

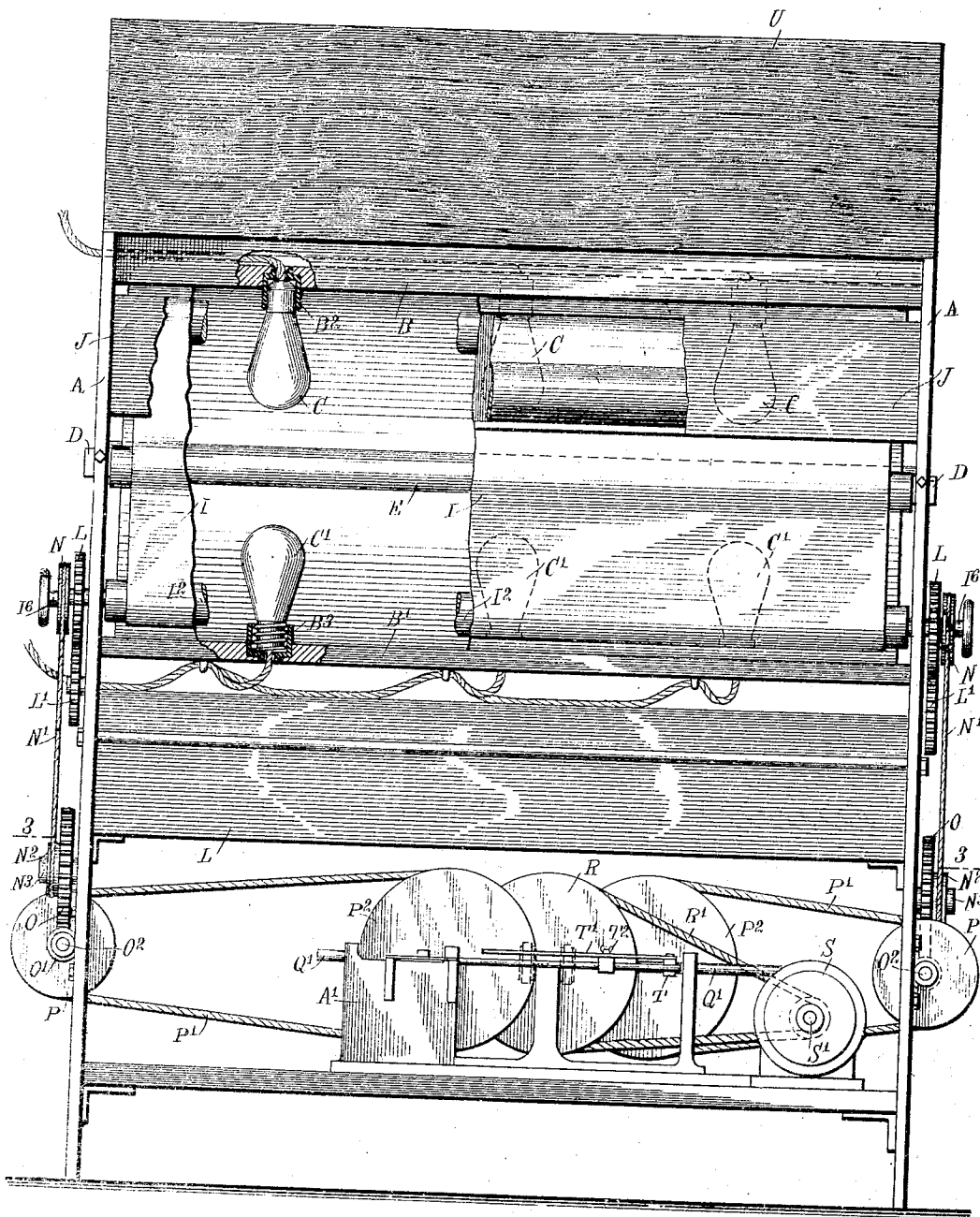
E. J. BROGAN.
ARTIFICIAL LIGHT PRINTING MACHINE.
APPLICATION FILED JAN. 24, 1911.

1,065,210.

Patented June 17, 1913.

3 SHEETS-SHEET 1.

Fig. 1



WITNESSES

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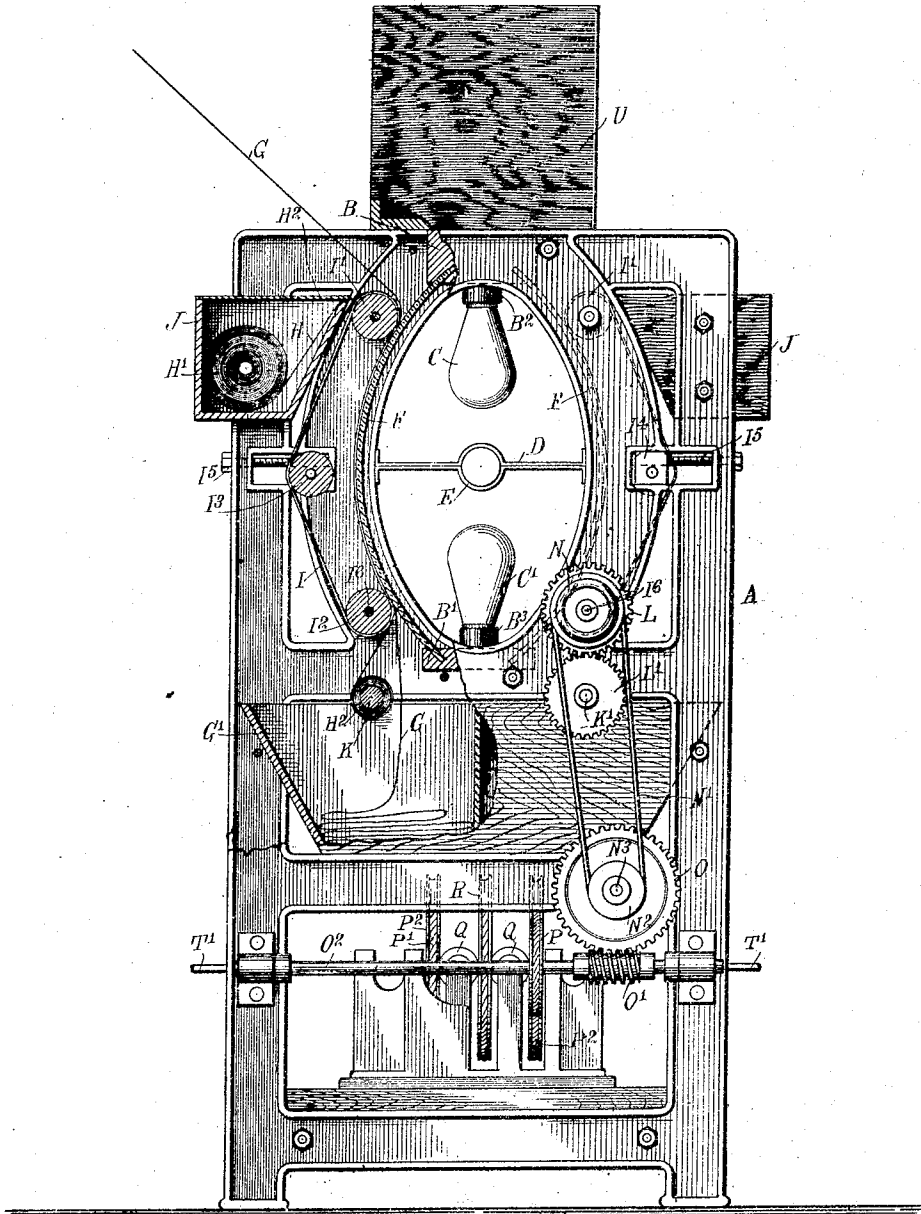
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3 SHEETS-SHEET 2.

Fig. 2



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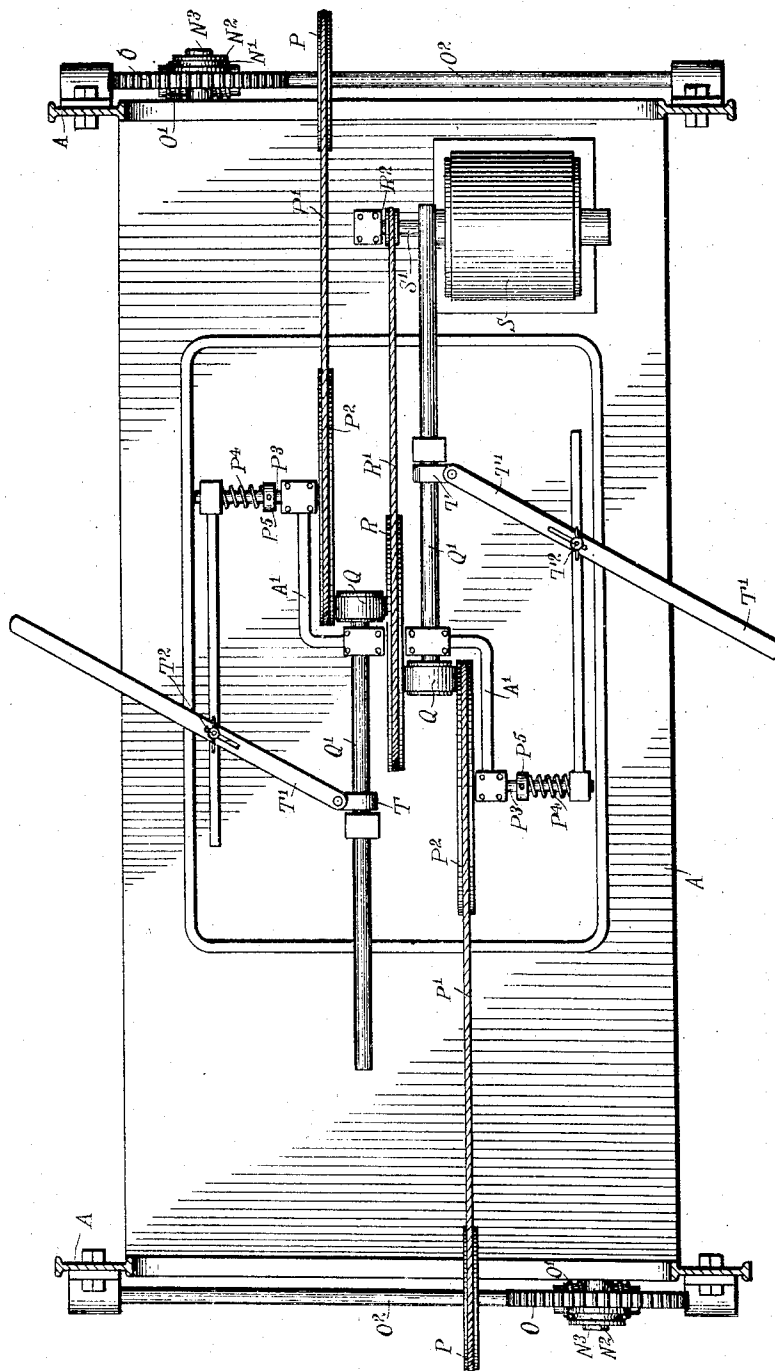
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Patented June 17, 1918.

3 SHEETS—SHEET 3.

Fig. 3



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UNITED STATES PATENT OFFICE.

EDWARD JOHN BROGAN, OF YONKERS, NEW YORK, ASSIGNOR OF ONE-THIRD TO JOHN D. REILLY, OF YONKERS, NEW YORK.

ARTIFICIAL-LIGHT PRINTING-MACHINE.

1,065,210.

Specification of Letters Patent.

Patented June 17, 1913.

Application filed January 24, 1911. Serial No. 604,330.

To all whom it may concern:

Be it known that I, EDWARD JOHN BROGAN, a citizen of the United States, and a resident of Yonkers, in the county of Westchester and State of New York, have invented a new and Improved Artificial-Light Printing-Machine, of which the following is a full, clear, and exact description.

The invention relates to devices for producing blue prints and the like, and its object is to provide a new and improved artificial light printing machine arranged to properly superimpose the sheets of tracing paper and the sensitive paper, and to cause the same to travel past a source of artificial light for making a proper exposure, and to finally separate the sheets of tracing paper and the exposed sensitive paper for removal from the machine.

For the purpose mentioned use is made of a transparent plate, on one side of which is arranged a source of artificial light and on the other side of the plate is arranged a traveling pressure device for holding the superimposed sheets of tracing paper and sensitive paper in contact with the surface of the glass plate.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the printing machine, parts being broken out; Fig. 2 is an end elevation of the same, parts being in section; and Fig. 3 is a sectional plan view of the machine on the line 3-3 of Fig. 1 and showing more particularly the adjustable driving mechanism.

On a suitably constructed frame A are arranged the longitudinally-extending beams B and B', located one above the other, and carrying at their opposite faces lamp sockets B², B³ for the reception of electric lamps C, C', of any approved construction. The frame A is also provided with supports D for carrying an electric lamp E, preferably of the Cooper-Hewitt mercury vapor lamp type, the said lamp E extending between the rows of lamps C and C', as will be readily understood by reference to Figs. 1 and 2. On opposite sides of the lamps C, C' and E

are arranged outwardly-curved plates F of glass or other transparent material, attached at their upper and lower edges to the beams B and B', so that the electric lamps extend between the glass plates F, F.

Over the outer face of each of the glass plates F pass the superimposed sheets G and H, of which the sheet G is a sheet of tracing paper or a copy from which an imprint is to be made on the sensitive sheet of paper H. The superimposed sheets G and H are pressed in contact with the corresponding outer face of a glass plate F by the use of an endless traveling apron or a belt I passing over a top roller I', a bottom roller I² and an intermediate or a tightening roller I³, of which the rollers I' and I² are journaled in suitable bearings arranged on the frame A, while the roller I³ is journaled in adjustable bearings I⁴ mounted to slide on the frame A by the use of screw rods I⁵ or other suitable means, to cause the roller I³ to keep the apron I at all times under the proper tension.

By reference to Fig. 2 it will be noticed that the top and bottom rollers I' and I² are located close to the upper and lower portions of the corresponding plate F, so that the superimposed sheets G and H are pressed in firm contact by the apron I with the corresponding glass plate F. The sheet of sensitive paper H is in the form of a roll H' contained in a light-proof box J mounted on the frame A, the box having a slit H² for the passage of the sheets from the box J onto the apron I adjacent to the upper roller I'. The sheet of tracing paper G is passed onto the sheet H at the roller I', so that the two superimposed sheets pass together between the plate F and the inner run of the apron I. When the superimposed sheets leave the plate F and apron I at the lower roller I², then the exposed sheet of sensitive paper H winds up on a winding up roller K, journaled on the main frame A, and the sheet of tracing paper G after it is separated from the exposed sheet H drops into a box G' on the main frame A.

Now in order to impart a traveling motion to each of the endless aprons I and the corresponding superimposed sheets G and H, the rollers I² and K are driven, and for

this purpose the following arrangement is made at each end of the frame: As stated the rolls I² and K are geared together so that ordinarily some increase in size of the take-up roll K might result during the operation of the apparatus, but it is obvious that at the beginning of the operation the roll K will turn too slowly to take up all of the film or sensitive sheet supplied thereto, so that the winding of the film or sensitive sheet on the said roll at such a time will be very loose or slack, and all portions of the film or sheet will remain unwound. Then as the size of the roll K increases from the accumulation of film or sensitive sheet thereon, there will be a compensation between the slack winding at the initiation of the operation, and greater winding toward the close of the operation, which will act automatically to compensate for the varying size of the roll K resulting from the winding of the film or sensitive sheet thereon. Where the construction or condition of the film or sensitive sheet is such that this automatic compensation does not operate satisfactorily, an auxiliary compensating means, such as usually employed, and which forms no part of the present invention, may be utilized to compensate for the varying winding of the film upon the roll K. The shafts I⁶ and H² of the rollers I² and K are provided with gear wheels L and L', in mesh with each other, and on the shaft I⁶ is also secured a pulley N, over which passes a belt N' passing over a pulley N² mounted to turn on a stud N³ supported on the frame A. On the pulley N² is secured a worm wheel O in mesh with a worm O' fastened to a transversely-extending shaft O² journaled in suitable bearings arranged on the main frame A. On the shaft O² is secured a pulley P, over which passes a belt P' also passing over a pulley P² secured on a shaft P³ journaled in suitable bearings arranged on a framework A' supported on the lower portion of the main frame A. The face of the pulley P² is in contact with a friction pinion Q secured on one end of a shaft Q' mounted to slide longitudinally in suitable bearings arranged on the framework A', and the said friction pulley Q is also in contact with one face of a pulley R, connected by a belt R' with a pulley R² secured to the shaft S' of a motor S, of any approved construction. The driving gears described for the two sets of rollers I² and K are preferably located on opposite ends of the main frame A, as will be readily understood by reference to the drawings, the arrangement being such that the friction pinions Q are in frictional contact with the opposite faces of the pulley R driven from the motor S, so that the rotary motion of the motor is transmitted by the pulley R to the friction pinions Q, which in turn rotate the pulleys P², driving the shafts

O², which in turn impart rotary motion to the shafts I⁶ by the gearing described and shown, to cause simultaneous rotation of the rollers I² and K, with a view to impart traveling motion to the aprons I and winding up rollers K to wind up the exposed sheets of sensitive paper H². The shafts P³ are pressed on by springs P⁴ coiled on the shafts and resting with one end on a framework A' and pressing with the other end against a collar P⁵ on the shaft P³.

Each of the shafts Q' is under the control of an operator standing on the corresponding side of the machine to impart a sliding movement to the shaft Q' to shift the friction pinion Q relative to the pulleys R and P², to vary the speed according to the nature of the superimposed sheets G and H and the strength of the light emanating from the lamps C, C' and to expose the sensitive paper a longer or a shorter period of time to the actinic rays emanating from the lamps C, C' and E.

In order to shift the shafts Q', each is provided with a shifting collar T, pivotally connected with a hand lever T' fulcrumed at T² on the framework A', the outer end of the hand lever T' extending to the corresponding side of the main frame A, so as to be within convenient reach of the operator in charge of the particular side of the machine. As the rollers I² and K are geared together they rotate in unison so that the apron I and the sheet H travel at the same speed, it being understood that owing to the pressure of the apron I on the sheet H the other sheet G is caused to travel along, to finally drop into the box G', from which the sheet of tracing paper G may be removed after the exposure has been made.

The electric lamps C, C' and E are connected with a suitable source of electricity, which may be in the form of a storage battery U, supported on the top of the frame A, as indicated in the drawings.

In running the machine two sets of superimposed sheets G and H may be run simultaneously through the machine under the guidance of two attendants controlling the levers T' for the purpose of regulating the speed of the superimposed sheets as previously explained.

By the arrangement shown and described, the superimposed sheets G and H are held firmly stretched over the corresponding glass plate F by the action of the apron I, and a continuous traveling motion is given to the superimposed sheets and the apron I at a desired speed to insure proper exposure of the sensitive sheet to the action of the actinic rays emanating from the lamps C, C' and E, and which rays pass through the glass plate F and the tracing paper G to cause the exposure on the sheet H.

It will be noticed that by the use of the

machine long sheets of tracing paper, having drawings of profiles, maps and the like thereon, can be readily run through the machine for making exposures on a sensitive sheet of paper H of a corresponding length. It will also be noticed that in case duplicate prints are to be made, one end of the sheet G can be removed from the box G' and fed between the sheet H and the plate F at the roller I', to pass the sheet G a second time through the machine with another portion of the sheet of sensitive paper H.

It is understood that by the combined action of the centrally arranged mercury vapor lamp E and the ordinary electric lamps C, C', a powerful source of light is provided capable of producing the desired action on the sensitive paper H, as the latter with the tracing superimposed thereon is moved over the glass plate F. It will also be noticed that by curving the glass plate F as shown, the superimposed sheets G and H are held properly stretched and held in firm contact one with the other during the travel of the sheets G and H over the glass plate F, and hence the minutest details of the drawing on the tracing paper is brought out in the final blue print.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. An artificial light printing machine, comprising a source of artificial light, a transparent plate arranged vertically adjacent to the source of light, a single traveling apron for pressing the superimposed sheets of tracing and sensitive paper in contact with the plate, rollers arranged one above the other and over which passes the apron, a winding up roller arranged below the lower apron roller for the exposed sheet of sensitive paper, a motor, means for operating one of the apron rollers from the motor, means for operating the winding up roller from one of the apron rollers, and a speed controlling device for the apron roller operating means.

2. An artificial light printing machine, comprising a source of artificial light, a vertically arranged transparent plate adjacent the said source of artificial light, a single endless traveling apron for pressing the superimposed sheets of tracing paper and sensitive paper in contact with the plate at the other side of the artificial light, rollers arranged one above the other and over which passes the said apron, means for rotating one of the rollers to impart a traveling motion to the said apron, a winding up roller below the lower apron roller for the exposed sheet of sensitive paper, a receptacle below the winding up roller for the sheets of tracing paper to drop in, and means for imparting rotary motion to the said winding up roller from one of the apron rollers.

3. An artificial light printing machine, comprising a frame, electric lamps mounted thereon, outwardly curved glass plates arranged vertically on opposite sides of the said lamps for the superimposed sheets of tracing paper and sensitive paper to pass over the outer face of each glass plate, a single endless apron adjacent the outside of each glass plate, a set of rollers journaled in the frame adjacent to each glass plate and over which passes an endless apron to press the corresponding superimposed sheets in contact with the adjacent glass plate, a winding up roller below a roller of each set of rollers for the exposed sensitive sheet to wind on, a motor, a shaft at each end of the frame, means for operating the shafts from the motor, means for operating one of the apron rollers from each shaft, and means for operating the winding up rollers from one of the apron rollers of each set.

4. An artificial light printing machine, comprising a frame, electric lamps mounted thereon, outwardly curved glass plates arranged vertically on opposite sides of the said lamps for the superimposed sheets of tracing paper and sensitive paper to pass over the outer face of each glass plate, a single endless apron adjacent the outside of each glass plate, a set of rollers journaled in the frame adjacent to each glass plate and over which passes an endless apron to press the corresponding superimposed sheets in contact with the adjacent glass plate, a box for containing a roll of sensitive paper arranged adjacent to the upper roller of each set of rollers and having an outlet slit leading to the corresponding apron, a winding up roller below the lower roller of each set of rollers for the exposed sensitive sheet to wind on, a driving gear for driving the said apron rollers, and gearing between the winding up rollers and one of the apron rollers.

5. In an artificial light printing machine, a frame, a transparent plate, a source of artificial light adjacent to the plate, rollers mounted in the frame at one side of the plate, an apron on said rollers, a winding up roller for the exposed sensitive paper, mounted in the frame adjacent one of the apron rollers and geared therewith, a shaft mounted in the frame, means for operating one of the apron rollers from the shaft, a motor, and means for operating the shaft from the motor, said means including a speed governing device.

6. In an artificial light printing machine, a frame, a transparent plate, a source of artificial light adjacent to the plate, rollers mounted in the frame at one side of the plate, an apron on the rollers, a winding up roller for the exposed sensitive paper provided with a pulley and geared with one of the apron rollers, a pulley mounted in the

frame and carrying a worm wheel, a belt
passing around said pulleys, a shaft mount-
ed in the frame and provided with a worm
meshing with the said worm wheel, a motor,
5 and means for operating the said shaft from
the motor, said means including a speed
governing device.

In testimony whereof I have signed my
name to this specification in the presence of
two subscribing witnesses.

EDWARD JOHN BROGAN.

Witnesses:

THEO. G. HOSTER,

PHILIP D. ROLLHAUS.

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