Sept. 17, 1929. F. A. LOVEGROVE 1,728,351

PRINTING MACHINE FOR SPHERES AND THE LIKE

Filed Aug. 10, 1928 5 Sheets-Sheet 1

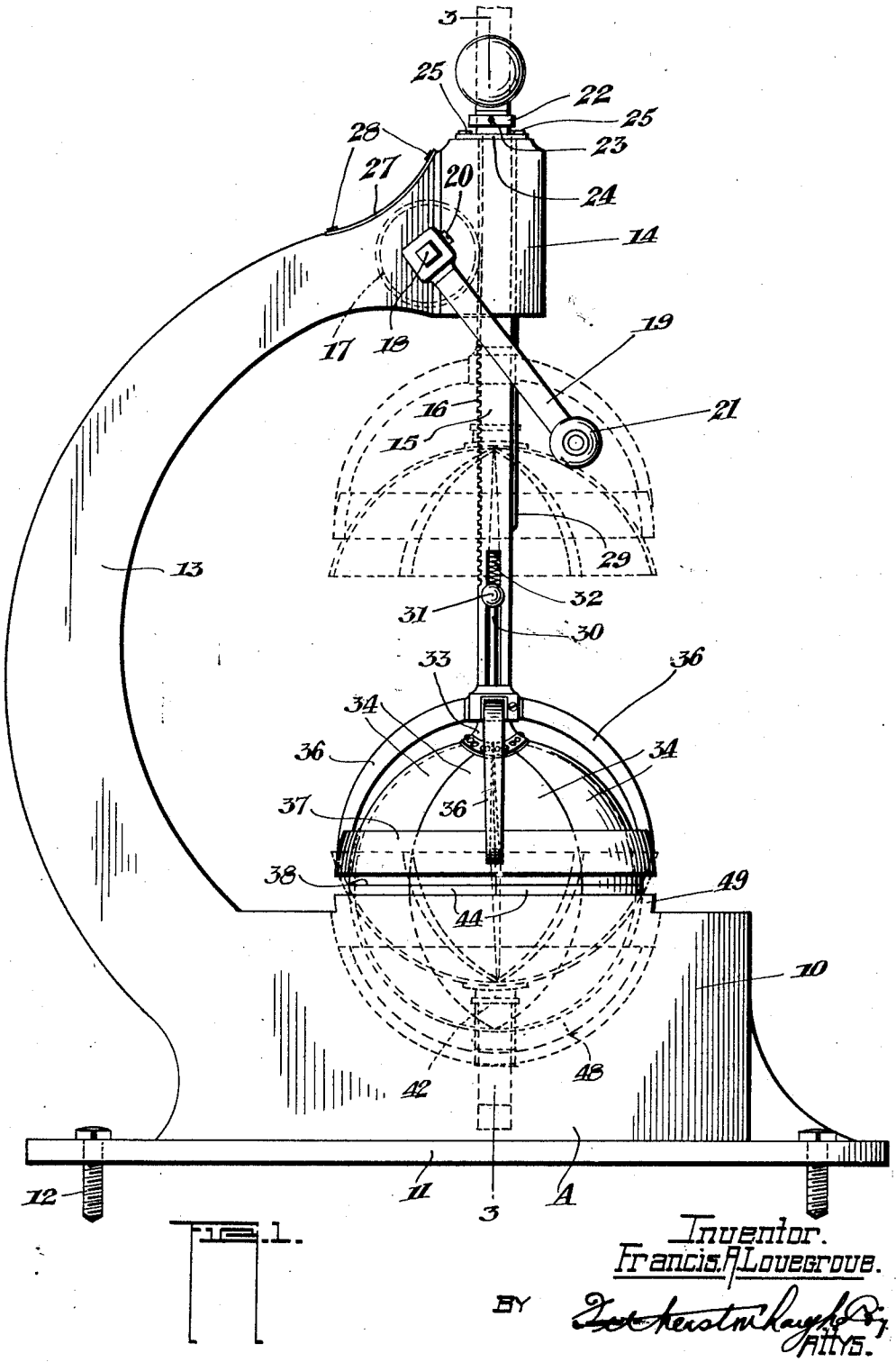


Fig. 1.

Inventor.
Francis A. Lovegrove.

BY Dodge Kenistin Lloyd & Fry
Attys.

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PRINTING MACHINE FOR SPHERES AND THE LIKE

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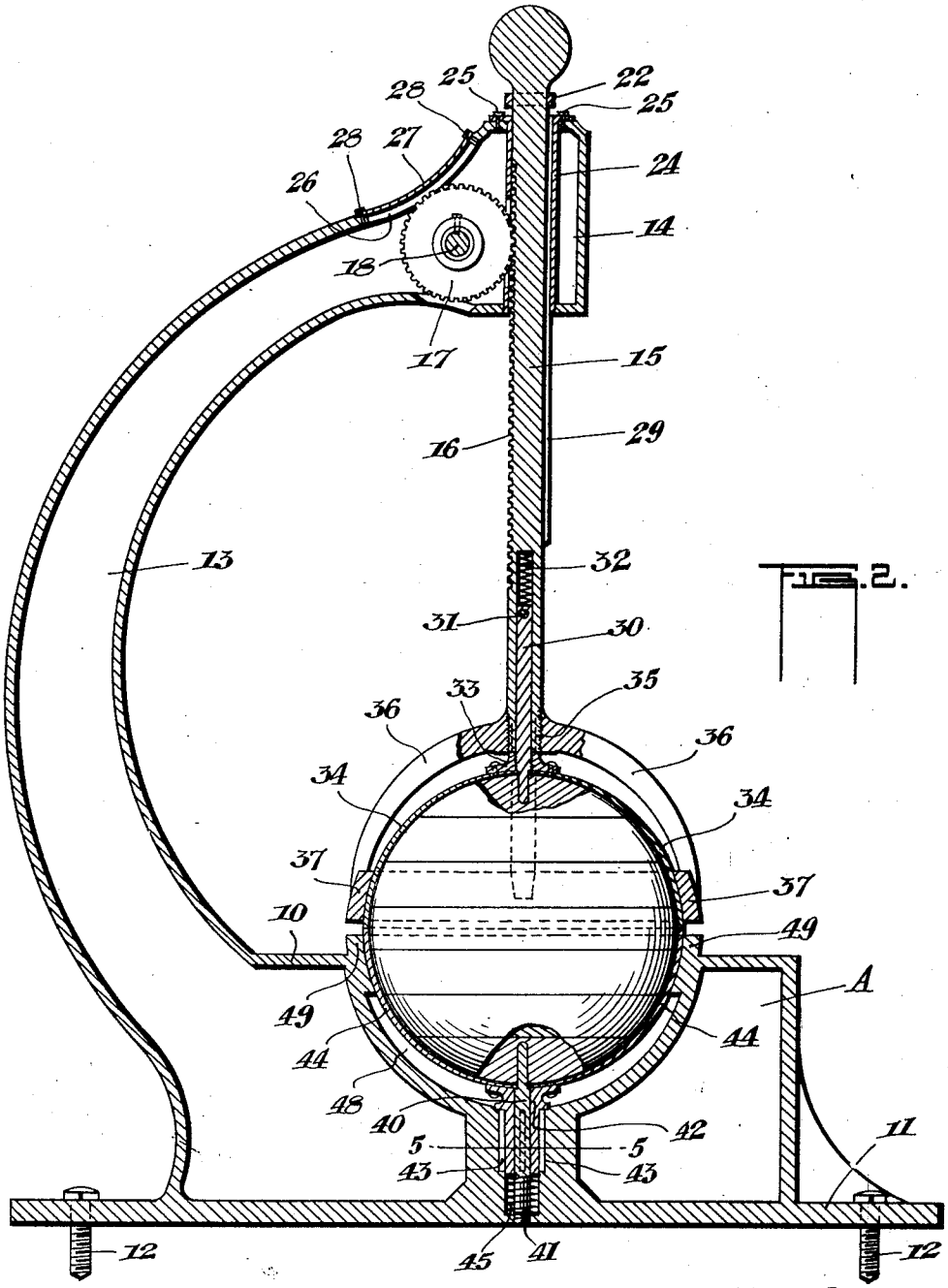


Fig. 2.

Inventor
Francis A. Lovegrove.

BY Fitzgerald, Hauff & Co.
Attys.

Sept. 17, 1929. F. A. LOVEGROVE 1,728,351

PRINTING MACHINE FOR SPHERES AND THE LIKE

Filed Aug. 10, 1928 5 Sheets-Sheet 3

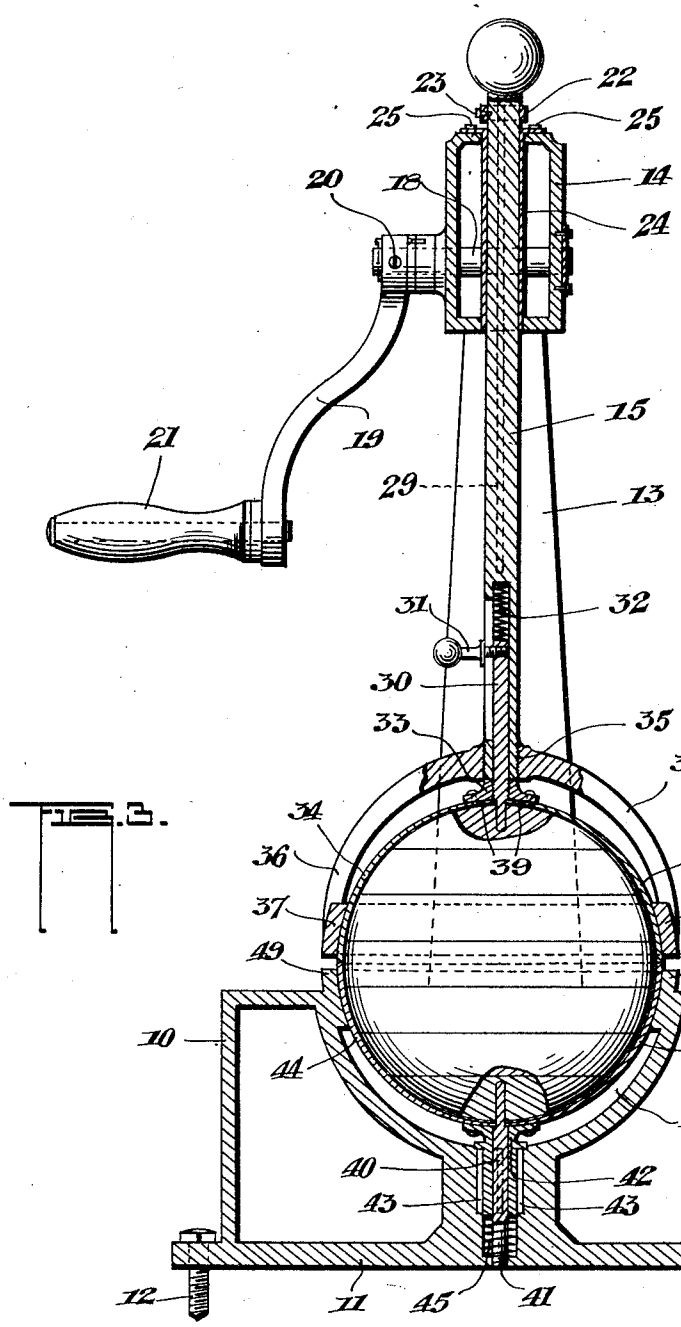


Fig. 3.

Inventor.
Francis A. Lovegrove

BY Fitchstorkaugh & Co.
Attys.

Sept. 17, 1929. F. A. LOVEGROVE 1,728,351

PRINTING MACHINE FOR SPHERES AND THE LIKE

Filed Aug. 10, 1928 5 Sheets-Sheet 4



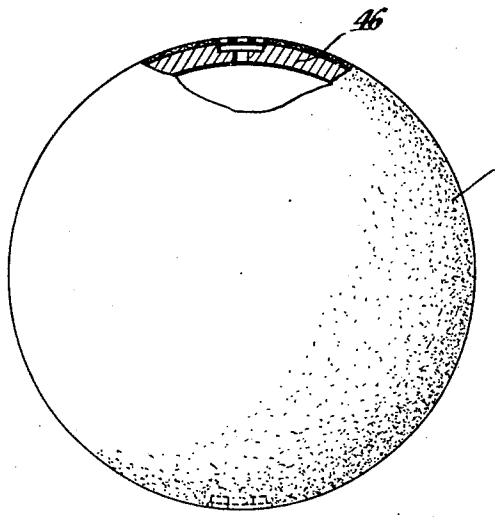


Fig. 6.

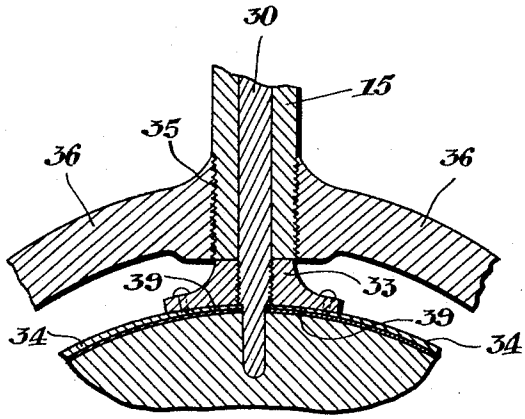


Fig. 4.

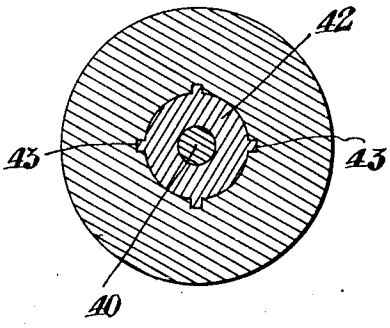


Fig. 5.

Inventor
Francis A. Lovegrove.

BY

Fitzpatrick, Laughlin & Cox
Attys.

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PRINTING MACHINE FOR SPHERES AND THE LIKE

Filed Aug. 10, 1928 5 Sheets-Sheet 5

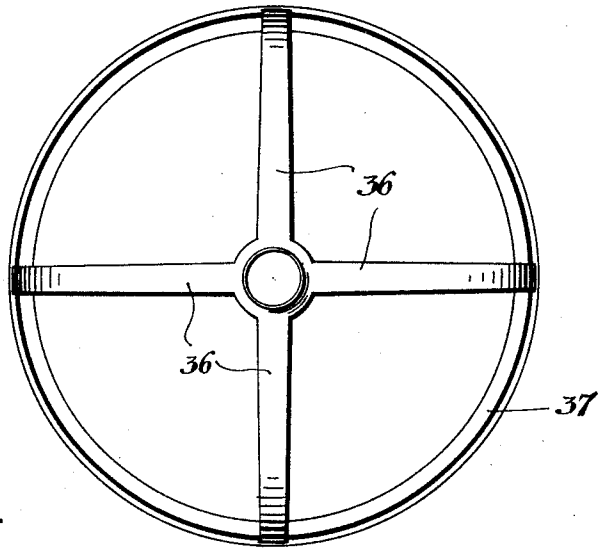


Fig. 7.

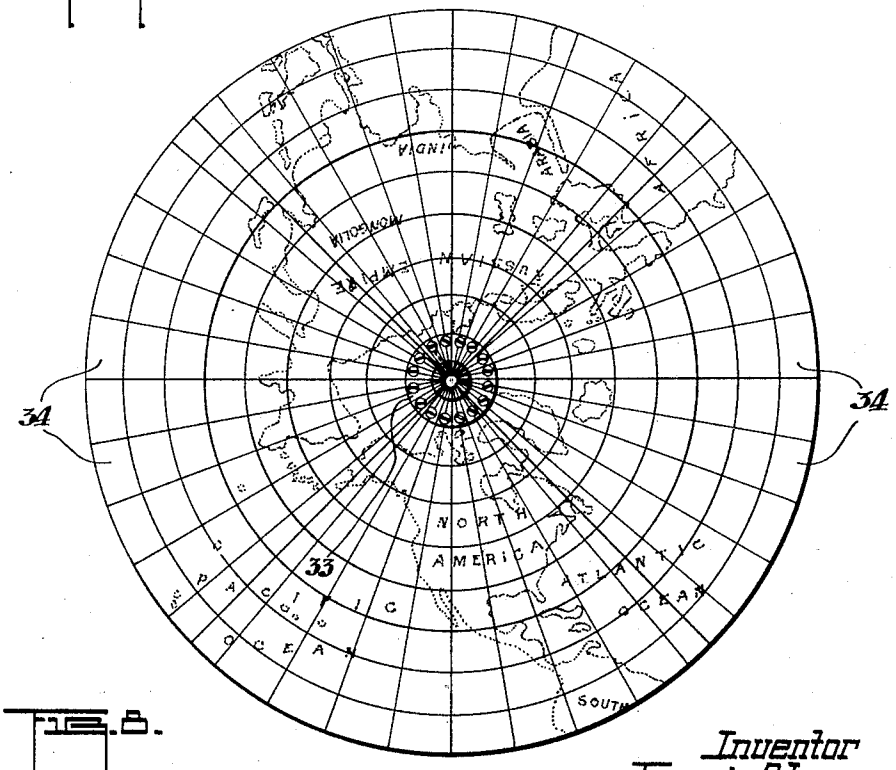


Fig. 8.

Inventor
Francis A. Lovegrove
BY Fitzgerald & Co.
Attys.

Patented Sept. 17, 1929 1,728,351

UNITED STATES PATENT OFFICE

FRANCIS AUGUSTUS LOVEGROVE, OF HALIFAX, NOVA SCOTIA, CANADA

PRINTING MACHINE FOR SPHERES AND THE LIKE

Application filed August 10, 1928. Serial No. 298,767.

This invention relates to improvements in printing machines for spheres and the like and more particularly to machines of this description designed to print on a globe or sphere an atlas of the world.

One object of the invention is to eliminate the tedious work of printing on papers and then subdividing same into quadrants and pasting the subdivisions on spheres.

A further object is to provide a machine of this description whereby a map of the world may be quickly and efficiently impressed upon a sphere at comparatively low cost as compared with the expenditure involved in methods and apparatus at present in use.

Yet another and essential object of the invention is to provide a globe atlas of the world in raised type to afford to blind people the same facilities for learning geography as those who have sight and thereby, it is believed providing a globe atlas for this purpose that has not heretofore been known or disclosed.

The novel features of the invention consist of a machine having a plurality of spaced, spring-pressed type-carrying sections conforming to the contour of, and adapted to clamp, a globe, the sections, or leaves as they are also termed, being adapted to impress in raised type on the globe indicia such as an atlas of the world, and mechanism associated with the sections or leaves for simultaneously opening and closing them.

Referring now to the drawings in which like characters of reference indicate corresponding parts in each figure,

Figure 1 is a side elevation of the machine

Figure 2 is a longitudinal section.

Figure 3 is a section on the line 3—3 of Figure 1.

Figure 4 is an enlarged fragmentary section of the guide bar, arms, and cone.

Figure 5 is an enlarged section on the line 5—5 of Figure 2.

Figure 6 is a detail of a hollow sphere with an ink pad cover and the hooked handle for lifting the ink pad and sphere.

Figure 7 is a detail of the press band for pressing the leaves together.

Figure 8 is a top plan view of an atlas sphere, the engraving underneath being shown in dotted lines.

Referring now more particularly to the drawings in which an example of the invention is disclosed, A designates the machine as a whole comprising a frame 10 adapted to be rigidly secured in any well known manner through the base 11 by means of bolts or the like 12. The frame 10 is formed with a substantially semi-circular arm 13 integral with which is a head portion 14 within which is a slidably mounted bar or rod 15 formed with a rack portion 16 designed to engage with a pinion 17 mounted on a shaft 18 in the head 14 and provided with an arm 19 detachably secured thereon by means of a screw 20 and having a handle portion 21 whereby the pinion 17 is rotated to raise or lower the bar 15. A collar 22 is provided on the bar 15 to limit its travel downwardly and is secured by means of a screw 23. A bushing 24 is also provided for the bar connected to the head 14 by screws 25.

For permitting access to the pinion 17 an opening 26 is provided in the head associated with which is a cover 27 secured by means of screws 28. The shaft or bar 15 is formed with a feather or guideway 29.

Set in a guide rod 30 in the shaft or bearing 15 is a stud 31 for moving the guide rod upwardly and downwardly. This rod is spring-pressed by a coil spring 32 and is provided at its lower extremity with a steel cap 33 screw threaded thereto and to which are secured in any well known manner a plurality of concave leaves 34, the surface of each leaf being formed in spherical sections engraved or adapted to carry type, in the present instance representing an atlas of the world, so that when the leaves are inked and then operated to clamp a globe or sphere supported thereby in the machine, the impression of the atlas will be made on the globe either in plan or raised type.

Co-operating with the upper leaves 34 is a press comprising spaced curved arms 36 screw-threaded to the lower end of the shaft or bar 15 as at 35 and joined together by a band member 37 (see Figure 7) preferably

made of steel, the arms and the band being also preferably made in one casting. The central line equally halving the leaves is indicated by the numeral 38, it being understood that a plurality of upper and lower leaves are provided, as hereinafter more fully referred to. The dotted lines in Figure 1 show the operation of the press band 37 on the leaves.

It will also be noted that the leaves or sections 34 are slightly flattened or thinned at the top as at 39 adjacent the cap member 33 to which they are fastened.

Co-operating with the upper leaves 34 are the lower leaves 44 (see Figures 2 and 3) arranged in a recess 48 in the frame of the machine and otherwise similar to the leaves 34. These lower leaves are slidably mounted in the recess 48 by means of a rod 40, screw-threaded as at 41 to the base 11 of the machine. On this rod 40 is slidably mounted a cap member 42 in the guideways 43 associated with the recess 48 and to this cap, as in the case of upper leaves, are secured the concave steel lower leaves 44, the cap 42 being spring-pressed by a coil spring 45 to normally retain the lower leaves in spread upward position, as shown in dotted lines in Figure 1.

Associated with these leaves and integral with the recess 48 in the machine is a fixed press band member 49 hereinafter more fully referred to.

From the foregoing it will be seen that, on the shaft 15 carrying the upper leaves and the movable press band 37 being moved upwardly, the arms 36 and the press band 37 will run back and the upper leaves 34 will automatically spread open. At the same time pressure being removed from the globe supported in the lower leaves, they will also spread under the influence of the coil spring 45, permitting the globe or sphere to be readily removed or replaced.

More particularly the operation of the machine is as follows:—The shaft 15 is first moved upwardly by operating the handle 21 one revolution to the left. Or in other words, the machine is opened for the reception of a globe or sphere. This usually takes the form of a sphere 46 covered by a pad of absorbent material 47 saturated with printer's ink to provide, as illustrated in Figure 6, an ink pad.

The handle 21 is then turned one revolution to the right, causing the press band 37 and upper leaves 34 to move downwardly in clamping position on the sphere the movable press band 37 engaging with the upper leaves 34 for this purpose. The pressure thus exerted on the upper half of the sphere causes the lower leaves to contract and be engaged by the fixed press band 49, thus completely clamping all around and all over the ink-padded sphere with the type carrying leaves and thereby thoroughly inking the type or engraving thereon. The operating handle is then again turned to the left; the clamping leaves and press band 37 released; and the ink-padded sphere removed. The sphere or globe to be printed or impressed is then placed in the machine and the same operation as above described is performed when the indicia carried by the leaves is efficiently and completely impressed on the globe in plain or raised type.

It will be noted that when the press is run back the leaves 34 expand upwardly leaving a space between each section, this being due, as previously mentioned, to the fact that the thin part of each leaf is flattened permitting them to open and is essentially for the purpose of providing that the engraving will press on the sphere at right angles so that lettering will not be pushed out of position but will be made clear and in concise form as if printed on a flat surface or plane.

It will also be noted that the lower leaves 44, which similar to the upper leaves are formed of resilient steel flat at the top, as already explained, will normally tend to expand under the influence of the spring 45 in a protruding position in regard to the press band 49 and that, on the globe being pressed within the lower leaves, the gravity pressure exerted will automatically tend to cause the leaves to contract and move inwardly to clamp the globe. The upper leaves 34 will engage with the upper portion of the globe, and finally, the shaft 15 operated through the handle 21 will be moved downwardly with the press band 37 engaging the upper leaves and simultaneously clamping them and retaining them clamped against the globe. At the same time the further pressure exerted by the shaft 15 and press band 37 will cause the lower leaves to retain a clamping position on the lower half of the globe thereby uniformly impressing the surface of said globe with the indicia on the under side of the leaves.

As many changes could be made in the above construction and many apparently widely different embodiments of my invention, within the scope of the claims, constructed without departing from the spirit or scope thereof, it is intended that all matter contained in the accompanying specification and drawings shall be interpreted as illustrative and not in a limiting sense.

What I claim as my invention is:—

1. In a printing machine of the character described, a plurality of automatically contractible type-carrying leaves for engagement, from opposite ends, with a globe or sphere to clamp it, a movably mounted press member co-operating with a section of the leaves, and a fixed press member co-operating with another section of the leaves whereby the leaves are retained in clamping position, and means for simultaneously operating the leaves and the movable press member.

2. A printing machine of the character described, comprising a frame provided with a suitable head and formed with a recess conforming to the contour of a globe or sphere, a plurality of type-carrying leaves vertically slidable in the frame and spring-pressed to open position to support a globe or sphere, a plurality of similar spring-pressed leaves slidably mounted in the machine head and normally retained in inoperative open position, adapted to co-operate with the first-mentioned leaves to clamp the globe or sphere, a vertically movable press band co-operating and operable with the last-mentioned leaves, rack and pinion mechanism operable from without the machine for operating the movable press, and separate manually operable means for operating the second-mentioned leaves.

3. A machine for printing on spheres or the like to provide a globe atlas, comprising a frame with a cup-shaped recess therein, a set of resilient curved leaves having indicia thereon associated with the recess, a spring-pressed support common to said leaves and movably mounted in the recess, a press band integral with the frame for engagement with the leaves, a second set of curved resilient spring-pressed leaves movable vertically relative to the first-mentioned set, a separately movable press band associated with the second-mentioned set of leaves, mechanism for operating the movable press band, and manually operable means for operating the second-mentioned set of leaves.

4. The invention according to claim 3 in which the mechanism for operating the movable press band comprises a shaft, a plurality of curved arms carried by said shaft in turn connected to the press band, and rack and pinion means for raising and lowering said shaft.

5. In a machine of the character described for printing on globes and such like, the combination with separate series of resilient type-carrying leaves, one of which is adapted to engage with and support the globe and to automatically clamp the globe under the influence of the weight of the globe, the other of said series of leaves being vertically movable relative to the first-mentioned series and spring-pressed to normally remain expanded, of a movable pressure plate or band movable vertically with the second series of leaves and adapted to engage with the second series of leaves and retain them in clamping position relative to the globe.

6. A printing machine for globes, spheres and the like comprising spring-pressed, cup-shaped indicia carrying members adapted to co-operate to support and clamp a globe.

7. A printing machine for globes, spheres and the like comprising cooperating sets of spring-pressed, cup-shaped indicia carrying members in spaced and vertically movable relationship to one another, adapted to co-operate to support and clamp a globe.

8. A printing machine for globes, spheres and the like comprising spring-pressed, cup-shaped indicia carrying members in spaced and vertically movable relationship to one another, adapted to co-operate to support and clamp a globe, a movable press member associated with one of the cup members, and a fixed press member associated with the other cup member.

In witness whereof I have hereunto set my hand.

FRANCIS AUGUSTUS LOVEGROVE.