

No. 644,327.

Patented Feb. 27, 1900.

L. L. KNOX.  
SCAFFOLDING.

(Application filed May 8, 1899.)

(No Model.)

2 Sheets—Sheet 1.

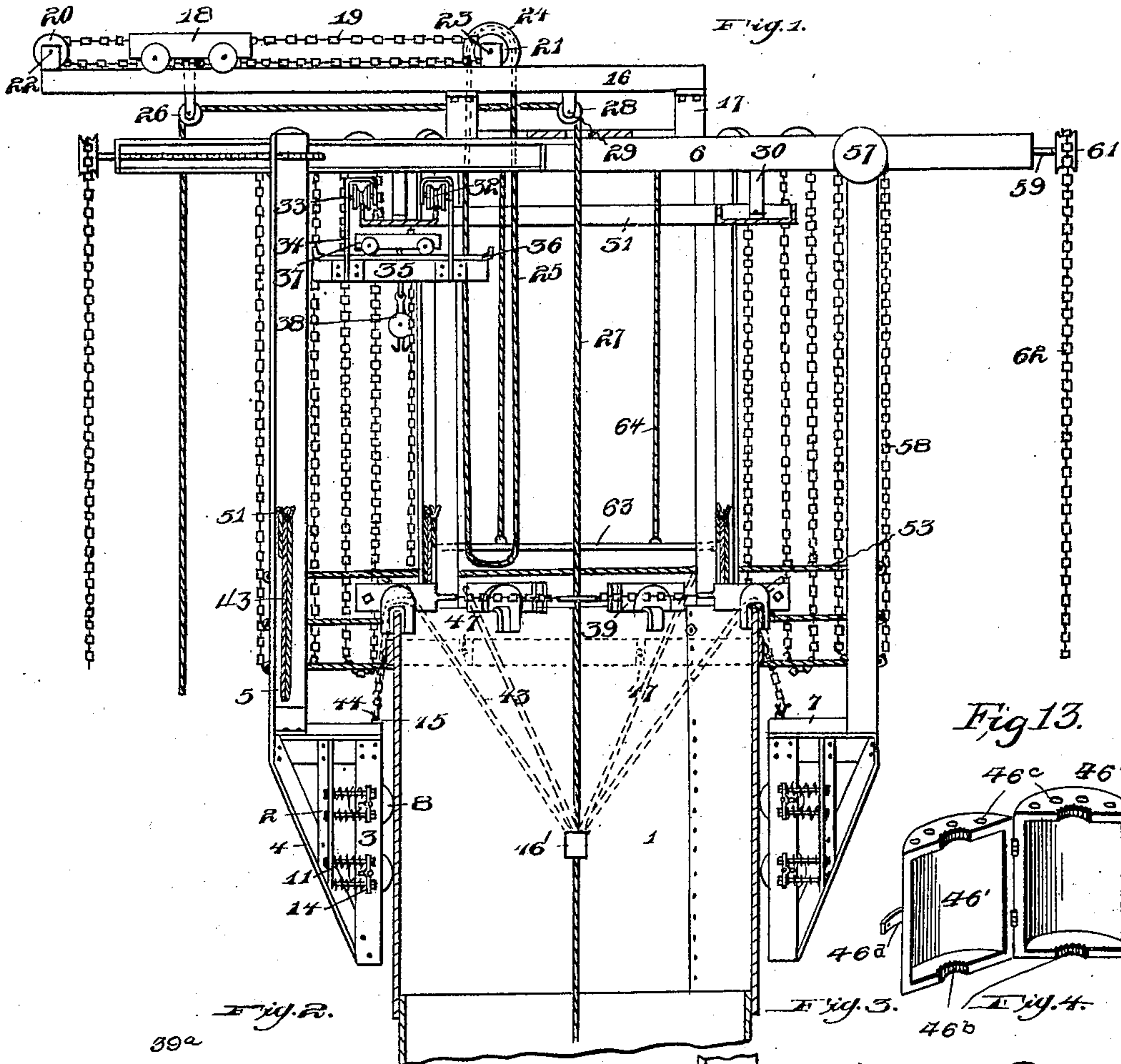


Fig. 13.

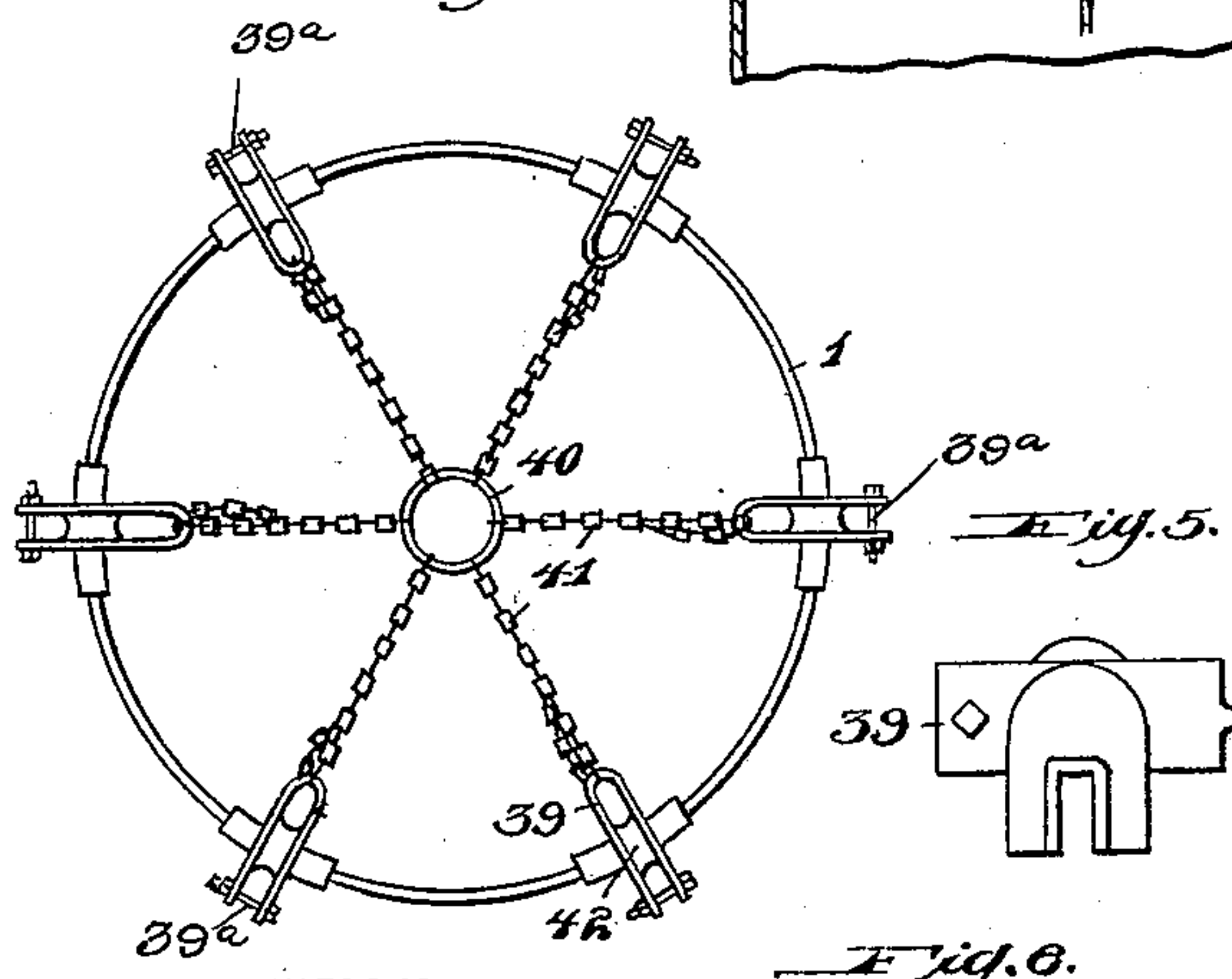
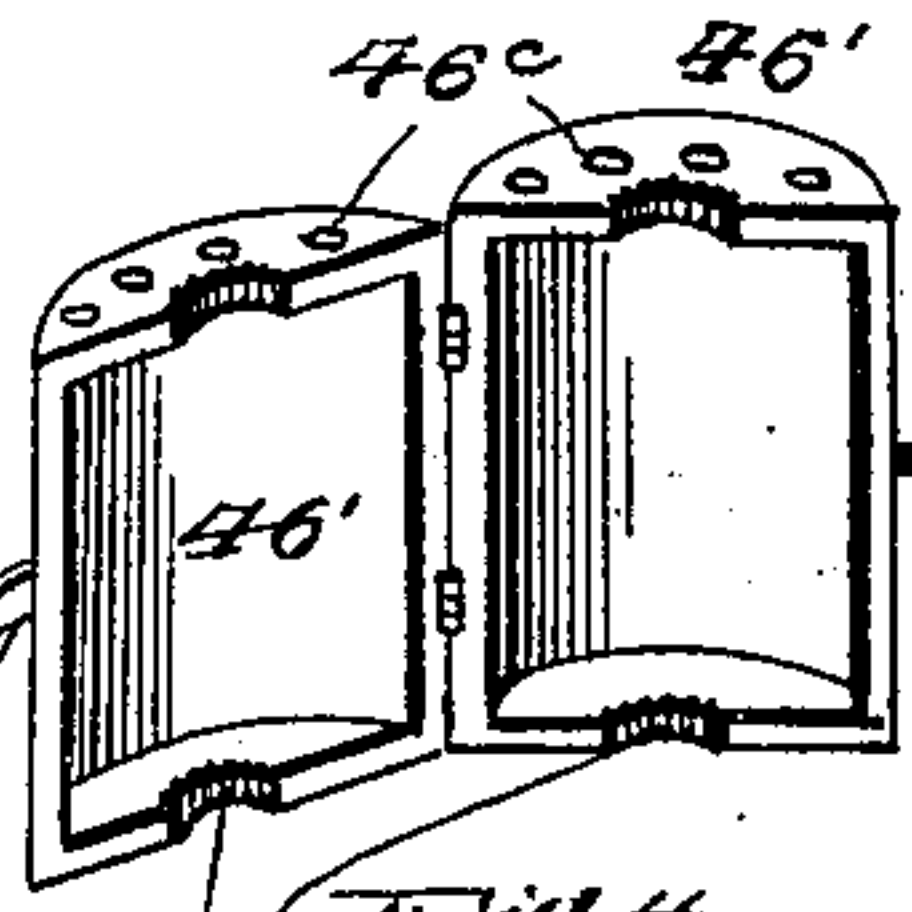


Fig. 6.

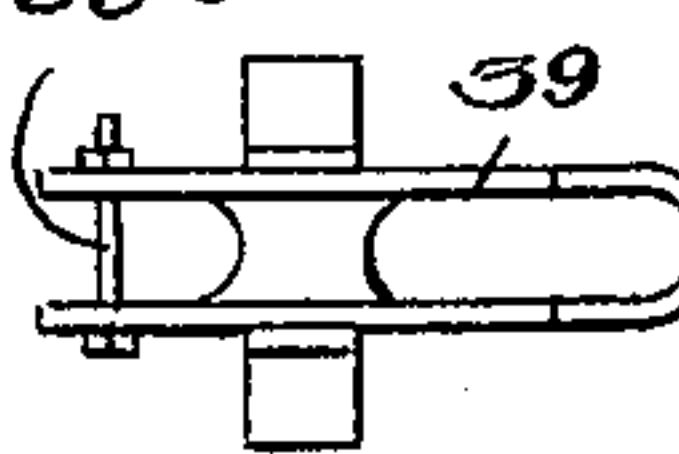
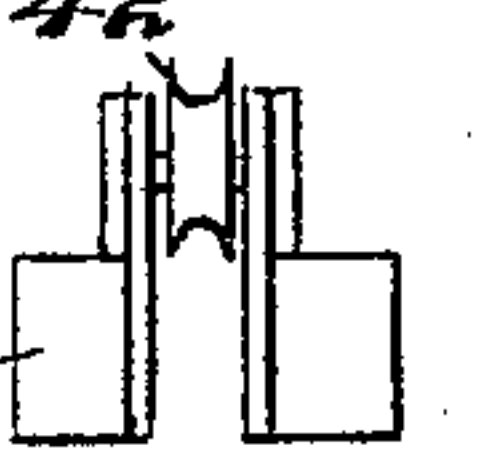


Fig. 7.



WITNESSES:  
*J. P. Appleman.*  
*A. M. Haymaker*

INVENTOR  
*L. L. Knox.*

BY  
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ATTORNEYS.

No. 644,327.

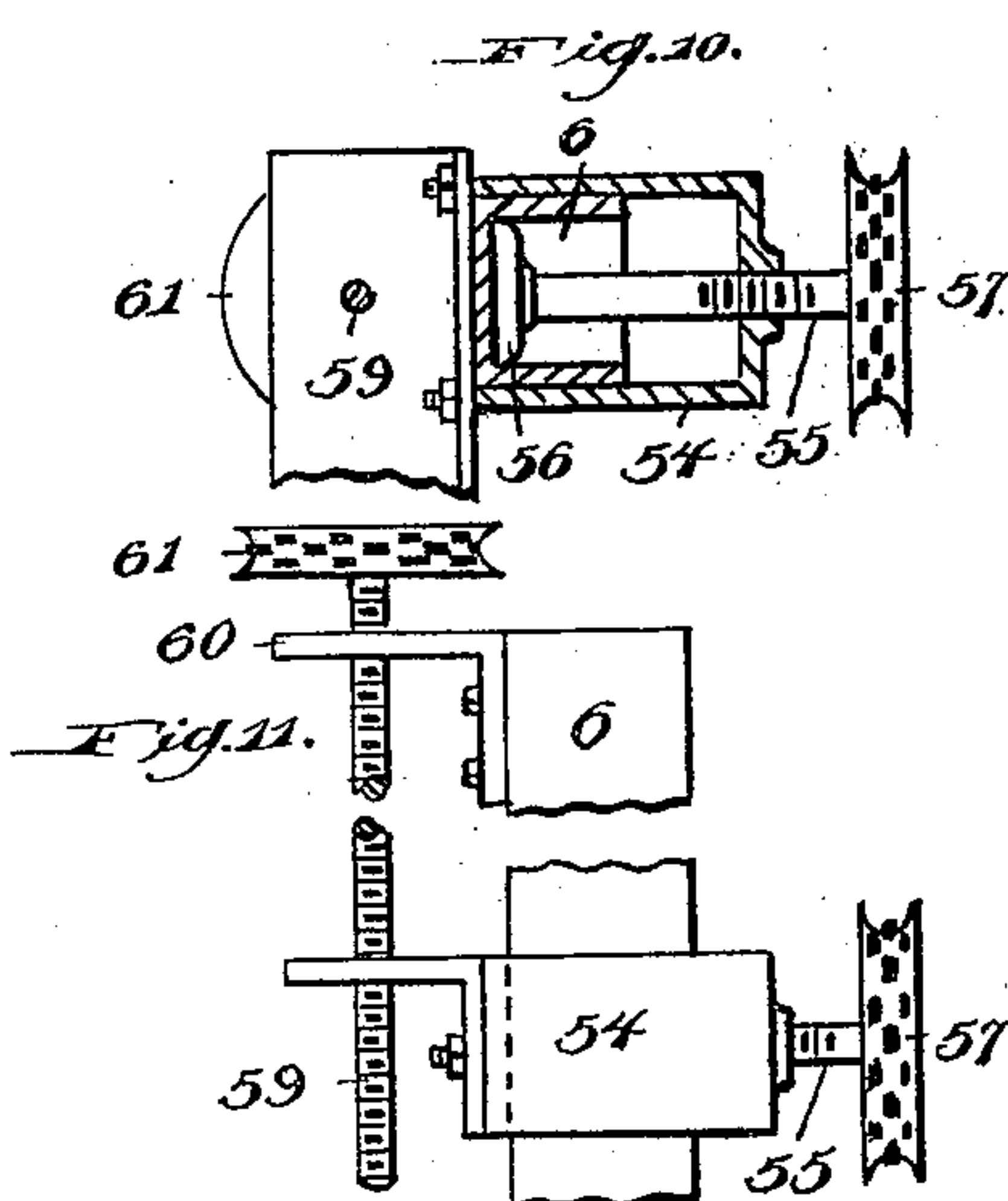
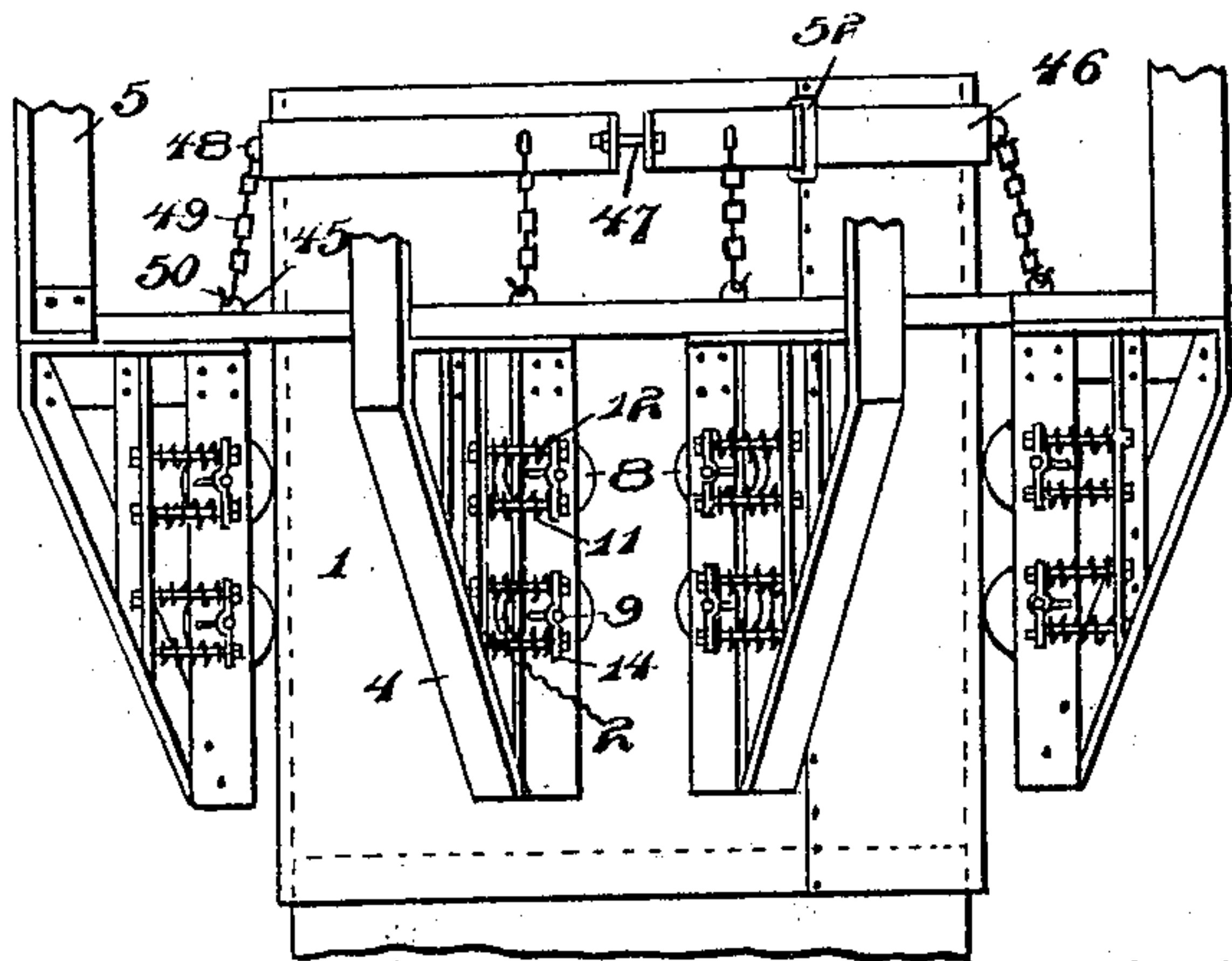
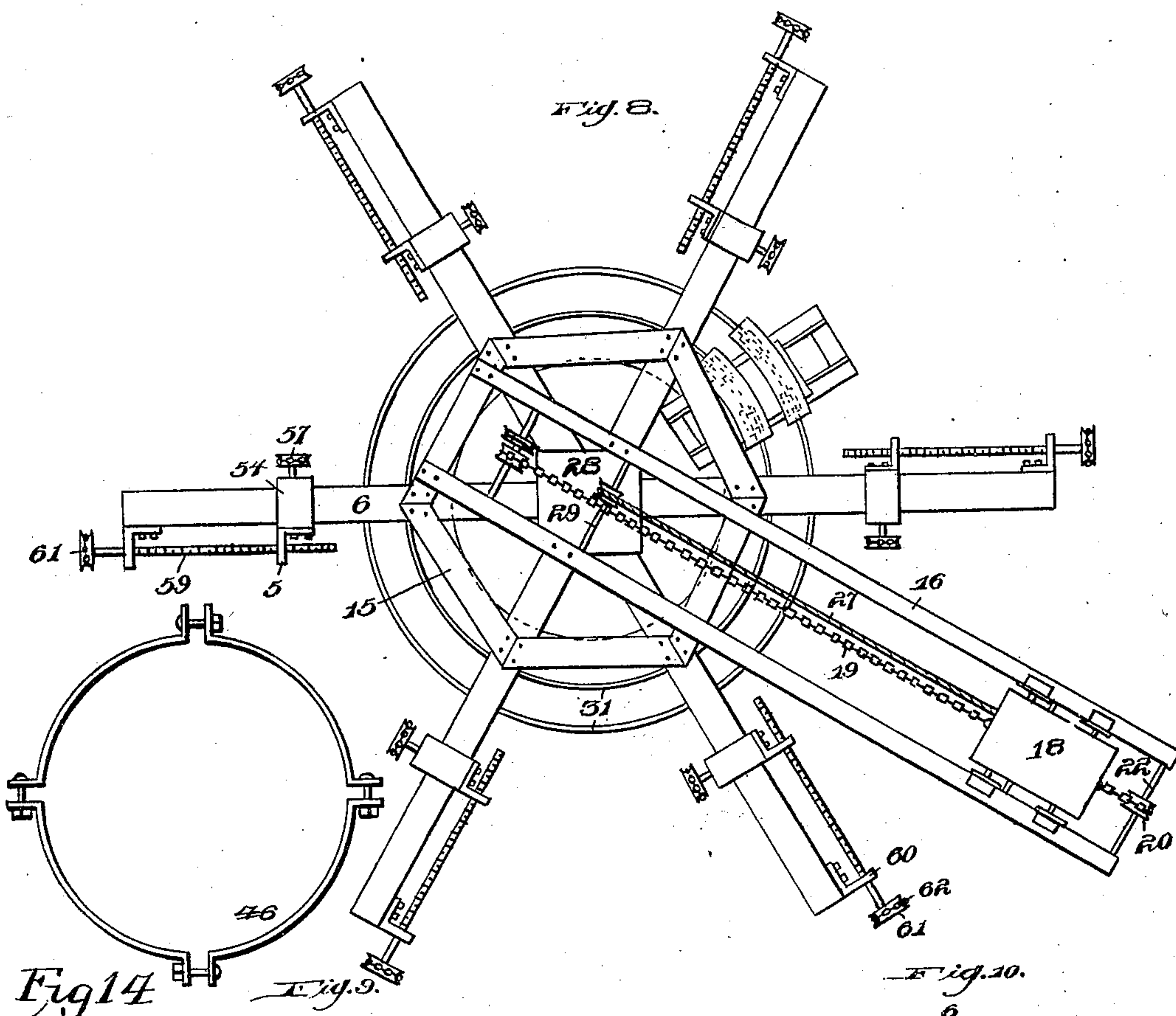
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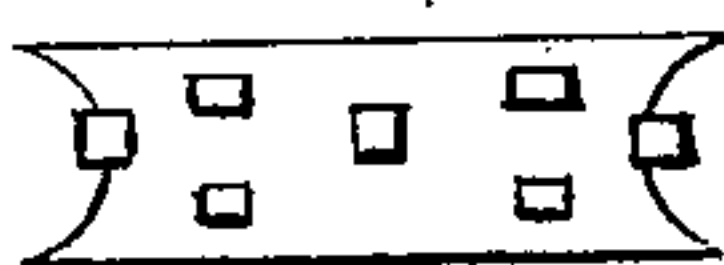
2 Sheets—Sheet 2.



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Fig. 12.



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# UNITED STATES PATENT OFFICE.

LUTHER L. KNOX, OF PITTSBURG, PENNSYLVANIA.

## SCAFFOLDING.

SPECIFICATION forming part of Letters Patent No. 644,327, dated February 27, 1900.

Application filed May 8, 1899. Serial No. 715,942. (No model.)

*To all whom it may concern:*

Be it known that I, LUTHER L. KNOX, a citizen of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Scaffolding, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in scaffolding, and it relates particularly to that class of scaffolding employed in the construction of chimneys, stacks, shafts of all descriptions, and the like.

One object of the invention is to construct a scaffold that may be supported from the chimney, stack, shaft, or the like direct without any support from the ground.

A further object of the invention is to construct a scaffold of this character having a traveling crane and a fall-line by means of which the material from which the chimney, stack, shaft, or the like is being built may be elevated and swung to the desired position for securing.

A still further object is to provide means for adjusting the scaffold or elevating the same as the height of the chimney, stack, or shaft increases, together with means for suspending the scaffold from the top of the chimney, stack, or shaft while the same is being elevated.

Briefly described, my invention consists of a series of brackets adapted to be arranged circumferentially around the stack or the like and each of which carries an upright or standard which supports a channel-bar. Arranged above the series of channel-bars are a track and traveling crane, to which the fall-line, by means of which the material is hoisted to position, is attached. Suspended from the channel-bars is a circular track, and from this circular track a carrier is suspended, by means of which the material is carried around the shaft or other object to the position desired. This latter carrier consists of a transversely-extending track having a buggy thereon, to which is attached a snatch-block, grip, or the like, by means of which the material may, after having been moved around the stack or other object, be adjusted into position. The series of supporting-brackets are each pro-

vided with spring-actuated rollers adapted to contact with the exterior of the stack or other object to permit the vertical adjustment of the brackets and allow the same to pass readily over the seams of the stack or over the rivets when the stack is being built of sheet-iron or the like. These brackets have the working platform arranged thereon, and they are supported from a split band or ring attached to the stack. When it is desired to adjust the scaffold, these brackets are detached from the supporting band or ring and are connected to a series of clamps attached to the top of the stack or chimney, the said clamps being in turn connected by chains or cables to the fall-line in order that when the latter is operated the brackets and entire scaffold will be elevated and when adjusted to the position desired are again suspended from the band or ring which has previously been adjusted upon the stack or chimney.

The various features of construction embodied in my invention by means of which the objects sought are obtained will be hereinafter more specifically described and then particularly pointed out in the claims, and in describing the invention in detail reference will be had to the accompanying drawings, forming a part of this specification, and wherein like numerals of reference indicate corresponding parts throughout the several views, in which—

Figure 1 is a vertical sectional view of my improved scaffold, showing the same suspended from the top of a stack, the latter being partly broken away. Fig. 2 is a top plan view of a stack, showing the clamps by means of which the scaffold is elevated attached thereto. Fig. 3 is a side view of one of the brackets. Fig. 4 is an edge view of the same. Figs. 5, 6, and 7 are detail plan views of the clamps which are attached to the top of a stack for elevating the scaffold. Fig. 8 is a top plan view of the scaffold. Fig. 9 is a side view of a portion of the stack, showing the scaffold suspended therefrom and partly broken away. Fig. 10 is a detail view of a part of one of the channel-bars, showing in section the adjusting means for the brackets. Fig. 11 is a detail view of a part of one of the channel-bars and the adjusting means for the brackets. Fig. 12 is a detail view of one of the sheave-



wheels. Fig. 13 is a perspective view of the clamp which is attached to the fall-line when it is desired to elevate the scaffold. Fig. 14 is a top plan view of the supplemental split band or ring for supporting the scaffold from the stack or the like.

Referring to the drawings by reference-numerals, 1 indicates the stack of a chimney, which in the drawings has been shown as constructed of sheet-iron or the like, being composed of a series of plates securely riveted together in the usual manner. I have shown a stack of this form, as my invention is particularly adapted to this class of work, though it is applicable to all forms of stacks, chimneys, or the like. For the purpose of clearly illustrating the construction, however, I will describe the stack of this form, and I arrange around the same a series of brackets 2, as many of which may be employed as desired. These brackets for cheapness in construction may be composed of ordinary angle-iron and are somewhat triangular-shaped when viewed in side elevation, the inner strips 3 being vertical and the outer strips 4 being at an angle of substantially forty-five degrees at the bracket proper and from the top of the bracket extending upward vertically and forming a standard 5, from which the channel-bars 6 are supported. On the top of the bracket proper is arranged a wooden strip 7, to which the working platform may be securely nailed.

Journaled between the two vertical angle-strips 3 of each bracket is one or more rollers 8, the shaft 9 of which operates in an oblong slot 10, provided in the strips 3, and which allows a lateral movement of these rollers and permits of the same readily passing over the seams or rivets of the stack. The rollers are held in frictional contact with the exterior wall of the stack by means of the tension-springs 11, which are arranged on rods 12, connected at one end to one of the angle-strips from which the brackets are formed and at their other end operating in a cross-head 14, which abuts against the shaft 9 of the rollers.

The channel-bars 6 extend radially from the central vertical line of the scaffold, and they may be connected together by stiffening-braces 15, formed of channel-bars or the like, riveted or firmly bolted thereto. Arranged above these channel-bars 6 is a track 16, which is supported either by brackets 17 or in any suitable manner, and for making the same secure the same is preferably bolted or riveted to the stiffening-braces 15. This track acts as the cantaliver for the fall-line and also constitutes a part of the traveling crane by means of which the material is moved toward the stack after having been hoisted by the fall-line, and has arranged thereon a truck 18, to which is connected an operating-chain 19, one end of said chain being connected to either end of the track, and the end-less chain thus formed operating over sheave-wheels 20 and 21, mounted on shafts 22 and 23, the former near the free or extending end

of the track and the latter near the rear end. A sheave-wheel 24 is also mounted upon the shaft 23 and is adapted to receive an endless cord, cable, or chain 25, which extends downwardly in close proximity to the working platform in order that the workmen thereon can readily operate the truck or crane upon the track 16. This truck or crane 18 carries a pulley 26 to receive the fall-line 27, the said line also passing over the pulley or roller 28, arranged on a shaft 29, journaled in the tracks 16 at a point centrally of the scaffold, in order that the fall-line may extend downwardly through the stack 1 at a point at or near its center. This fall-line is adapted to be operated from the ground by means of a windlass (not shown) or in any other suitable and well-known manner. Suspended from the channel-bars 6 by brackets 30 or other suitable means is a circular track 31, which may be formed of ordinary channel-iron, the said flanges thereof acting as the rails of the track. Upon each of these rails is mounted a pair of peripherally-grooved wheels or rollers 32, mounted on shafts 33, which are journaled in hangers 34. These hangers 34 are connected at their lower ends to a transversely-extending platform 35, upon which are mounted track-rails 36 to receive the buggy 37. The ends of the rails 36 are bent upwardly to form stops or buffers to limit the movement of the buggy on the track and to retain the same thereon. Suspended from this buggy 37 is a snatch-block 38, carrying hooks to engage in the apertures of the plate from which the stack is being constructed.

In order to support the scaffold from the stack while elevating the same, I provide a series of clamps 39, adapted to fit over the top edge of the stack and each connected to a central ring 40 by chains 41 or other suitable means, which form a brace and prevent the slipping of any of the clamps in case undue strain is brought to bear upon one of the same. These clamps 39 each have a sheave wheel or pulley 42 journaled therein to receive a hoisting cord, cable, or chain 43, the one end of each of these cords, chains, or cables carrying a hook 44 to engage in a U-shaped bolt 45, secured in the brackets 2, and the other end of each cord, chain, or cable being connected to a common clamp 46', which is secured to the fall-line 27. This clamp may be of any desired form of construction, though in Fig. 13 I illustrate one form which consists of two hinged sections, which are provided with the openings 46<sup>b</sup> in top and bottom and in the top with openings 46<sup>c</sup> for securing the lower ends of the cords or chains 43 to the clamp. The two sections are fastened together when engaged on the fall-line by a clasp 46<sup>d</sup> or other suitable means. The walls of the openings 46<sup>b</sup> are preferably serrated, so that the clamp will firmly engage the fall-line. When thus connected and the fall-line 27 is operated, it will be observed that the cords, chains, or cables 43



will elevate the scaffolding, and when raised to the desired height the brackets are supported from the exterior wall of the stack, as will now be described. For this purpose I provide a split band 46, preferably made in several sections, with the ends of each section flanged to receive securing-bolts 47. These sections carry staples 48, having chains 49 connected thereto, the other end of said chains carrying a hook 50 to engage in the U-shaped bolt 45 of the brackets. When the scaffold has been suspended from the stack in this manner, the cords or cables 43 are detached from the U-shaped bolts 45, the clamp 46' detached from the fall-line, and these cords or cables 43, their clamp 46', and the clamp 39, hung from the supporting-hook 51, secured in the standards 5.

In order to make the support for the scaffold secure and not depend solely upon the engagement of the sectional band with the stack, I provide U-shaped clamps or keepers 52, the ends of which are screw-threaded and are inserted in rivet-holes left therefor when riveting the sheets together. Nuts are placed upon these screw-threaded ends to hold the keepers 52 in position, and when the scaffold is again supported from the clamps 39 and cables or chains 43 these U-shaped keepers are removed and the rivets then placed in position in these two remaining apertures. I preferably provide two of these split bands in order that one may be placed in position upon the last ring that has been placed on the stack, thus permitting the ready attaching thereto of the platform when the scaffold is elevated, as heretofore described, by the fall-line. The split band that was previously used may be detached and placed upon the working platform and used for the succeeding tier. I preferably shield the workmen upon this working platform by providing a series of ropes or cable 53, surrounding the standards 5 and connected thereto for any desired distance above the platform, as shown in Fig. 1 of the drawings.

In order to allow for the taper of the stack being constructed and permit the brackets to remain in a vertical position, with their rollers contacting with the exterior of the stack as the taper of the latter increases, I provide adjusting means for these brackets, which consists of a U-shaped clamp-screw 54, bolted or riveted to the angle-strip from which the standards 5 are formed and which engages the channel-bars 6. This clamp 54 has threaded therein a rod 55, carrying a head 56 on its inner end to engage the channel-bar 6 and lock the clamp-screw in position. Upon the outer end of the rod is mounted a sheave-wheel 57, operated by an endless chain 58, extending down in close proximity to the working platform, so that the clamp-screw may be readily loosened or tightened by the workmen thereon. When loosened, the clamp-screw 54 is adjusted longitudinally of the

channel-bar 6 by the adjusting-screw 59, operating in a bracket 60, secured to the channel-bars 6 and through the vertical standards 5. This screw 59 has a sheave 61 mounted on its outer end and is operated by an endless chain 62, which hangs downwardly some distance outside of the working platform, where it may be readily engaged and operated by the workmen.

The snatch-block or other supporting device which is suspended from the buggy 37 may be employed after the plate or sheet is placed in position for suspending the riveter, which may be moved around the stack as occasion demands.

The operation of the device is as follows: We will assume that the scaffold has been secured to or is suspended from the stack 1 in the manner shown in Fig. 9 of the drawings. It will be observed in this view that the split band 46 is placed on the stack a slight distance below the top of the last tier in order that when the sheets of the succeeding tier are elevated to position clearance enough is provided for riveting the sheets in position. The plate or sheet is elevated by attaching thereto a fall-line 27 and operating the said fall-line by windlass or other suitable means until such time as the plate or sheet has been elevated to a point opposite the snatch-block or other suspending device which is carried by the buggy 37. When the plate or sheet has been elevated to this height, the workman operates the endless cord, chain, or cable 25, thereby moving the truck 18 toward the rear end of its track and bringing the plate or sheet over into position where it may be engaged by the device suspended from the buggy 37 and the fall-line detached therefrom. When thus suspended from the buggy 37, it may be moved around upon the circular track 31 to the position desired on the stack and securely riveted. When all the plates or sheets forming one tier have thus been placed in position, the supplemental split band 46, which, as heretofore stated, is usually kept on the working platform, is placed in the same relative position upon the last ring added to the stack as the band 46 occupies upon the preceding tier. The clamps 39 are then placed in position upon the stack, as shown in Figs. 1 and 2 of the drawings, the clamp 46' is attached to the fall-line, and the ends of the cords or cables 43 are connected to the U-shaped bolts 45 of the brackets. Upon elevating the fall-line when these cords or cables are so attached the chains 49 may be detached from the U-shaped bolts 45 and the entire scaffold elevated to a position where the chains 49 on the upper split band may then be attached to the U-shaped bolts 45, which will again suspend the scaffold from the stack in the manner shown in Fig. 9. The cords or cables 43, the clamp 46', and the clamps 39 are then detached and hung upon their supporting-hooks 51, and the



scaffold is again in position to place another ring or tier upon the stack. This operation is carried out until the stack is completed.

The means by which the brackets or standards are adjusted, so as to at all times have the same in a vertical position, will, it is thought, be readily apparent from the foregoing description of these parts.

A cage 63 is suspended from the cords or cables 64, attached to the channel-bars 6. This cage is used by the riveter on the inside of the stack or chimney, and it may be so arranged with block and tackle as to be adjustable by the workmen as desired.

If desired, I may dispense with the cords or cables 43 and elevate the scaffold by ordinary hoisting blocks and clamps connected direct to the bolts 39<sup>a</sup>, carried by the clamps 39, and to the U-shaped bolts 45. These hoists, it will be observed, may readily be operated by the workmen from the working platform.

It will be noted that various changes may be made in the details of construction without departing from the general spirit of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a scaffold, the combination with a series of brackets and vertical standards, of a support connected to each of said standards, a circular track suspended from the said supports, and means for supporting said scaffold from the exterior of a stack or the like, substantially as described.

2. In combination with a stack or like structure, a series of brackets carrying spring-actuated friction-rollers arranged circumferentially around said structure, a working platform arranged on said brackets, and means for supporting the brackets and platform from the exterior of the structure, substantially as described.

3. In combination with a stack or like structure, a series of supporting-brackets and a working platform, a traveling crane supported by said brackets, a fall-line connected to said crane, means supported by the brackets for adjusting the material after disengagement from the fall-line, and means for supporting said brackets directly from the stack or like structure, substantially as described.

4. In a scaffold adapted for constructing stacks, chimneys and the like, the combination of a series of brackets with a working platform thereon, a crane supported from the brackets, a circular track and a transverse track supported from the circular track, a fall-line supported from the crane, means capable of being connected to said fall-line for elevating the scaffold, and means supported direct from the stack or chimney for supporting the scaffold, substantially as described.

5. In a scaffold of the class described, a series of supporting-brackets with a working platform thereon, spring-actuated friction-

rollers suitably mounted in the said brackets combined with means comprising a band engaging the exterior of the stack and detachably connected to the brackets for supporting the latter and the working platform, substantially as described.

6. In a scaffold, the combination with a working platform arranged around a stack or chimney, of a crane and a fall-line, means capable of being connected to the fall-line and to the stack or chimney for elevating the working platform, and means connected to the working platform and to the stack or chimney for supporting the working platform direct therefrom, substantially as described.

7. In a scaffold, the combination with a stack or like structure, of a series of brackets and means for adjusting said brackets to the exterior of the stack or like structure, means capable of being connected to the stack or like structure and to the brackets for adjusting the latter vertically, and means connected to and supported direct from the stack for supporting the brackets, substantially as described.

8. In a scaffold, the combination with a stack or like structure, of a series of brackets arranged around said stack or like structure and supported direct therefrom, a working platform arranged on the brackets, spring-pressed rollers carried by the brackets, and means connected to the brackets and to the stack or like structure for elevating the brackets and working platform, substantially as described.

9. In combination, a series of brackets carrying a working platform, a crane, a fall-line, a circular track, a buggy or carrier traveling thereon, means for adjusting the brackets vertically, and means for supporting the same direct from a stack or like structure, substantially as described.

10. In a scaffold, the combination with a series of supporting-brackets carrying a series of spring-actuated friction-rollers, a working platform arranged on the said brackets, of a crane and fall-line, and means connected to the working platform and to a stack or like structure for supporting the working platform, substantially as set forth.

11. In a scaffold, the combination with a working platform arranged around a stack or like structure, of a crane and fall-line, means capable of being connected to the fall-line and structure for elevating the working platform, means for supporting the platform when not in use from the top of the structure, and separate means for supporting the platform when in use from the exterior of the structure, substantially as described.

12. In a scaffold, the combination of the supports with the working platform thereon, of the standards carried by said supports, bars supported from said standards, a circular track supported from said bars, a transversely-extending track supported from said circular track, and means connected to the



working platform and to a stack or like structure for supporting the working platform therefrom, substantially as described.

13. In a scaffold, the combination of a working platform, a crane and a fall-line, a circular track and a transversely-extending track supported therefrom, a buggy or carrier supported from said transversely-extending track, means connected to the working platform and to a stack or like structure for supporting the platform therefrom, and means for adjusting said platform vertically, substantially as described.

14. In a scaffold, the combination of a working platform, a crane and a fall-line, a carrier supported on said crane and means for operating said carrier, a circular track supported below the crane, and a transversely-extending track supported from said circular track and adapted to travel thereon, and means connected to the working platform and to a stack or like structure for supporting the platform therefrom, substantially as described.

15. In combination with a stack or like structure, a working platform, a crane and a fall-line, a traveling carrier arranged on said crane, means for operating said carrier, and means connected to the structure for supporting the working platform therefrom, substantially as described.

16. An adjustable scaffold comprising a series of supporting-brackets with a working platform arranged thereon, spring-actuated friction-rollers journaled in an oblong slot arranged in the said brackets, and means connected to a stack or like structure for supporting the said brackets and platform, substantially as set forth.

17. In a scaffold, the combination with a series of brackets, spring-actuated friction-rollers mounted therein, a vertical standard carried by each of the said brackets, of a support connected to each of the said standards, a circular track suspended from the said supports, and means for supporting the said brackets from the exterior of a stack or the like, substantially as set forth.

18. In a scaffold, the combination of a series of supporting-brackets arranged circumferentially of a stack or chimney, spring-actuated friction-rollers mounted therein, a working platform secured to the said brackets, a crane and a fall-line, means capable of being connected to the fall-line and to the stack or chimney for elevating the brackets and working platform, and means connected to the said brackets and to the stack or chimney for supporting the brackets directly therefrom, substantially as described.

19. In a scaffold, the combination of a series of brackets arranged circumferentially of

a stack or like structure, spring-actuated friction-rollers arranged therein, a working platform secured to the said brackets, standards carried by the said brackets, bars supported thereby, a circular track supported from the said bars, a transversely-extending track supported from said circular track, means for supporting the said platform when not in use from the top of the said structure, and separate means for supporting the platform when in use from the exterior of the structure, substantially as described.

20. In a scaffold, the combination of a series of brackets arranged circumferentially of a stack or like structure, spring-actuated friction-rollers arranged therein a working platform secured to the said brackets, standards carried by the said brackets, bars supported thereby, a circular track supported from the said bars, a transversely-extending track supported from said circular track, means for supporting the said platform when not in use from the top of the said structure, separate means for supporting the said platform when in use from the exterior of the structure, and means for adjusting the said brackets and platform vertically, substantially as set forth.

21. In combination with a stack or like structure, a series of supporting-brackets arranged circumferentially thereof and carrying a working platform, spring-actuated friction-rollers mounted in the said brackets adapted to engage the said stack or structure, a crane and a fall-line, a traveling carrier arranged on said crane, means for operating said carrier, and means connected to the stack or structure for supporting the said brackets and platform, substantially as described.

22. In combination with a stack or like structure, a series of supporting-brackets arranged circumferentially thereof and carrying a working platform, spring-actuated friction-rollers mounted in the said brackets adapted to engage the said stack or structure, a crane and a fall-line, a traveling carrier arranged on said crane, means for operating said carrier, means connected to the exterior of the stack or structure for supporting the said brackets and platform when in use, separate means for supporting the brackets and platform when not in use from the top of the stack or structure, and means for adjusting the brackets and platform vertically, substantially as set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

LUTHER L. KNOX.

Witnesses:

JOHN NOLAND,  
E. W. ARTHUR.