steel forms during movement and setting from a simple roller assembly located at top of the tunnel thus permitting passage of men and material through the forms.

Still another object of the present invention is to provide forms with simple hinge construction allowing maximum space for passage of men and material while permitting concrete to be pumped into the tunnel forms at centerline.

Other objects will become apparent from the ensuing specification and attached drawings, wherein:

FIG. 1 is a section view illustrating the form in traveling position;

FIG. 2 is a section view illustrating the form in pouring position;

FIG. 3 is an enlarged section view illustrating details of the roller assembly and the form in collapsed position; and

FIG. 4 is section view illustrating details of the roller assembly and the form in concreting position.

As seen in FIG. 1, the present system consists of a plurality of hangers **10** which are fastened to supporting ring beams **12** within tunnel **14**. Attached to the threaded lower portions **16** of hangers **10** with bolts **18** are roller assemblies **20**. During movement, forms **22** are collapsed and fed onto rollers **20**, their weight, importantly, being supported entirely by rollers **20**.

While forms **22** are being concreted, as seen in FIG. 2, rollers **20** remain in place to form a finished portion of tunnel **14** thus supporting forms **22** in the finished section when they are being moved out.

Forms **22** each include a top hinge **24** located directly below rollers **20** and side hinges **26** and **28** enabling assembly of lower segments **30** and **32** of forms **22**, engagement occuring along stripping joint **34** when assuming the pouring position of FIG. 2. Of course, stripping ratchet **36** enables extension of upper segments **38** and **40** of forms **22**. As seen more clearly in FIGS. 1 and 3, hinge **24** is located in such position that when forms **22** are collapsed, a gap appears through which hanger rods **10** may pass. In some instances it may be necessary to have two hinges, in which case the broad technique will be similar, continuing to permit concrete to be pumped into tunnel forms **22** at centerline. Of course, the concreting operation may simply consist of holes drilled through the earth downward to the center of forms **22**. Therefore, it is not necessary to offset hangers **10**.

While FIG. 3 illustrates upper segment **40** of forms **22** in collapsed position, FIG. 4 shows upper segments **38** and **40** during concreting position. Note the angular disposition of flange **42** of leg **44** while forms **22** are in collapsed position, as contrasted to the horizontal position of flange **42** during assumption of concreting position. As further seen in FIG. 4, rubber sealing strips **50** and **52** span openings between opposed flanges **42** and are held in place with plate clamps **54** and bolt assemblies **56**.

Manifestly, variation in design and arrangement of parts may be employed without departing from the spirit and scope of this invention as defined by the sub-joined claim.

I claim:

1. A system for moving and setting forms in a tunnel, comprising:

(A) hanger arrangement means attached to and suspended from portions of the top of said tunnel;

(B) roller assemblies mounted upon said hanger means; and

(C) collapsible forms suspended from said roller assemblies, including:

(i) four segments held in rotating relationship with respect to each other about a first top hinge and second side hinges;

(ii) supporting means extending circumferentially towards each other from said first two segments about said first top hinge, such that a gap is defined in said forms through which said hanger arrangement means may pass and;

(D) a stripping ratchet interconnecting said first two segments, such as to radially expand said segments and close said gap above said rollers during pour-

ing and to radially contract said first two segments, so that said supporting means are supported upon said rollers during movement of said forms.

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