

C. F. PEASE.
 BLUE PRINT MACHINE.
 APPLICATION FILED JULY 27, 1910.

1,004,069.

Patented Sept. 26, 1911.

5 SHEETS—SHEET 1.

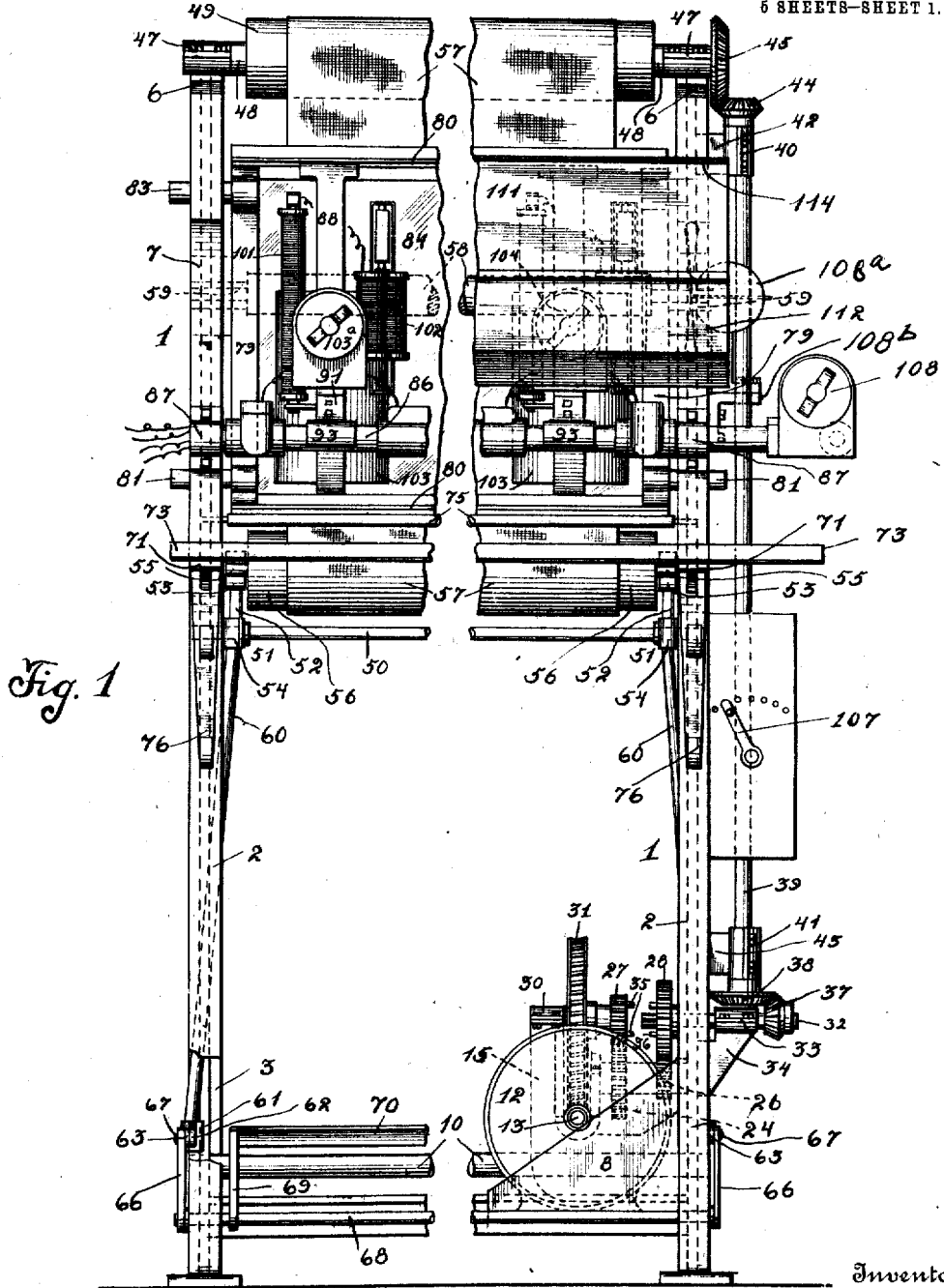


Fig. 1

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334

C. L. Parker, Attorney

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5 SHEETS—SHEET 2.

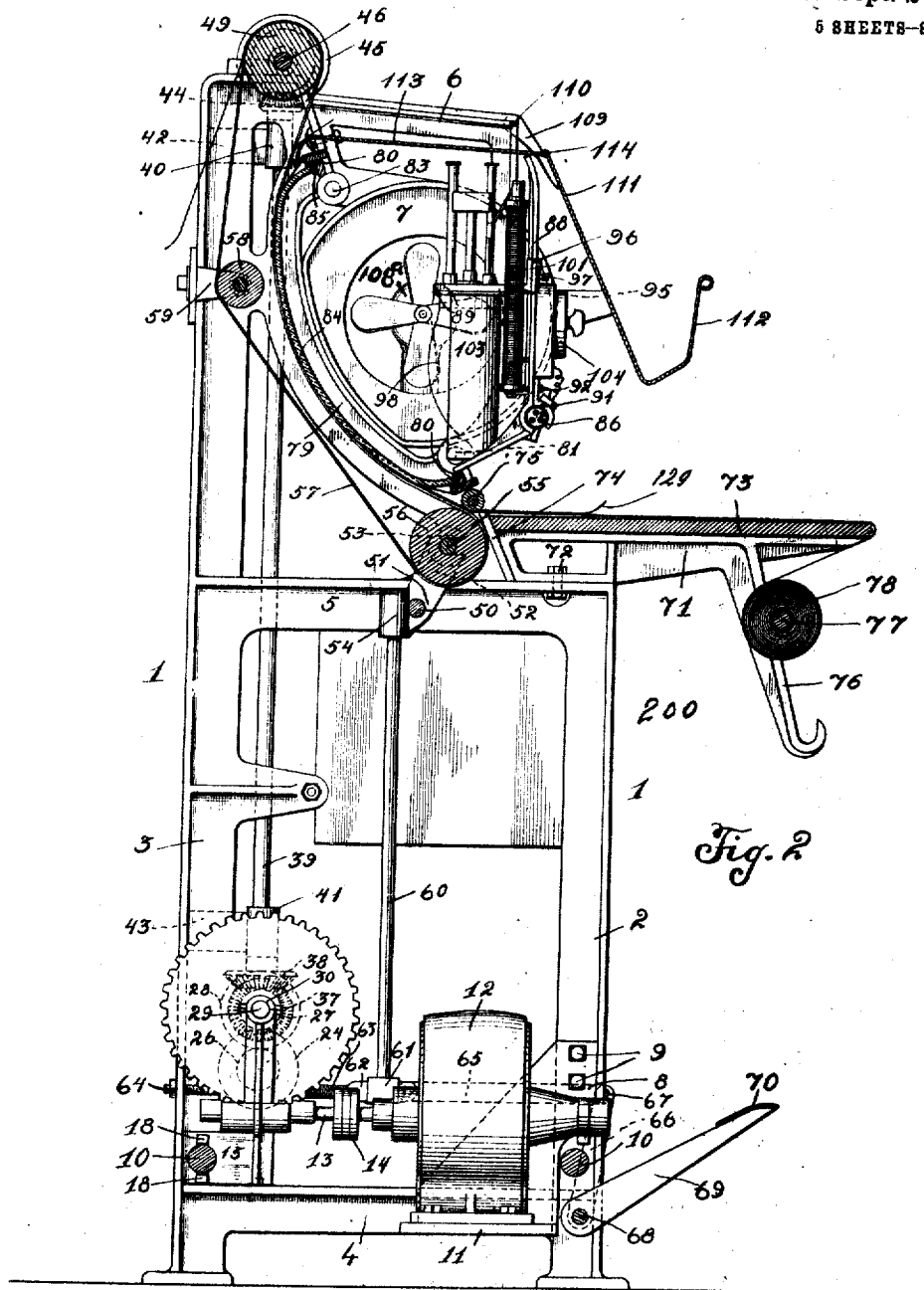


Fig. 2

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5 SHEETS-SHEET 3.

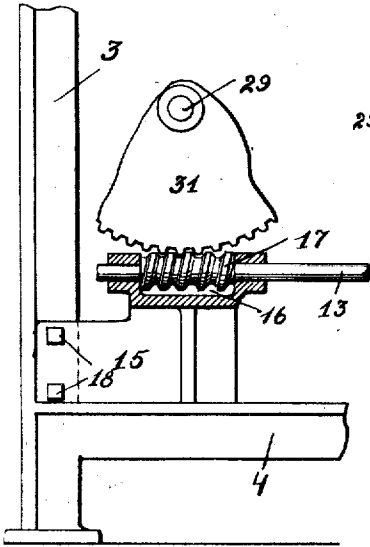


Fig. 5.

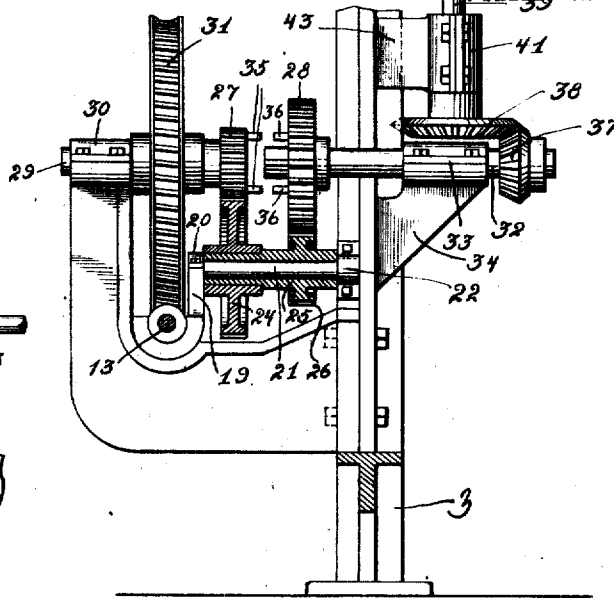


Fig. 3.

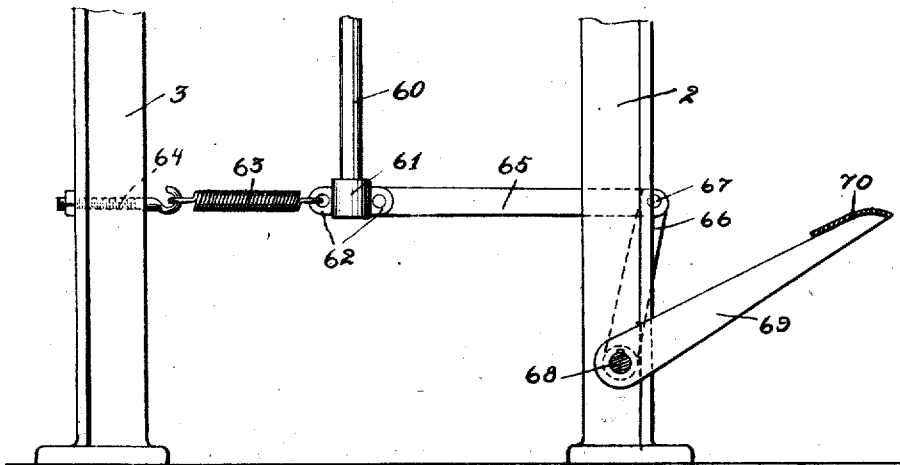


Fig. 4.

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5 SHEETS-SHEET 4.

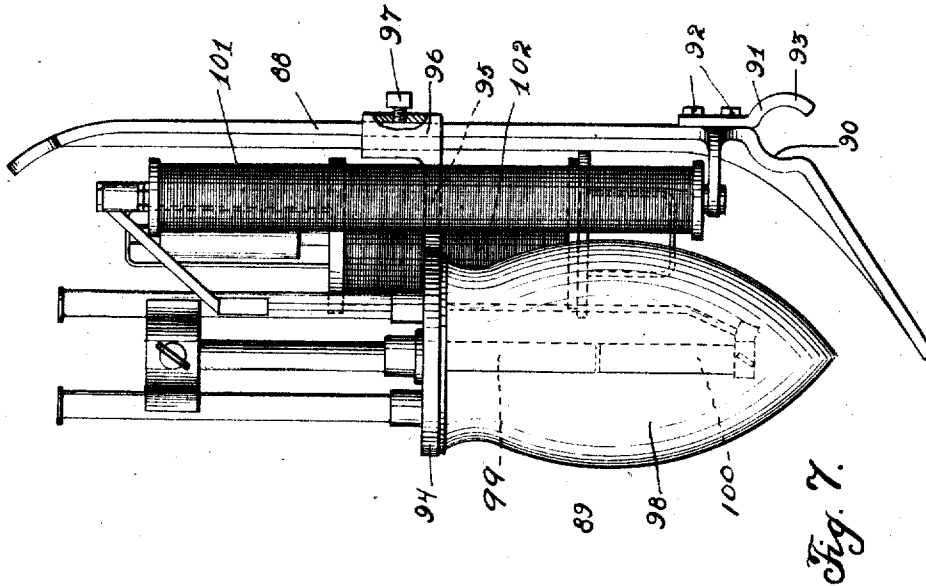


Fig. 7.

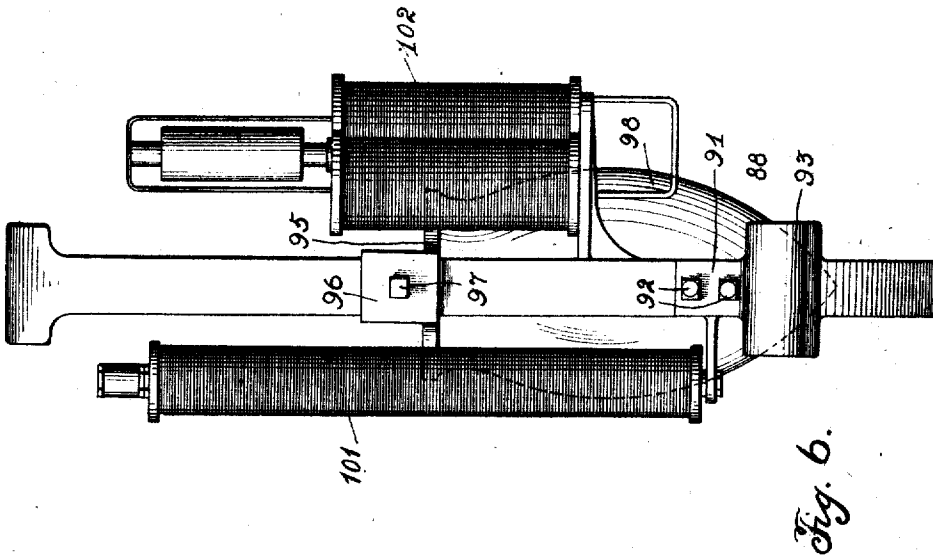


Fig. 6.

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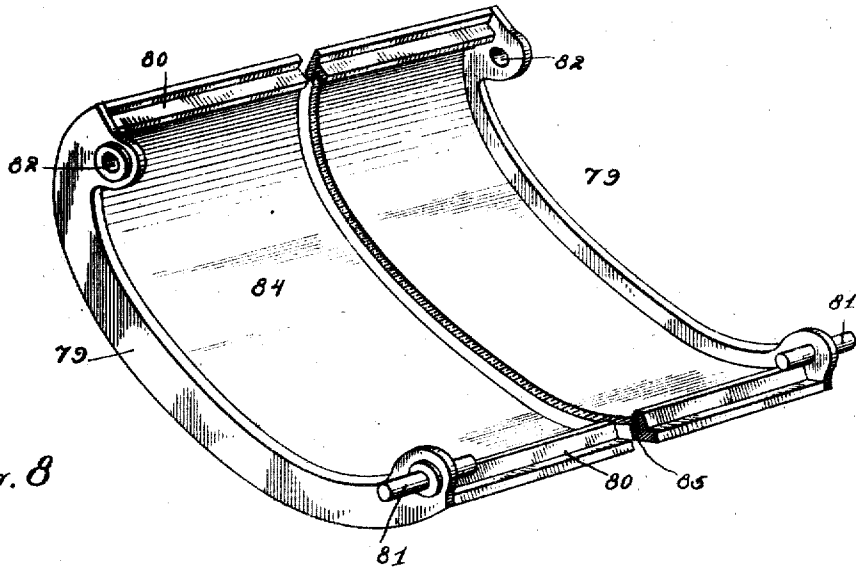


Fig. 8

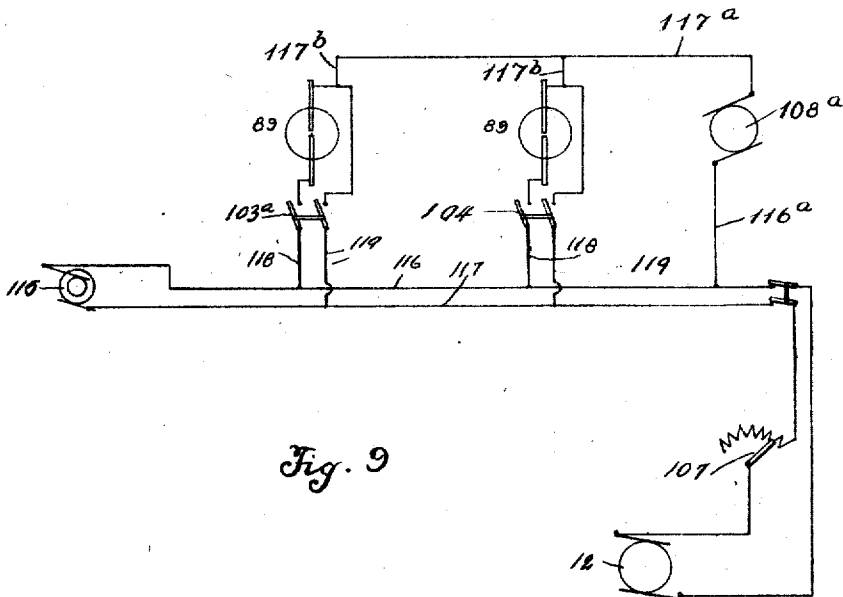


Fig. 9

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 B. F. Fishburne

By

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 Attorney

UNITED STATES PATENT OFFICE.

CHARLES F. PEASE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE C. F. PEASE COMPANY,
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BLUE-PRINT MACHINE.

1,004,069.

Specification of Letters Patent.

Patented Sept. 26, 1911.

Application filed July 27, 1910. Serial No. 574,212.

To all whom it may concern:

Be it known that I, CHARLES F. PEASE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Blue-Print Machines, of which the following is a specification.

My invention relates to a machine for manufacturing photographic copies of drawings, or the like.

An important object of this invention is to provide a machine of the above character, so constructed that a maximum amount of light may be thrown upon the print and drawing without danger of cracking the transparent printing plate across which such print and drawing are fed.

A further object of this invention is to provide supporting means for the transparent printing plate, which will permit the same to be moved to a position where said plate may be cleaned.

A further object of my invention is to provide supporting means for the arc-lamps employed in connection with my machine, whereby said arc-lamps may be swung toward the horizontal so that their carbons may be trimmed.

A further object of this invention is to provide supporting means for the arc-lamps, which also serves as a housing for the wires which supply the current to said lamps.

A further object of my invention is to provide novel means for preventing the endless belt from having undue lateral movement toward one end of its rollers.

A further object of this invention is to provide a machine of the above character, so constructed that the print paper and tracing are fed into the same at one side of the machine and the tracing discharged from the machine at the same side, whereby the operator is not forced to change his position when operating the machine.

A further object of this invention is to provide means for slackening the endless belt, whereby the print paper and tracing may be removed from within the machine without having to pass entirely there-through.

A further object of my invention is to provide novel gearing for positively driving the endless belt.

A further object of this invention is to

provide a blue print machine, the operation of which may be readily controlled by the attendant.

A further object of this invention is to improve the construction in general of a machine of this class, whereby the process of making photographic copies is rendered more expeditious and reliable.

Other objects and advantages of this invention will appear in the course of the following description.

In the accompanying drawings forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same, Figure 1 is a front elevation of the machine, Fig. 2 is a central vertical section through the same, Fig. 3 is an enlarged detail view of the transmission gear employed upon the machine, Fig. 4 is an enlarged detail side view of the pedal and associated members, for controlling the operation of the endless belt, Fig. 5 is a side view of the worm, showing its bearing in section, Fig. 6 is a front view of a bracket and an arc-lamp connected therewith, Fig. 7 is a side view of the same, Fig. 8 is a perspective view of the printing plate and its supporting frame, and Fig. 9 is a diagrammatic view of the arc-lamps, motor and their circuits.

In the drawings wherein is illustrated a preferred embodiment of my invention, the numeral 1 designates pairs of vertically disposed spaced castings, each of which comprises a short forward upright 2 and a long rear upright 3. For the sake of clearness, the side of the machine designated by the numeral 200 will be termed the forward side of the machine, it being the side at which the operator stands, and all parts of the machine which are moved toward the side 200 may be said to be moved forwardly, as will occur in the course of the description. These uprights are connected near their lower ends by horizontal sections 4, as shown. The upper end of the forward uprights of each casting is connected with the rear upright 3 near its center, by a horizontal section 5. The upper end of each of the rear uprights 3, is provided with a forwardly extending section 6 having an annular portion 7 connected therewith, as shown. One of the forward uprights 2 has a bracket or support 8, connected therewith,

as shown at 9. The lower ends of the up-
rights 2 and 3 are connected by transverse
rods 10, as shown. The bracket 8 has a
horizontal portion 11, upon which is rigidly
mounted a motor 12 of any preferred or
well known form. This motor has its arma-
ture shaft 13. The armature shaft 13 has
its rear portion journaled through a bracket
15, which is provided with a cut-out portion
16 for forming a recess for a worm 17
formed upon said armature shaft, as
shown. The bracket 15 has its lower por-
tion bolted to the rear upright 3, as shown
at 18. The bracket 15 has formed integral
therewith an upstanding arm 19, provided
at its upper end with a journal box 20 for
rotatably holding one end of a connecting
shaft 21, the other end of which is rotatably
mounted within a journal box 22, which is
suitably secured to the upright 3. Rotata-
bly mounted upon the shaft 21 is a large
pinion 24, which is rigidly mounted upon
a hub-portion 25 of a small pinion 26, as
shown. The pinions 24 and 26 thus rotate
together and engage respectively, small and
large pinions 27 and 28. The pinion 27
is rigidly mounted upon a stud shaft 29,
which is rotatably mounted within a journal
box 30 formed upon the vertical portion of
the bracket 15. This stud shaft is further
provided with a worm-wheel 31, which
meshes with the worm 17. This large pinion
28 is splined upon a shaft 32, arranged ad-
jacent to and in end to end relation with
the said stud shaft. The shaft 32 is rotatably
mounted within a journal box 33, supported
by a bracket 34 which is rigidly connected
with the upright 3. The pinions 27 and 28
are provided upon their adjacent faces with
pins 35 and 36, respectively, which are
adapted to engage each other when the pin-
ion 28 is moved longitudinally of its shaft,
whereby the stud shaft 29 and the shaft 32
are locked together. The longitudinal move-
ment of the pinion 28 may be effected by
means of a shifting lever or the like (not
shown). From the description of the above
referred to parts, it is obvious that the rota-
tion of the armature shaft 13 may be im-
parted to the shaft 32, to cause the latter
to be rotated at different rates of speed.
When the pinion 28 is in engagement with
the pinion 26, the shaft 32 is driven by the
armature shaft at low speed. When the
pinion 28 is disengaged from the pinion 26
and moved longitudinally of its shaft, so
that its pins 36 engage the pins 35 of pinion
27, the shaft 32 is locked with the shaft 29
and rotated at high speed.

The outer end of the shaft 32 has a bevel-
gear 37 rigidly mounted thereon, as shown,
for meshing with a second bevel-gear 38,
which is rigidly mounted upon the lower
end of a vertically disposed actuating shaft
39. This actuating shaft has its upper and

lower portions rotatably mounted within
journal boxes 40 and 41, respectively, which
are carried by brackets 42 and 43 having
rigid connection with the upright 3, as shown.
The actuating shaft 39 has a bevel-gear 44
rigidly connected with the upper end there-
of, which meshes with a bevel-gear 45. This
bevel-gear 45 is rigidly connected with one
end of a rotary shaft 46, which is mounted
within journal boxes 47 disposed upon the
upper ends of the uprights 3. The longi-
tudinal displacement of the shaft 46 is pre-
vented by washers 48, which are disposed
between the ends of a roller 49 rigidly
mounted upon the shaft 46, and said journal
boxes 47. A rock-shaft 50 is journaled
through the central portions of the sections
5, as shown, and has brackets 51 rigidly
mounted upon the same near its ends and
inwardly of the castings 1. Each of the
brackets 51 comprises an upstanding body
portion 52, having its upper free end pro-
vided with a substantially horizontally dis-
posed cut-out portion 53, and its lower end
provided with a vertically disposed cylin-
drical portion 54, which is preferably cast
integral with the body portion 52. The
brackets 51 are provided to adjustably sup-
port a rotatable shaft 55, which has its ends
disposed within the openings 53. A roller
56 is loosely mounted upon the shaft 55 and
has trained thereabout a flexible endless belt
57, which is also trained about the roller 49
and a small roller 58, rotatably mounted be-
tween brackets 59. These brackets are inde-
pendently vertically adjustably mounted
upon the uprights 3, in any suitable manner.
By the vertical adjustment of either of these
brackets 59, the corresponding end of the
roller 58 may be raised, to prevent the lat-
eral creeping of the endless belt 57 in that
direction. The object of having the brackets
51 to adjustably support the shaft 55 and
its roller, is to permit of the removal of the
print paper and tracing from the machine
when desired.

The cylindrical portion 54 of each of the
brackets 51 has rigid connection with a rod
60, extending downwardly in a substantially
vertical position for engagement with a head
61, which is provided upon its opposite sides
with apertured ears 62. The rear ear 62 is
connected with a retractile coil spring 63,
having its opposite end connected with a bolt
64, which is suitably connected with the rear
upright 3, as shown. The forward ear 62
has pivotal connection with a link 65, pivoted
at its forward end to an arm 66, as shown at
67. This arm is rigidly mounted upon one
end of a rock-shaft 68, which is journaled
through the lower portions of the uprights
2. The rock-shaft 68 has a lever 69 rigidly
connected therewith near each end, as
shown, for engaging one end of a pedal 70,
which extends forwardly of the castings 1.

When the pedal 70 is depressed, the rods 60 are oscillated rearwardly and the brackets 51 are oscillated to move the roller 56 forwardly, whereby the belt 57 is slackened. Upon the release of the pedal 70, the springs 63 oscillate the rods rearwardly, which cause the oscillation of the brackets 51, whereby the belt 57 is placed under proper tension.

Pairs of brackets 71 are provided, which are bolted as shown at 72, to the sections 5. These brackets serve to support a top 73 forming a feed table. Strips 74 are rigidly connected with the inner ends of the brackets 71 and rotatably support therebetween a feed roller 75. The brackets 71 are each provided with depending arms 76, for rotatably supporting a roller 77 upon which is mounted the print paper 78. Above and near the brackets 71, are disposed swinging curved arms 79, which are spaced from each other, as shown, and rigidly connected at their upper and lower ends by means of T-irons 80. Each of the arms 79 is pivotally connected with the annular section 7, by a pin 81. The upper end of each of the arms 79 is apertured, as shown at 82, to receive a removable pin 83, which is passed through an opening formed in the casting 1. The pins 82 retain the arms 79 in their normal positions, as shown in Fig. 2, and said pins being removable, permit of the oscillation of said arms in a forwardly direction. The arms 79 together with the T-irons 80, form a support for a preferably glass transparent printing plate 84, which is substantially semi-elliptical in cross-section, as shown. This printing plate may be translucent instead of transparent. The printing plate 84 is of the proper width to fit snugly between the T-irons 80 and engages shock-absorbing members 85, carried by said T-irons. The printing plate 84 engages the endless belt 57, and when in such engagement, as shown in Fig. 2, has its major transverse axis inclined, as shown. A cylindrical pipe 86 is horizontally disposed and suitably connected with the annular section 7, as shown at 87. This pipe serves to support adjustable brackets 88, which have connected therewith arc-lamps 89. Each of the brackets 88 (see Fig. 7) has its lower end provided with a semi-cylindrical cut-out portion 90 for the reception of the pipe 86. A clamp 91 is adjustably connected with the bracket 88 adjacent the cut-out portion 90, by means of bolts 92, or the like. This clamp has a curved lip 93 to cooperate with the wall of the cut-out portion 90 for gripping the pipe 86. From the description of the above referred to parts, it is obvious that each of the brackets 88 may be oscillated from their normal vertical position to a substantially horizontal position, and that said bracket may be clamped in a rigid position to the

pipe 86 at any desired angle. When the brackets 88 are oscillated forwardly, a sufficient space is afforded to permit of the oscillation of the transparent plate 84 and its supporting means forwardly, to assume an approximately horizontal position, so that the convex side of the plate 84 may be readily cleaned. Each of the arc-lamps 89 comprises a body portion 94 provided with an arm 95 having a head or socket 96 formed the end and slidably mounted upon the bracket 88. A bolt 97 is provided for clamping the head 96 in a rigid position upon said bracket. The body portion of the arc-lamp supports a globe 98, within which are mounted positive and negative carbons 99 and 100. Owing to the upper portion of the transparent plate 84 being farther removed from the free ends of the carbons than the lower end of said plate, all the heat rays from the lamps will strike against said plate with substantially the same intensity, avoiding extreme local overheating and breakage by the resulting uneven expansion. No detail description will be given of each of the arc-lamps, as no claim will be made to the same in this application.

The automatic adjustment of the carbons in the arc-lamp, is effected by the solenoids 101 and 102, there being suitable connecting means between these solenoids and said carbons, as is the case in an ordinary arc-lamp. These arc-lamps are compact in arrangement and owing to the location of the solenoids 101 and 102, said lamps are formed short so that they will not occupy too much space in the machine. Each arc-lamp 89, is provided with a reflector 103, having suitable connection with the body portion 94 and extending downwardly to engage the foot of the bracket 88. The arc-lamps are connected with circuits to be described, and these circuits are controlled by switches 103^a and 104. The motor 12 is connected with a circuit to be described, which circuit comprises suitable wires and a rheostat 107, as shown in Fig. 1. A switch 108 is provided to control the motor circuit. The feed wires for supplying current to the said circuits are disposed within the pipe 86. A fan motor 108^b is arranged at one side of the machine and centrally of the annular section 7, as shown. This fan motor is connected with a bracket 108^b which is suitably connected with the casting 1. The function of this fan is to drive out of the machine the air heated by the arc-lamps, whereby plate 113 is prevented from becoming too hot. A diagrammatic view of the circuits for the lamps, fan motor and motor forms a part of this specification, and the same will be described in detail hereinafter. The horizontal sections 6 have links 109 pivoted thereto, as shown at 110, and these links are shown in their lowermost position. The

links 109 have rigidly connected therewith a section of sheet metal 111, having its lower end bent upwardly, as shown at 112, to form a receptacle for receiving the tracing after the same has passed through the machine. A sheet metal lid 113 is hinged to the section 111, as shown at 114. This lid normally covers the transparent plate 84 and the arc-lamps, but the same may be oscillated upon its hinged joint to allow access to the last referred to parts. The section 111, together with links 109, may also be oscillated upwardly to permit the arc-lamps and their brackets to be inclined toward the horizontal.

In Fig. 9 is illustrated the diagrammatic view above referred to. The numeral 115 designates a dynamo for supplying current to the arc-lamps, fan motor and motor. Lead wires 116 and 117 are connected with the dynamo 115, as shown, and the arc-lamps are connected with the lead wires 116 and 117, by means of branch wires 118 and 119. The switches 103^a and 104 control the current supplied to the arc-lamps. The fan motor 108^a is connected with the feed wire 116 by means of a wire 116^a and said fan motor is connected with the arc-lamps, as shown, by means of a wire 117^a and the branch wires 117^b. The motor 12 is connected with lead wires 116 and 117, as shown, and the rheostat 107 is placed in series with the wire 117 for controlling the speed of the motor. It is obvious that the fan motor will be in operation when current is flowing through both or either of the arc-lamps 89. It is thought that the operation of the above referred to circuit may be readily understood, and therefore such operation will not be recited.

In the operation of the machine the print paper and tracing 129 are fed between the feed roller 75 and the endless belt. The print paper and tracing are carried upwardly across the printing plate and said print paper is made to travel about the roller 46, while the tracing is conducted over the lid 113 and collected within the receptacle formed by the sheet metal section 111. It is thus seen that the tracing is fed into the machine and discharged therefrom upon the same side. The operator may slacken the endless belt 57 by proper manipulation of the pedal 70, whereby the print paper and tracing may be removed from the machine or shifted in position when necessary.

I wish it understood that the form of my invention herewith shown and described, is to be taken as a preferred example of the same, and that certain changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus fully described my invention

what I claim as new and desire to secure by Letters Patent, is:—

1. In a machine of the character described, a supporting structure, a printing plate having connection therewith, a source of light disposed near the printing plate and adapted to be swung away from the same, and paper holding means to operate in engagement with said printing plate, said printing plate being adapted to be swung away from said paper holding means.

2. In a machine of the character described, a supporting structure, an endless belt, arms swingingly mounted upon said supporting structure, a printing plate connected with said arms and disposed to engage the endless belt, means to lock said arms in their normal inclined position, said means being constructed to permit the arms to be swung from such position toward the horizontal, and a source of light arranged near said plate and capable of being swung out of the way of said printing plate when the latter is being oscillated toward the horizontal.

3. In a machine of the character described, a support, rollers mounted upon said support, an endless belt trained about said rollers, means to move one of the rollers to slacken said endless belt, a printing plate disposed to coöperate with the endless belt, means constructed to permit of the swinging of said printing plate away from the endless belt, a source of light, and means constructed to permit of the moving of said source of light with relation to said printing plate.

4. In a machine of the character described, a supporting structure, a printing plate connected therewith and having an approximately upright position, paper holding means operating in engagement with said printing plate, including a roller disposed above the printing plate to be readily observed by the operator from the forward side of the machine, means to effect the movement of said paper holding means to cause a print and tracing to travel upwardly in engagement with said printing plate, whereby said print may be made to travel about said roller and readily observed by the operator, and a source of light arranged near said printing plate.

5. In a machine of the character described, a supporting structure, a printing plate connected therewith and having an approximately upright position, paper holding means operating in engagement with said printing plate, including a roller disposed above the printing plate to be in the ready observation of the operator from the forward side of the machine, means to effect the movement of said paper holding means to cause a print and tracing to travel upwardly in engagement with said printing plate, whereby said print may be made to

travel about said roller and be readily observed by the operator, a source of light arranged near said printing plate, a feed table connected with said supporting structure adjacent the lower end of said printing plate and the forward side of the machine, a receptacle disposed above said feed table and having connection with the forward side of said supporting structure, and means to conduct material from the paper holding means across the source of light to deposit the same within said receptacle.

6. In a machine of the character described, a support, a printing plate connected therewith, a pipe connected with said support, an arc-lamp pivotally connected with said pipe, said pipe serving as a housing for the wire to supply current to said arc-lamp, an endless belt to operate in engagement with the printing plate, and means to prevent the lateral displacement of the belt.

7. In a machine of the character described, a supporting structure, a feed table and collecting receptacle having connection with and arranged upon the same side of said supporting structure, a printing plate curved in cross-section having connection with said supporting structure, and being approximately vertically disposed, paper holding means operating in engagement with said printing plate, including a roller disposed above said printing plate to be in the ready observation of the operator, a source of light disposed near said printing plate, a feed roller disposed adjacent the lower end of said paper holding means, and means to effect the movement of the paper holding means, whereby a print and tracing may be made to travel from said feed table in an upward direction in engagement with said printing plate, and whereby the print may travel about said roller and the tracing conducted to said receptacle.

8. In a machine of the character described, a supporting structure, a printing plate connected therewith and having an approximately upright position, an upper roller disposed above said printing plate to be in the ready observation of the operator, a lower roller disposed near the lower end of said printing plate, a belt trained about said rollers to operate in engagement with said printing plate, a substantially vertically disposed actuating shaft having suitable connection with said upper roller for operating the same, and means disposed in the lower portion of said supporting structure to positively rotate said actuating shaft.

9. In a machine of the character described, a support, a source of light connected therewith, a printing plate arranged near the source of light, upper and lower rollers arranged near the printing plate, an endless belt trained about said rollers to operate in engagement with said transparent plate, a

rock-shaft connected with said support for pivotally supporting the lower roller, connecting means between said rock-shaft and the lower roller, and means to effect the movement of said rock-shaft.

10. In a machine of the character described, a support, a source of light, a printing plate to cooperate with the source of light and disposed in an inclined position so that the distance between the same and the source of light increases toward the upper end of said printing plate, means to feed material to the lower end of the printing plate, means to effect the movement of such material in an upwardly direction across said printing plate, and means to conduct such material in a forwardly direction away from said printing plate.

11. In a machine of the character described, a supporting structure, a source of light connected therewith, a printing plate curved in cross-section to cooperate with said source of light and disposed in an inclined position so that the distance between the same and said source of light increases toward the upper end of said printing plate, paper holding means operating in engagement with said printing plate and having the upper portion thereof disposed above said printing plate, and means to effect the movement of said paper holding means, so that a print and tracing may be made to travel upwardly in engagement with said printing plate and said print discharged from the upper portion of said paper holding means in the ready observation of the operator.

12. In a machine of the character described, a supporting structure, a printing plate connected therewith, paper holding means operating in engagement with said printing plate, a pipe connected with said supporting structure near the printing plate, a bracket pivotally mounted upon said pipe, an electric lamp connected with said bracket, and wires disposed within said pipe for supplying current to said lamp.

13. In a machine of the character described, a supporting structure, paper holding means connected therewith, a printing plate having pivotal connection with said supporting structure so as to normally engage said paper holding means and be capable of disengagement therewith, a pipe connected with said supporting structure and disposed near said transparent plate, an electric lamp pivotally mounted upon said pipe to be moved away from said printing plate, and wires disposed within said pipe for supplying current to said lamp.

14. In a machine of the character described, a supporting structure, a printing plate connected therewith, a source of light disposed near said printing plate, upper and lower rollers disposed near said printing

plate, swinging means connected with the supporting structure for supporting the lower roller, an endless belt trained about said rollers to operate in engagement with said printing plate, means including an elastic member for holding said swinging means in such a position that said endless belt is retained relatively tight, and means to move the last named means for slackening said endless belt.

15. In a machine of the character described, a supporting structure, a printing plate connected therewith, a source of light arranged near said printing plate, paper holding means operating in engagement with said printing plate, including a roller disposed near the upper portion of said supporting structure, an actuating shaft for effecting the movement of said roller, a motor arranged within the lower portion of said supporting structure, and transmission gearing between said motor and actuating shaft.

16. In a machine of the character described, a supporting structure, a printing plate connected therewith, a source of light arranged near said printing plate, paper holding means operating in engagement with said printing plate, including a roller disposed above said printing plate, an actuating shaft to effect the movement of said roller, a motor disposed within the lower portion of said supporting structure, and speed changing transmission gearing between said motor and actuating shaft.

17. In a machine of the character described, a supporting structure, a source of light pivotally connected therewith to swing in a substantially vertical plane, a printing plate curved in cross-section and pivotally connected with said supporting structure to swing in a substantially vertical plane, said

printing plate being normally positioned so that the distance between the same and said source of light increases toward the upper end of said transparent plate, and paper holding means operating in engagement with said transparent plate.

18. In a machine of the character described, a supporting structure, a feed table connected therewith adjacent the forward side thereof, paper holding means connected with said supporting structure and having one end thereof disposed adjacent said feed table, a printing plate to engage said paper holding means, and a source of light disposed above the feed table and capable of being oscillated in a substantially vertical plane to assume a horizontal position adjacent and above said feed table, when it is desired to trim the carbons of said source of light.

19. In a machine of the character described, a supporting structure, a printing plate movably mounted upon said supporting structure, paper holding means to engage said printing plate, said printing plate being adapted for movement into and out of engagement with said paper holding means, a source of light movably mounted upon the supporting structure, said source of light being normally disposed near said printing plate and adapted to be moved away from the same to permit said printing plate to be moved out of engagement with said paper holding means, and means to effect a movement of the paper holding means.

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

CHARLES F. PEASE.

Witnesses:

MARCUS KASKEL,

CHARLES L. HERRICK.