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IMPROVED TYPE COMPOSING AND DISTRIBUTING MACHINE.

A great deal of ingenuity has been exercised upon the perfecting of labor-saving machinery for the composing rooms of printing offices, and quite a large number of devices for setting up and distributing type mechanically are now actually in use. Whether the ordinary conditions of the printing trade are such as to render a general use of this machinery impracticable, or whether a conservative adherence to time-honored customs is antagonistic to revolutions such as would ensue upon the adoption of wholly efficient composing and distributing machinery, need hardly be discussed. It is certain that in this country at least, while such machinery does find favor in quite a number of offices, their use does not extend widely. Of course they are necessarily costly and complicated, and assuming everything to be satisfactory, they must be

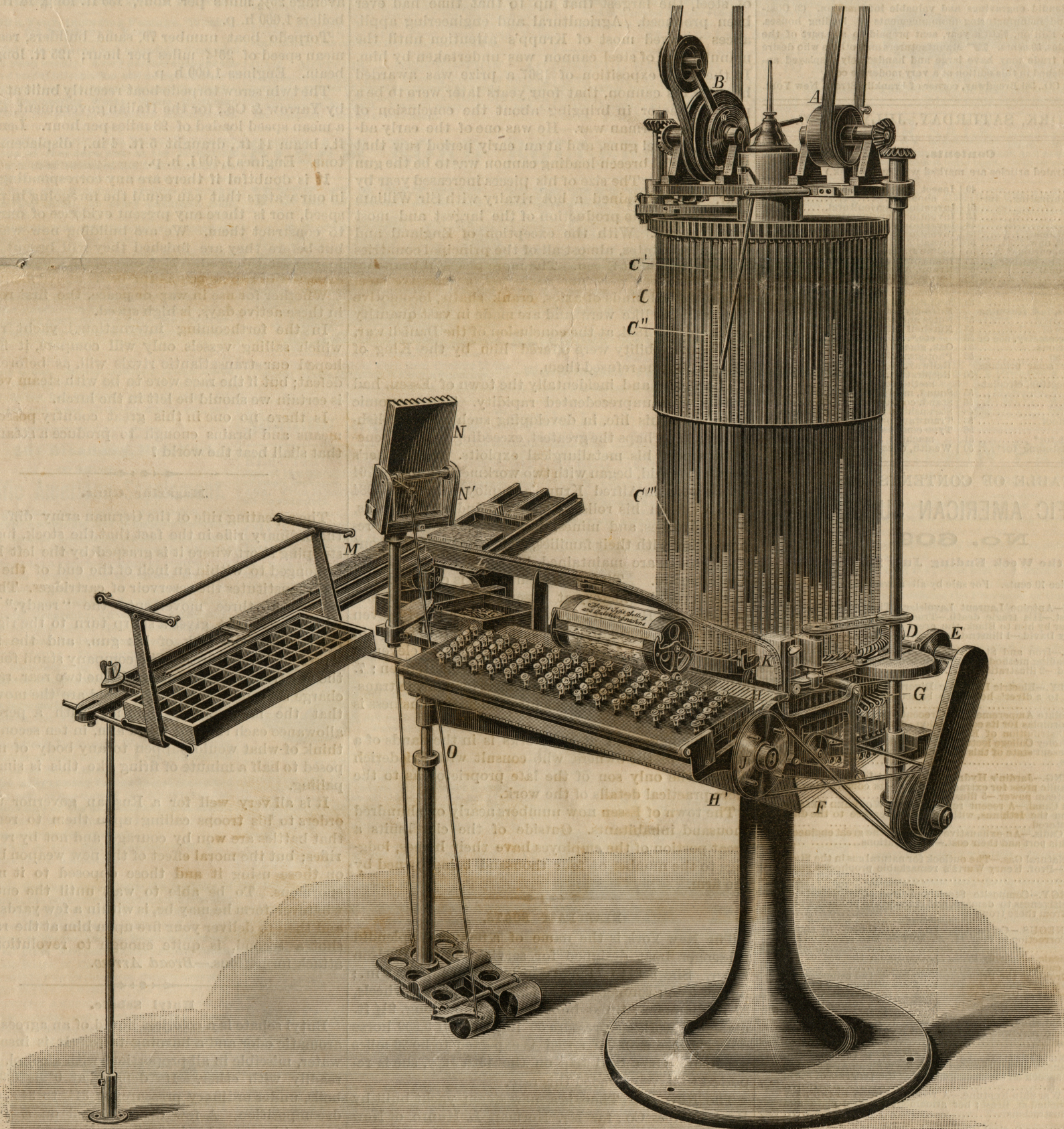
kept in constant use to effect any marked economy, or rather perhaps to avoid a loss.

One of the most interesting objects at the American Exhibition, now open in London, is a machine of this kind. We illustrate it below by a general view, and by some diagrams which will serve to show the general mode of working.

As will be seen on reference to the general view, the two principal features of the Thorne type setting and distributing machine are a keyboard and two vertical cylinders, C and C¹, having the same axis, the upper cylinder resting on the lower one. Both cylinders are cut with a number of vertical grooves, C¹ C¹, of such a form as to receive the type, which is to be first distributed and then reset. In the machine shown at the exhibition there are 90 of these vertical grooves in each of the cylinders, sufficient to contain enough characters and kinds of characters as are wanted for ordinary

purposes, but of course machines are made with a greater number of these grooves. The keyboard carries a number of keys corresponding to that of the grooves, and when the machine is in operation, whatever key is depressed, the letter corresponding to it is thrown from its proper groove in the cylinder, C¹, upon a circular and revolving table, D, which has the same axis as the cylinder, but is of larger diameter. Of course quite a number of types may thus be ejected from the grooves in each revolution of the disk, D, and all are brought round in their proper order to a point of delivery, where they are taken up by a traveling metallic band, K, and fed continuously in front of the keyboard to a galley, M. Here any justifying that is necessary is done by a second operator, who stands opposite the small case, N, containing spaces, quads., etc., any desired one of which can be thrown forward by an

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ingenious treadle arrangement, N and O. Proof corrections are, of course, done in the ordinary way. The lever connections between the keyboard and the stops, which eject the various types from their respective slots, are indicated by F, J, G, H, and H'. They are necessarily complicated, but, according to the manufacturer, are not liable to get out of order. Their mode of working will be presently explained. In the general view, A B show the mechanism for causing the distributing cylinder to revolve. As in many other machines of this class, the control of the types is effected by forming on the side of each character recesses something like the wards of a key, the arrangement, of course, being different for each different character. Besides this, some very thin types, such as *l* and *z*, are formed with a nick at the bottom. The grooves on the cylinders are provided with projections corresponding to those on the types, so that no type will fall into any groove other than that it is intended for. This arrangement applies only to the cylinder, C'', which does not revolve. The grooves in the distributing cylinder, C, are large enough to receive all the types indifferently that are fed into them.

The work of distribution is effected as follows: A suitable attachment to the side of the cylinder, C, enables the operator to place the galley containing the type to be distributed in contact with the cylinder, and by a very simple device line after line of type is fed into the cylinder until, if desired, every groove is nearly filled. Weights are then introduced into the grooves above the type to keep the latter steady, and the upper cylinder is caused to revolve upon the lower one with which it is in contact. As the columns of mixed type pass over the heads of the shaped grooves of the lower cylinder, letter by letter falls into its proper groove as soon as the nicks in the type find their corresponding wards. In this way, and at a speed depending on the rate at which the cylinder, C, is driven, the types are all distributed ready for the work of the compositor.

The details on this page, while not representing exactly the arrangement of the mechanism of the Thorne machine shown at the American Exhibition, will give a clear idea of the principles upon which its action depends.

Fig. 1 is a diagram plan of the stationary type case, showing a sufficient number of grooves to illustrate the principle. These grooves or channels, 2, are so formed in the type case as to be open at their upper ends, and they are closed at their bottom ends by means of the base, 20, Fig. 3, which forms a rest for the type lying in the channels. These channels are all furnished on one side with one or more wards, 8, which are variously arranged so as to correspond with nicks made in the types as already said.

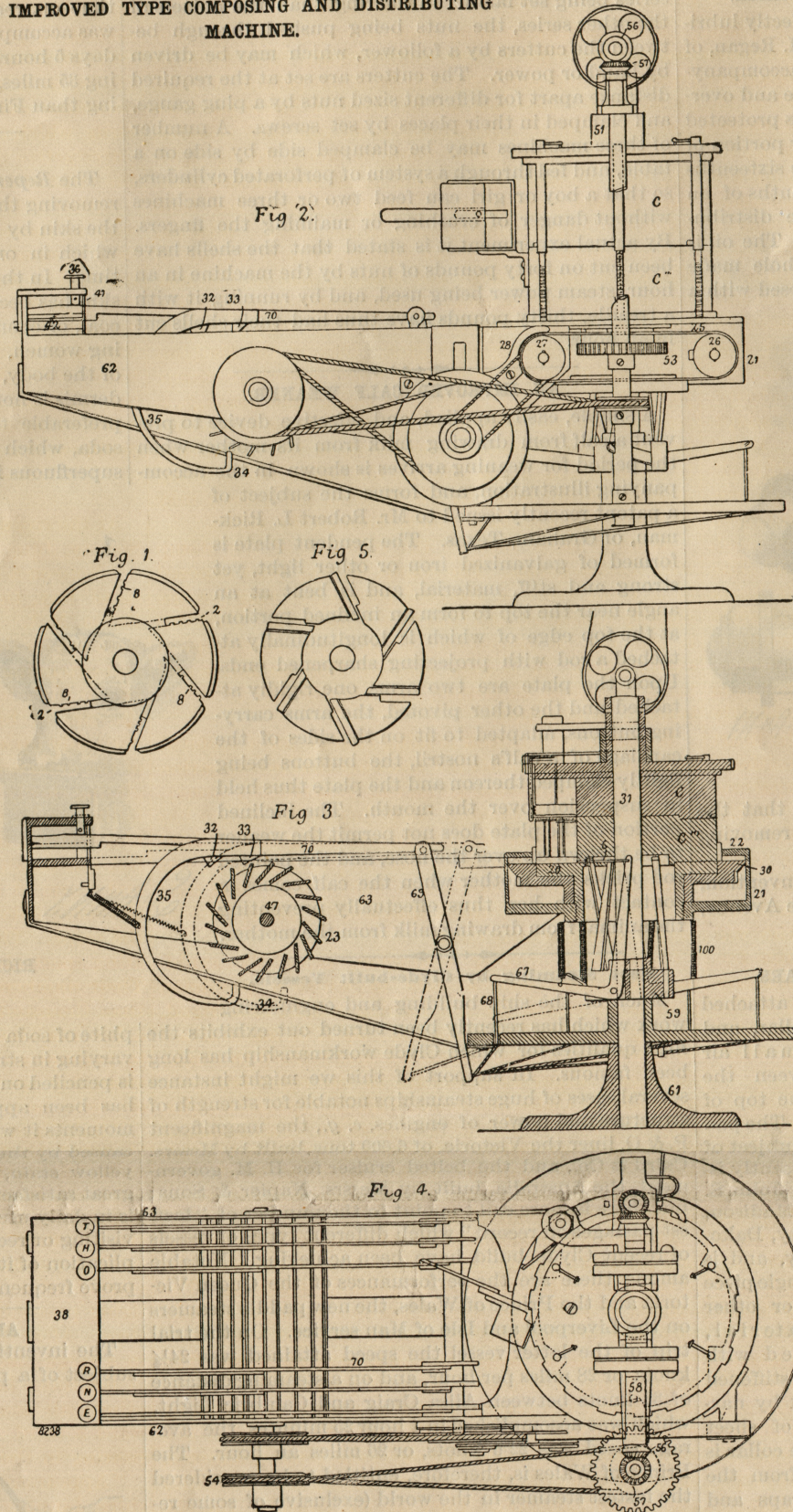
The type conveying mechanism consists of a type carrying table, 30, the surface of which lies in the same horizontal plane as that occupied by the bottoms of the type channels formed by the base, 20. It is mounted so as to revolve with the center of the type case for its center of movement, and thus is adapted to receive type from the channels, 2, upon its surface and carry the same around with it in its circular path of travel.

A circular vertical guard, 21, forms the outward limit to which the types may be projected. This guard is attached to the base, 20, so as to project above the face of the table, 30, to a height at least equal to the thickness of the largest type used in the machine, and this vertical guard is supplemented by a horizontal guard, 22, which projects inwardly and nearly covers the type face that is formed by the type case, the table, and the vertical guard.

The lower end of the type case is furnished with guards covering the space between the type channels that prevent type in process of composition from becoming jammed between the guard, 21, and the type case, as will be explained further on.

The type case, C, and the mechanism and devices sustained by it are supported by a central shaft, 31, mounted in a stand, 61, and by the framework that carries the keys and the side plates, 62, 63.

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The means for revolving the type carrying table, 30, is a vertical shaft, 51, at one side of the machine, which carries a spur wheel, 53, that engages the toothed perimeter of the table, 30. This shaft is driven by means of bevel gears, 56, 57, from a cross shaft, 58, mounted above the machine, and supplied with driving and loose pulleys.

The type ejecting mechanism is constructed as follows: Each type channel of the type case, C, is provided with a type ejector, 6, each of such ejectors consisting of a flat plate of metal of a width adapted to that of the type channels, and of a thickness less than that of the type it is to operate upon. The faces of these ejectors are beveled and are carried at the ends of bell crank levers, 67, that are pivoted in recesses of a fixed hub, 59, and held normally in the positions shown in Figs. 2 and 3 by springs, 100, the movement of which bell cranks causes the ejectors to reciprocate horizontally in the bottom ends of the type channels, and during each forward movement to push the lowermost type out of a channel on to the revolving type carrying table, and during each rearward movement to clear the channel, so that the types remaining therein may fall.

The bell cranks, 67, are attached by means of cords, 68, to the lower ends of rocking levers, 69, to the upper ends of which latter the key bars, 70, are pivoted. These key bars are provided with tappets, 32, 33, attached to their bodies so as to be above the plates, 23, of a rotating type bar driver, and with a tappet, 34, that is carried by a curved arm, 35, so as to be below the plates, 23, of the same type bar driver.

This type bar driver consists of suitable heads attached to a carrying shaft, 47, and provided with a number of angularly arranged plates, 23, and it is constantly rotated by means of a pulley, 54. The key bars are capable of being moved vertically as well as horizontally, and when carried downward their tappet, 32,

will be engaged by one of the revolving plates, 23, which will thus move the depressed key bar forward and carry its tappets, 33 and 34, into their foremost position. When the key bar is thrown so far forward that the plate, 23, which propelled it passes off from the tappet, 23, it will have brought its tappet, 33, into a position to have its rear face engaged by another of the plates, 23, which plate, in moving over the inclined rear face of said tappet, 33, presses the same upward and raises the key bar to which it is attached, thus lifting the tappet, 34, high enough to be engaged by one of the plates, 23, which will then, by means of the arm, 35, carry the type bar back to its rearward position, when it will be held by its sustaining spring in the raised position shown in Fig. 3.

Each of these key bars has its front end guided in a vertical slot in the plate, 41, and the division plate, 42, of the key board frame, and it carries at its front end a small cross stud that will pass through a slot at the front end of the division plate, 42, when the key bar is pressed downward and forms a riding guide bearing against the under side of the division plate, 42, as the key bar is carried inward. At its rear end this division plate has another slot that permits the upward passage of the stud, 43, and consequently allows the key bar to rise at the end of its rearward stroke, so that it may be moved forward with its stud, 43, riding upon the top of said division plate.

Each key bar is surmounted by a key, 36, which keys are held in vertical guide slots in the top plate, 38, of the key board frame, and so as to rest upon the upper surface of the key bars. When a key is depressed, it forces a key bar downward, thus bringing its tappet, 32, into a position to be engaged by one of the plates, 23, the slot in the front end of the division plate causing the stud, 43, not to obstruct such movement. When a key bar, 70, is thus moved downward, a plate, 23, engages its tappet, 32, and forces the bar rearward by a positive movement. The stud, 43, then bears against the under face of the division plate, 42, and with it acting as a guide, holding the key down, the tappet, 32, is in engagement with the said plate. The rearward or inward movement of the key bar moves the lever, 69, and rocks the bell crank, 67, the latter forcing a type ejector, 6, outward, and causing

it to expel a type from its type channel. The type thus ejected is received upon the rotating carrying table, 30, and is carried around with its face foremost until it reaches the throat, 3, through which it is propelled on to a type conveying belt, 25, running over pulleys, 26, 27, which is arranged to travel with its edge in the same plane as that of the table, 30. This belt travels at a speed slower than that of the carrying table, and conveys the type to an inclined guiding chute, 28, whence it is conveyed to the line forming mechanism with a momentum that will not cause its face to be injured.

The detailed figure illustrates the type distributing mechanism, which is very simple and has already been sufficiently described.

From the foregoing description the great ingenuity of this machine will be evident. It appears to have been very successfully introduced in the United States, where its capacity for setting and distributing is equal to 12,000 ens per hour. The machine is made by the Thorne Machine Company, Hartford, Conn.

We are indebted to *Engineering* for our engravings and the foregoing particulars.

Fluoride of Nitrogen.

The supposed compound was formed by passing an electric current from seven ferric chloride batteries through a concentrated solution of ammonium fluoride. After the lapse of a short time, several drops, of oily consistence, were observed attached to the negative plate. On becoming connected with the positive, a thin gold wire, these drops exploded with violence. The compound is undoubtedly highly unstable, being at once decomposed in contact with glass, silica, or organic matter, thus rendering the analysis of the same one of considerable risk. Its explosive violence is even greater than the chloride of nitrogen, and it is also prone to spontaneous decomposition.—*Chem. News.*