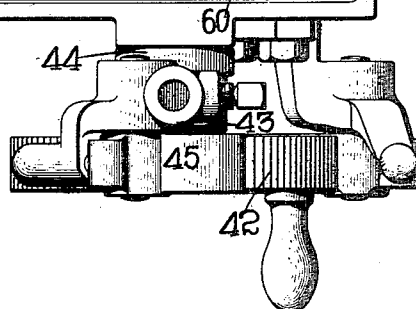
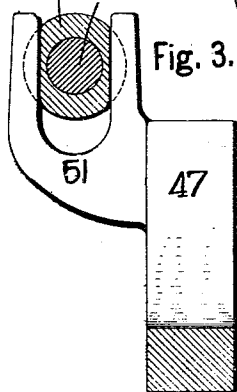
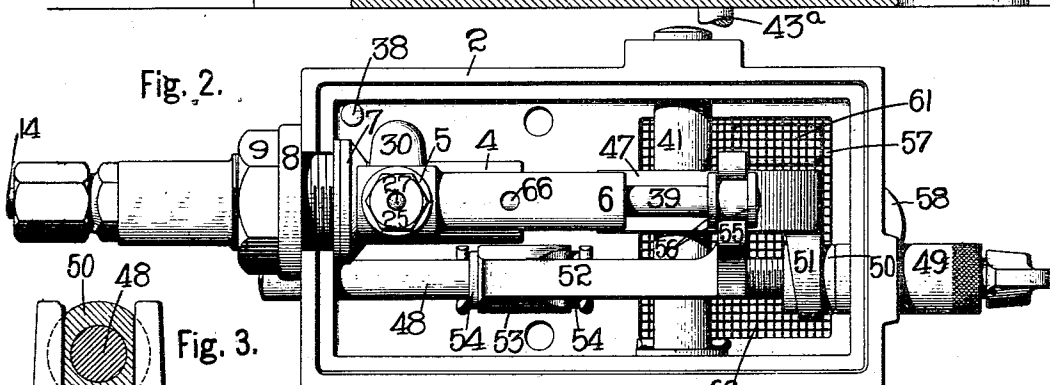
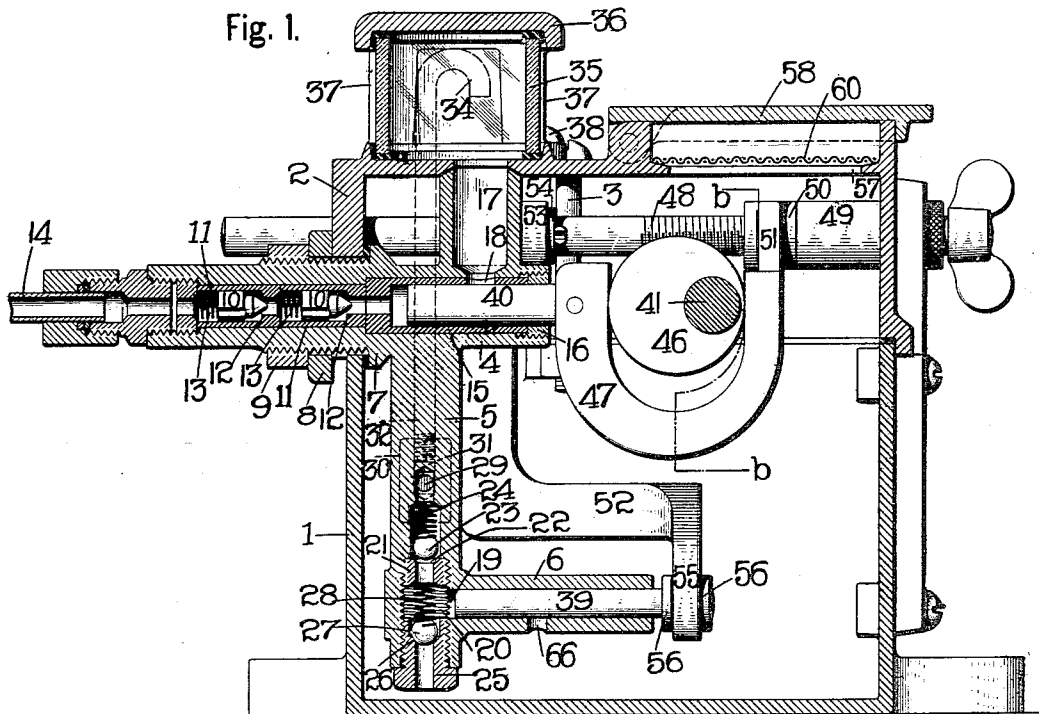


A. W. MANZEL.
 FORCE FEED LUBRICATOR.
 APPLICATION FILED APR. 29, 1908.

1,032,487.

Patented July 16, 1912.

3 SHEETS-SHEET 1.



Witnesses.
L. M. Langster
George A. Neubauer

Inventor.
Adolph W. Manzel
 By *C. Langster* Attorney

1,032,487.

3 SHEETS--SHEET 2.

Fig. 5. Fig. 7. Fig. 8.

A cross-sectional view of a substrate 11. A recessed portion 12 is formed in the upper surface of the substrate 11.



L. M. Sangster
George A. Neubauer.

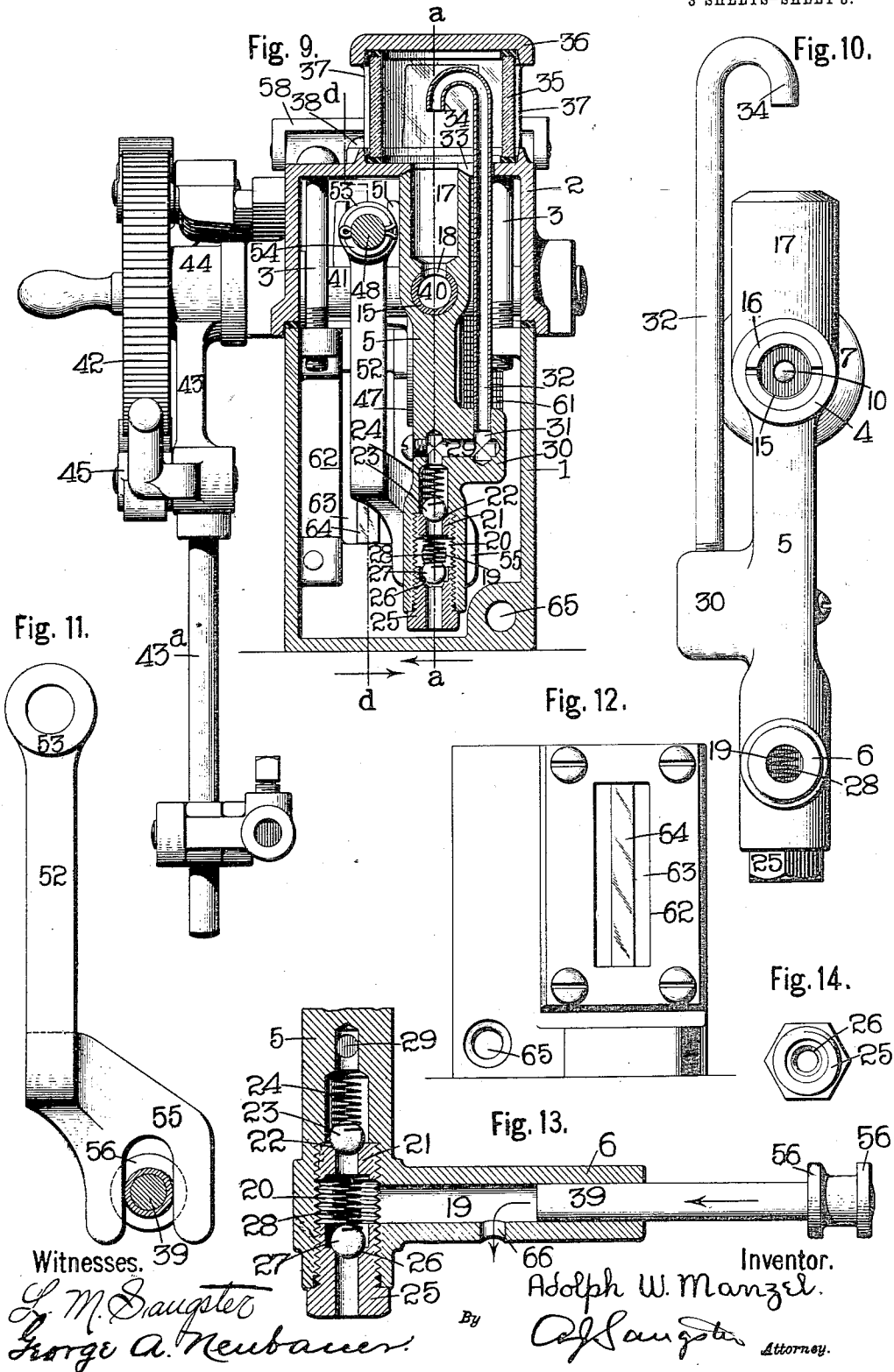
e Inventor.
Adolph W. Mangel
G. S. Langston Attorney.

A. W. MANZEL.
FORCE FEED LUBRICATOR.
APPLICATION FILED APR. 29, 1908.

1,032,487.

Patented July 16, 1912.

3 SHEETS—SHEET 3.



Witnesses.

L. M. Saugster
George A. Neubauer

By

Inventor.

Adolph W. Manzel
Col. Saugster Attorney.

UNITED STATES PATENT OFFICE.

ADOLPH W. MANZEL, OF BUFFALO, NEW YORK, ASSIGNOR TO MANZEL BROTHERS COMPANY, OF BUFFALO, NEW YORK.

FORCE-FEED LUBRICATOR.

1,032,487.

Specification of Letters Patent.

Patented July 16, 1912.

Application filed April 29, 1908. Serial No. 429,910.

To all whom it may concern:

Be it known that I, ADOLPH W. MANZEL, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a certain new and useful Improvement in Force-Feed Lubricators, of which the following is a specification.

This invention relates to an improved force feed lubricator which is principally designed to feed thick heavy lubricant, and the objects of the invention are to render the pumping mechanism easily and quickly accessible, positive in action and capable of accurate adjustment.

The invention also relates to certain details of construction which will be hereinafter described and claimed reference being had to the accompanying drawings, in which,—

Figure 1 is a central vertical longitudinal section through the improved force feed lubricator on line *a a*, Fig. 9 showing the plungers at the end of the in-stroke, the valves, plungers, eccentric and eccentric strap being shown in elevation. Fig. 2 is an inverted view of the cover or upper part of the reservoir, showing a bottom view of all of the mechanism of the improved force feed lubricator, the plungers being shown at the end of the suction stroke. Fig. 3 is an enlarged transverse section through the eccentric strap, the regulating screw, and the regulating screw spool, on line *b b*, Fig. 1. Fig. 4 is a central horizontal section through the improved force feed lubricator on line *c c*, Fig. 5, the mechanism being in the position shown in Fig. 2 and the eccentric shaft, valves, eccentric strap and plunger being shown in full. Fig. 5 is a vertical longitudinal section through the reservoir, reservoir cover and eccentric shaft of the improved force feed lubricator on line *d d*, Fig. 9, showing a side elevation of the mechanism thereof. Fig. 6 is a detached bottom view of the sight glass cover or cap. Fig. 7 is an enlarged detached central section through one of the sleeves of the check valve. Fig. 8 is an enlarged detached end view of one of the valves of the check valve. Fig. 9 is a vertical transverse section through the improved force feed lubricator on line *e e*, Fig. 5. Fig. 10 is an enlarged detached end elevation of the cylinder. Fig. 11 is an enlarged detached end elevation of the regulat-

ing arm, showing a transverse section through the lower plunger. Fig. 12 is an end elevation of the reservoir. Fig. 13 is an enlarged fragmentary section through the lower portion of the cylinder, showing the lower valves and the lower plunger. Fig. 14 is an enlarged detached plan view of the suction valve plug.

In referring to the drawings in detail like numerals designate like parts.

The box inclosing the mechanism is divided about midway horizontally into two sections a lower section 1, which constitutes a reservoir for the lubricant and an upper section 2 which serves both as a cover for the lower member and a support for the pumping mechanism. The two sections are fastened together by bolts 3 which are preferably two in number.

The pumping mechanism is supported wholly from the upper section of the box so that it can be quickly exposed for repair or replacement should it become necessary, by removing the bolts 3 and lifting the upper section from the lower section.

The pumping mechanism is what is known as a force feed, the lubricant being drawn by suction into a suitable pipe and then forced through the pipe to the point requiring lubrication, and it includes a plurality of feeding plungers and a sight glass located in the path of the feed between the plungers.

A tubular metal element of angular form which will hereinafter be termed the cylinder is supported from the upper section and has an upper horizontal member or portion 4 which extends through an opening or slot in one of the vertical ends of the upper section, a vertical portion or member 5 depending from the upper portion 4 and a lower horizontal member or portion 6.

The upper horizontal member 4 is in part exteriorly screw threaded and is clamped in place in the opening in the end of the upper section between a shoulder 7 formed on the cylinder and a washer 8 and nut 9.

A plurality of valves are arranged in the outer projecting part of the member 4 and each preferably consists of cone valves 10, removable sleeves 11, having annular valve seats 12 as shown in Fig. 7 and valve tensioning springs 13.

A pipe 14 which serves to conduct the oil to the desired location is connected to the outer end of the member 4.

In that portion of the upper member 4 located within the box and extending inwardly from the valves, a bushing 15 is removably placed being secured in place by a screw ring 16, see Fig. 1.

A cup portion 17 is formed upon the upper member 4 which communicates with the chamber within the bushing 15 through a transverse opening 18, see Fig. 1.

The lower horizontal member 6 extends toward the center of the box from at or near the lower end of the vertical member and is tubular in form to constitute a chamber 19 for a lower feeding plunger.

The opening 19 through the lower horizontal member communicates at its inner end with a vertical opening 20 in the lower end of the vertical member and two ball valves are arranged in the vertical opening one being located above and the other below the opening 19, as shown in Figs. 1 and 13.

The upper ball valve consists of an annulus or ring 21 screwed in the vertical opening 20 and having a valve seat 22, a ball 23 arranged above the seat 22 and a spiral tensioning spring 24 in the vertical opening 20 above the ball 23; and the lower ball valve comprises a tubular plug 25 screwed in the lower end of the vertical opening 20 and having a valve seat 26, a ball 27 located above the seat 26 and a spiral tensioning spring 28 arranged between the ball and the ring 21 of the upper valve, see Fig. 13.

From the upper termination of the vertical opening 20, a short horizontal opening 29 extends in a lateral enlargement 30 of the vertical member to a vertical opening 31. The vertical opening 31 extends upward through the top of the lateral enlargement 30 and a vertical pipe 32 has its lower end fitted in said opening 31. The upper extremity of the pipe 32 extends through an opening 33 in the top of the upper section of the box and is bent upon itself to form a goose neck 34 which is vertically over the cup 17. A dome is erected over the goose neck which consists of a circular ring of glass or other transparent material 35 and a top cap 36 provided with depending legs 37 which extend downward on the outside of the ring 35 to the top surface of the upper box section. Some of the legs 37 are provided with lateral lugs at their lower ends, as shown in Fig. 6, through which screws 38 are fitted to secure the cap to the upper section of the box.

A lower feeding plunger 39 is slidably fitted in the opening 19 in the lower horizontal member and an upper feeding plunger 40 is slidably fitted in the opening in the bushing 15 in the upper member 4. The upper plunger is preferably of larger diameter than the lower plunger so as to have a greater feeding capacity. Both of the plungers are reciprocated from a shaft 41 which

is journaled transversely in suitable bearings in the upper section of the inclosing box, and said shaft has a projecting end upon which a ratchet wheel 42 is mounted.

An arm 43 has a collar 44 at its inner end which is mounted on the shaft 41 and a spring tensioned pawl 45 at its outer end which engages with the ratchet wheel. A rod 43^a which is actuated from some movable portion of the machinery requiring lubrication is connected to the arm 43 to rock the same and thereby impart an intermittent rotary movement to the shaft. An eccentric 46 is mounted on the shaft 41 and an eccentric strap 47 which is preferably in the form of the letter U is secured to the inner end of the upper plunger 40 and partially surrounds the eccentric 46. A longitudinally extending regulating screw 48 is rotatably mounted in the end of the upper section of the box opposite the end through which the member 4 extends and is longitudinally adjustable in a screw threaded sleeve 49 and a regulator spool 50 is internally screw threaded and fitted on the screw threaded portion of the screw 48 on the inner side of the sleeve, see Fig. 5. The sleeve 49 acts as a lock nut to prevent involuntary rotation of the regulating screw in the spool. The outer end of the strap 47 is bifurcated as shown at 51 in Fig. 3 and the spool 50 is fitted between the forks. An angular arm 52 has a collar 53 at its upper end which is loosely mounted on the regulating screw 48 and maintained in position by two washers 54, held in place by split pins, as shown in Figs. 5 and 9; and a bifurcated lower end 55, the forks of which extend upon opposite sides of the lower plunger and between two flanges 56 on the lower plunger as shown in Figs. 2 and 11.

The reservoir is filled through an opening 57 in the top of the upper section at one side of the dome. A cover 58 is hinged to the top and serves to close the opening 57, and said cover is locked in place when closed by a bent spring finger 59, see Fig. 5. A wire screen 60 is placed over the opening 57 below the cover 58 and the usual filtering cup 61 depends from the screen as shown in Fig. 5.

A device for indicating the amount of oil in the reservoir is provided in the lower section of the box which consists of a vertical slot 62 formed in one of the sides of said lower member and constituting a view window, a closure 63 of transparent material in said slot and a strip of metal 64 in the rear of the closure which has a bright highly polished surface and serves by contrast to enable the oil level to be constantly and accurately ascertained at a glance.

The lower section or reservoir of the box is provided with a heating chamber 65 for the purpose of warming the oil so that it will flow freely in cold weather or in frigid

countries, which is formed by coring out a portion of the bottom of the box and connecting the chamber so formed to any suitable source of heat such as steam or hot air.

5 The operation of this improved force feed lubricator is as follows:—Both of the plungers being reciprocated back and forth from the eccentric on the shaft, the oil is drawn through the lower ball valve by the suction
10 stroke of the lower plunger into the opening in the lower horizontal member and then forced upward through the upper ball valve to and through the goose neck pipe from which it drops through the sight dome
15 into the cup. Passing through the opening in the bottom of the cup it flows into the chamber in which the upper plunger is located and is forced from said chamber through the double cone valves into the pipe
20 extending to the point requiring lubrication. The regulation of the feed is controlled by the regulating screw, the turning of which moves it longitudinally in its supporting sleeve, and changes the position of
25 the angular arm and through said arm the feeding position of the lower plunger. An overflow opening 66 is formed in the lower horizontal member as shown in Fig. 13 and the volume of oil fed at each forcing stroke
30 of the lower plunger is regulated by the length of the feeding stroke of the plunger beyond the over-flow opening, as the oil drawn into the chamber in front of the plunger by the suction stroke passes out
35 through the overflow opening during the fore part of the force stroke until the end of the plunger passes over said opening. The feeding of the oil it will be thus noted
40 does not begin on the force stroke of the plunger until the plunger passes over and closes the overflow opening 66. The stroke of the upper plunger is not varied or changed as it is not necessary as it always
45 has a greater feeding capacity than the lower plunger so that the sight dome cannot fill with oil. The entire cylinder complete with the eccentric strap and goose neck pipe can be removed bodily from the upper section when said section is separate from the
50 lower section by simply loosening the nut 9, and lifting the upper section together with the shaft and the regulating screw from the cylinder. This enables the machine to be quickly and completely dis-
55 mounted and the entire cylinder mechanism to be wholly exposed. Owing to the improved construction the lower plunger together with the lower portion of the cylinder is submerged in the oil in the reservoir
60 portion of the box, being located completely beneath the surface of the oil so that when the reservoir is filled no air can be pumped and the pumping action is both uniform and positive. The angular arm 52 in operating
65 the lower plunger moves to and fro in the

oil and tends to agitate or stir the same keeping it at a constant level which is a great advantage with heavy slow flowing oil especially when the oil is nearly exhausted and the level in the reservoir is near the bottom
70 as it prevents the suction action of the pumping mechanism lowering the level near the valve entrance sufficiently to suck in air.

The chief advantages of this improved force feed lubricator reside in the separable
75 construction of the box and the mounting of the pump mechanism in one section of the box so that it can be easily and quickly exposed for inspection, repair, adjustment, or replacement, in the simple and strong
80 construction and positive action of the pumping mechanism, in the manner of indicating the oil level and the means for heating the oil in cold weather.

I claim—

1. In a machine of the class described, a
85 box divided about midway horizontally into separable sections and consisting of a lower section which constitutes a reservoir and an upper section removably fitted upon the
90 lower section and forming a cover for said lower section; said upper section having a sight dome and pumping mechanism supported wholly from the upper section and having a suction portion depending into the
95 interior of the lower section and a sight feed portion projecting into the dome.

2. In a machine of the class described, a box divided about midway horizontally into
100 separable sections and consisting of a lower section which constitutes a reservoir and an upper section removably fitted upon the lower section and forming a cover for said lower section and pumping mechanism sup-
105 ported wholly from the upper section and having an element provided with a lower oil feeding chamber located in the lower section, an upper oil feeding chamber located in the upper section and a tubular connection between the upper and lower chambers,
110 feeding plungers in said chambers and means for reciprocating said plungers.

3. In a machine of the class described, a box consisting of a lower section which
115 constitutes a reservoir and an upper section removably fitted upon the lower section and forming a cover for said lower section and pumping mechanism supported wholly from the upper section and having a shaft transversely journaled in the upper section,
120 an eccentric on said shaft, an element provided with a lower oil feeding chamber located in the lower section, an upper oil feeding chamber located in the upper section and a tubular connection between the
125 upper and lower chambers, feeding plungers in said chambers, an eccentric strap extending from one plunger and partially surrounding the eccentric on the shaft, a regulating screw supported in the upper
130

section, an angular arm connected at its upper end to the regulating screw and at its lower end to the lower plunger, and connections between the eccentric strap and the regulating screw, substantially as set forth.

4. In a device of the class described, the combination with a reservoir, of a pump and its operating mechanism including a part projecting beneath the surface of and submerged in the lubricant in the reservoir and having a feeding chamber provided with an overflow opening, a plunger slidably fitted in said feeding chamber and means for adjusting the stroke of said plunger relatively to the overflow opening to regulate the feed consisting of a regulating screw, a supporting sleeve for said regulating screw mounted in the reservoir and an angular arm controlled by the regulating screw and engaging the plunger.

5. In a machine of the class described, a box divided about midway horizontally into separable sections and consisting of a lower section which constitutes a reservoir and an upper section removably fitted upon the lower section and forming a cover for said

lower section; said upper section having a top opening, a hinged lid or cover for said opening and a sight dome projecting up at one side of the top opening and pumping mechanism supported wholly from the upper section and having a suction portion depending into the interior of the lower section and a sight feed portion projecting into the dome.

6. In a device of the character described, a reservoir and cover therefor, separable one from the other; a pump carried on the underside of said cover and detachable from the cover; means carried on the underside of the cover to operate the pump and attached to the cover independently of the pump and means carried on the underside of the cover to adjust the throw of the pump and also attached to the cover independently of the pump, whereby the pump may be detached from the cover without disturbing the operating and adjusting means.

ADOLPH W. MANZEL.

Witnesses:

L. M. SANGSTER,

GEORGE A. NEUBAUER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."