(No Model.) 4 Sheets—Sheet 1.

R. CALLENDER.

COMBINATION ORGAN STOP ACTION.

No. 420,435. Patented Feb. 4, 1890

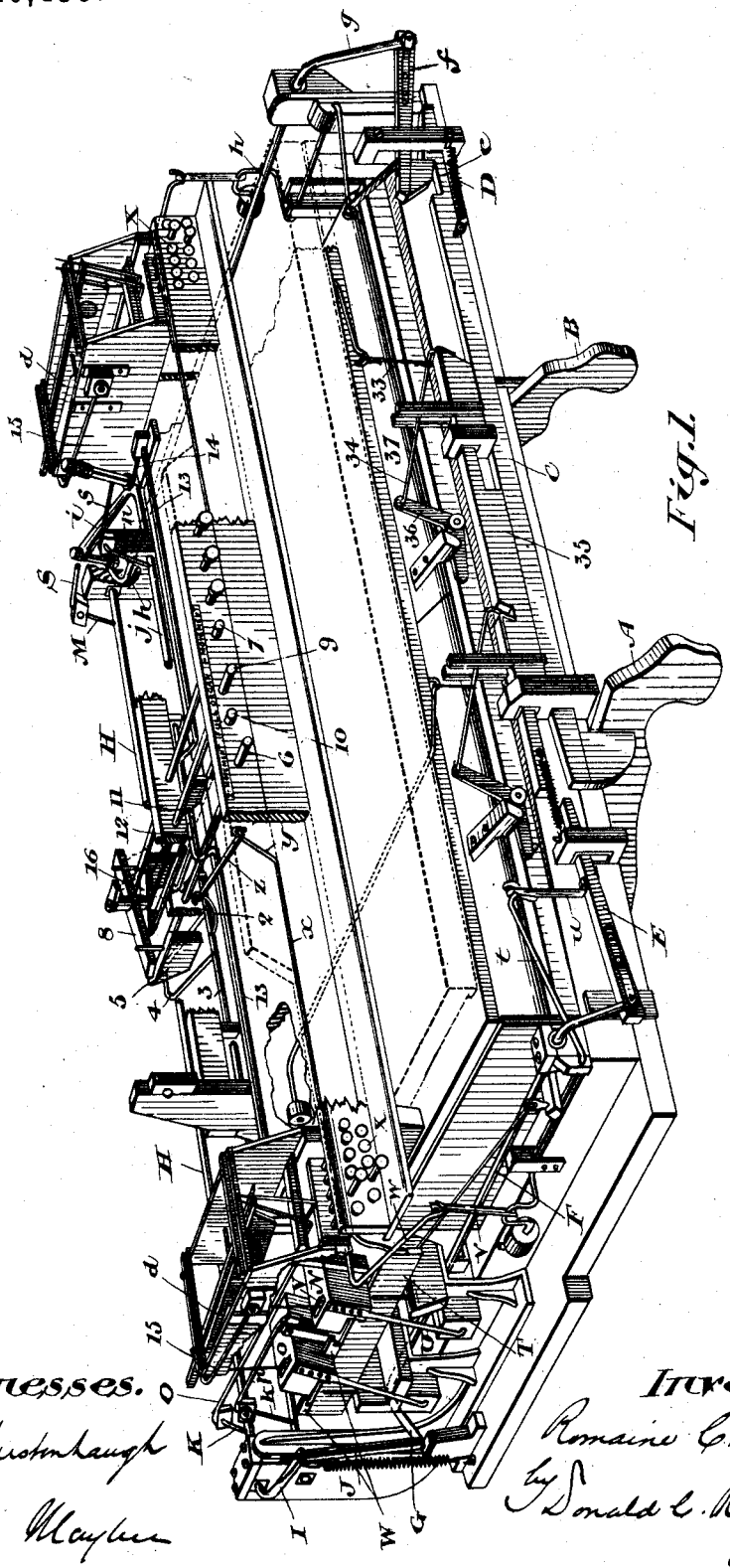

Fig. 1.

Witnesses.
F. B. Fethurstonhaugh
J. Edw. Maybee

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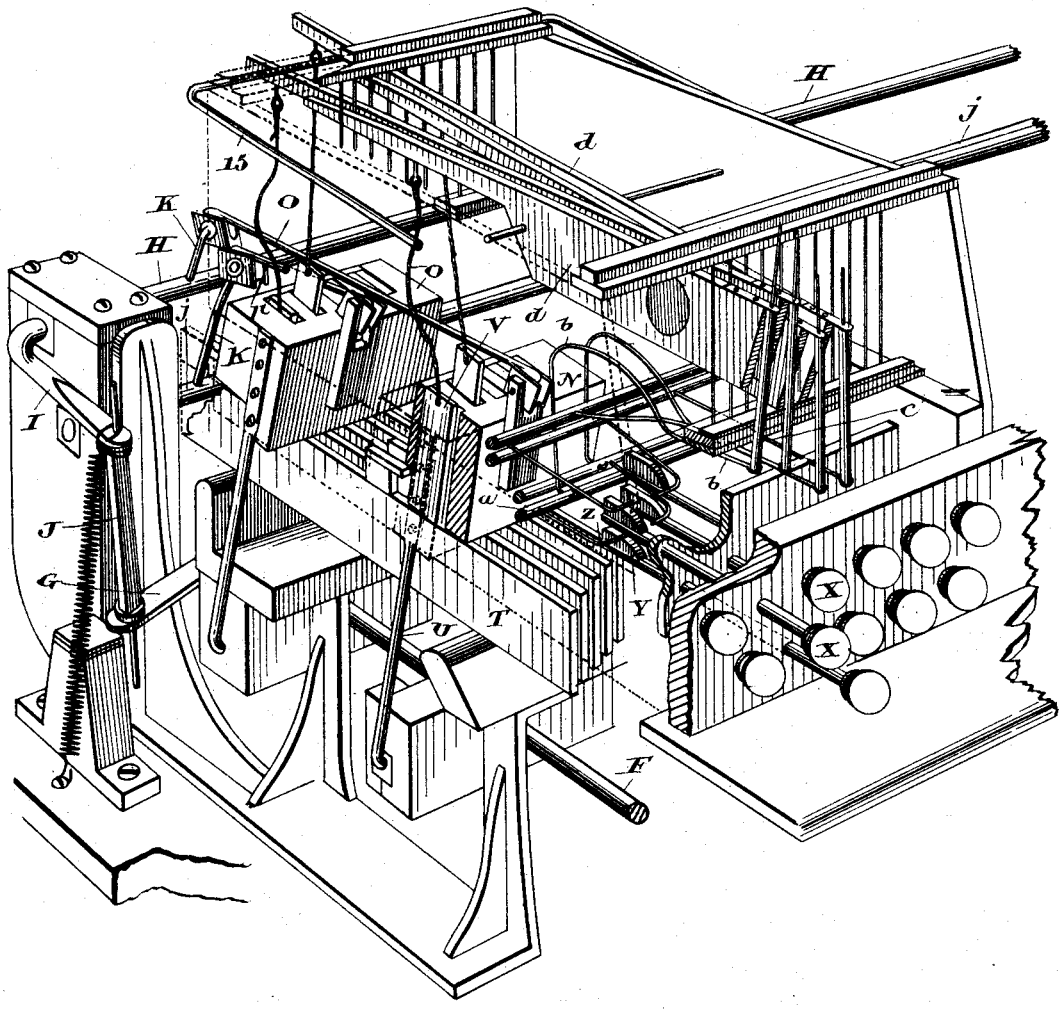

Fig. 2.

Witnesses.
F. B. Fesherstonhaugh
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R. CALLENDER.

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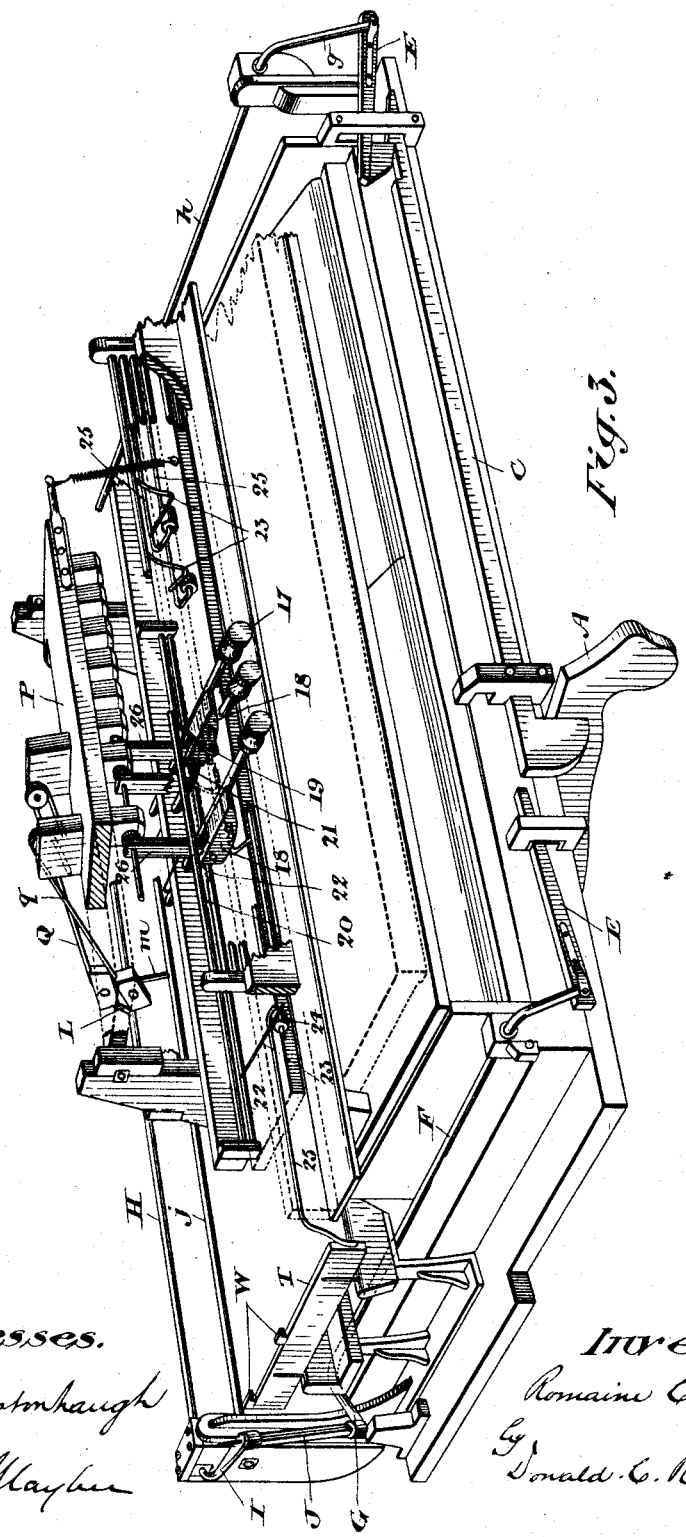

Fig. 3.

Witnesses.
F. B. Fethestonhaugh
J. Lau. Mayhew

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(No Model.) 4 Sheets—Sheet 4.

R. CALLENDER.

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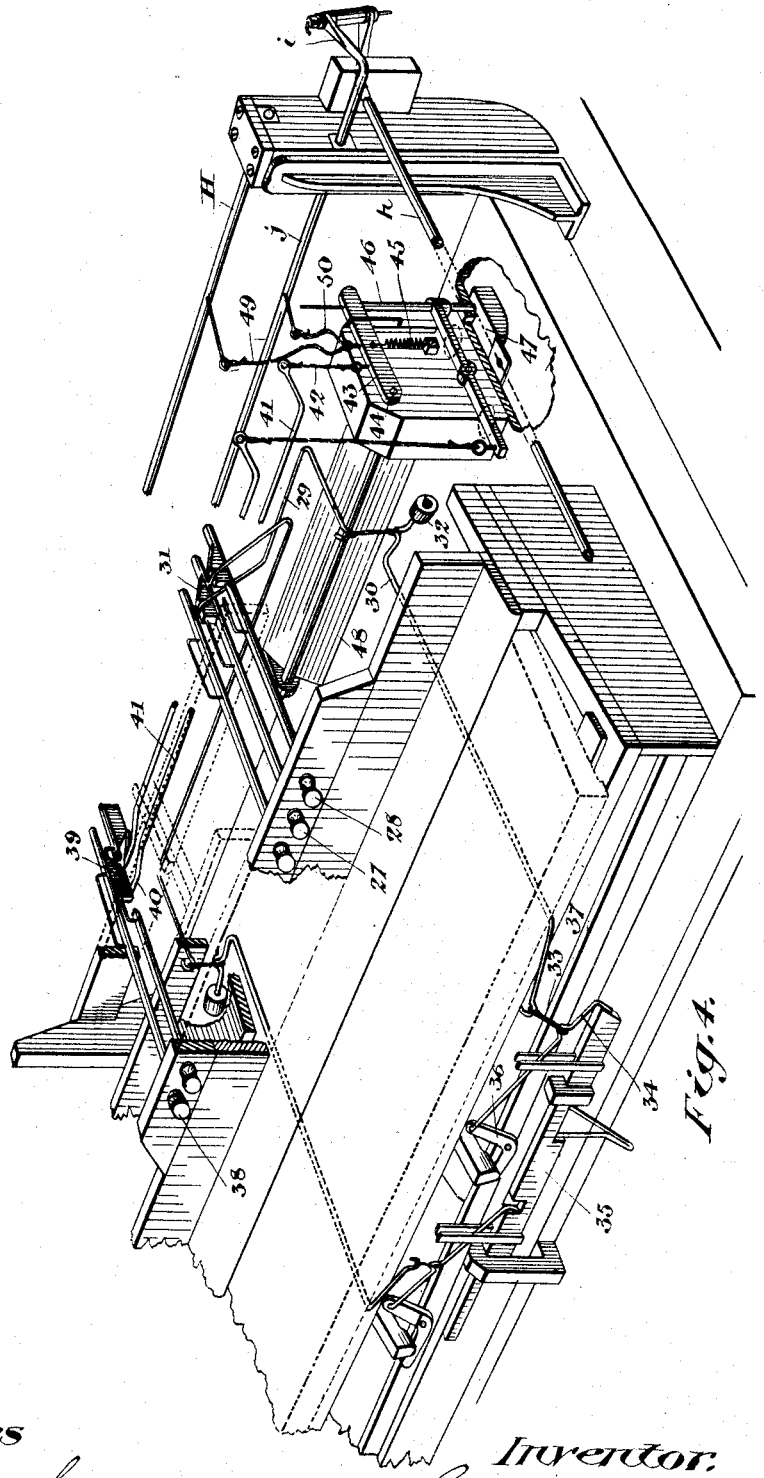

Fig. 4.

Witnesses
F. B. Fetherstonhaugh
J. Edw. Maylan

Inventor:
Romaine Callender
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N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

ROMAINE CALLENDER, OF ST. THOMAS, ONTARIO, CANADA, ASSIGNOR OF ONE-HALF TO JOHN PIPER MARTYN, OF SAME PLACE.

COMBINATION ORGAN-STOP ACTION.

SPECIFICATION forming part of Letters Patent No. 420,435, dated February 4, 1890.

Application filed April 26, 1888. Renewed October 18, 1889. Serial No. 327,399. (No model.)

To all whom it may concern:

Be it known that I, ROMAINE CALLENDER, professor of music, of the city of St. Thomas, in the county of Elgin, in the Province of Ontario, Canada, have invented a certain new and useful Improvement in Organ-Actions, of which the following is a specification.

The object of the invention is to design an organ in which the performer has complete control of all the resources of the instrument and is enabled to produce various combinations without any effort and without interrupting his performance; and it consists, essentially, in providing a number of stops so connected to the organ-action that they may be set into various combinations by the performer before commencing to play, simple mechanism being provided by which the performer can instantly change the action from one combination to another without any effort or break in the continuity of the music, substantially as hereinafter more particularly explained.

In the drawings, Figure 1 is a perspective view of my organ-action, showing the parts operated from the grand-organ knee-push. Fig. 2 is an enlarged view of the adjustable combinations for my first and second movements. Fig. 3 is a view of my solo and damping actions. Fig. 4 is a view showing my divided swell and automatic vox humana.

In the drawings like letters and figures of reference indicate corresponding parts in the different figures.

A represents a knee-push similar to the ordinary knee-swell B, with which my improved organ is of course provided.

C is the grand-organ rod carried in suitable bearings on the front of the organ and acted on by a spring D, so as to hold it in its normal position, as shown in Fig. 1.

E is a bar pivoted on the end of the crank-rod F. This rod extends to the back of the instrument, and has a crank G formed on it.

H is a rolling rod carried in suitable journals, as indicated, and having a crank I formed on its end, the cranks G and I being connected by the push-bar J, so as to transmit the rolling movement of the rod F to the rod H. The rod H has three cranks K, L, and M formed on it, the crank K being connected to the block N by the rod O, the crank L to the damping-action P by the rod Q, and the crank M is connected by the rod S to a block similar to the block N on the opposite end of the instrument. Both blocks are supported above the slides T by a pivoted frame U, and in each block is fitted a number of vertically-adjustable plungers V, a separate plunger being provided for each separate slide T, and is arranged so that when allowed to drop below its block the particular plunger so dropped will fall in front of a projection W, formed on the top of its slide. Consequently, when the block is caused to move back by the rolling action of the rods F and H, the plunger so dropped engages with its slide, and as each slide is suitably connected to a separate mute a separate set of reeds is brought into action by each separate slide, and only such slides as are connected to the blocks by their plungers will move, and only such sets of reeds as may be thus connected to the blocks will be brought into action, except such reeds as may be brought into action by the manipulation of the ordinary stops of the organ.

In order to produce the necessary rolling movement to the rods F and H, I arrange the pivoted bar E so that its end may be dropped in front of the end of the grand-organ rod C, which rod may be pressed against the end of the bar E by the performer pressing against the knee-push A, thus producing the necessary rolling movement to the rod F, and through its connection with the rod H a corresponding rolling movement is imparted to the latter rod, which latter rod being connected, as described, to the blocks N and R, the combinations controlled by the said blocks may be instantly brought into action by the performer pressing against the knee-push A, the rods F and H, with their connections, being so arranged that they instantly resume their initial position the moment that the pressure is removed from the end of the pivoted bar E.

Before describing how I control more than one combination through the knee-push A, I shall first explain briefly the mechanism by which the plungers V are operated. In ad-

dition to the ordinary stops of the organ, I provide an independent set of stops, each stop being connected to a separate plunger; but as all the stops are connected to their respective plungers in the same manner it will be sufficient for the purpose of this specification to describe the mechanism connected with one stop. The stop X has a wedge-shaped block Y formed upon or attached to its end. This block is located behind a crank Z, formed on or attached to the rolling rod *a*. An arm *b* is attached to the rod *a* and connects with a sticker *c*. This sticker is connected to the weighted end of the pivoted lever *d*, which lever is attached to the plunger V by a flexible connection located on the opposite side of the pivot of the lever. When it is desired to connect the particular plunger to its slide, the stop X is pulled out, and its block Y, pressing against the crank Z, presses up the said crank, which action rolls the rod *a*, causing the arm *b* to lift the sticker *c*, raising the weighted end of the lever *d*, thereby permitting the plunger V to fall below its block in front of the projection W, and thus forming the connection before described between the block and slide. When the stop X is pushed in, the weighted end of the lever *d* causes the said end to fall and instantly raises the plunger V out of connection with its slide.

With the view of enabling the performer to arrange two sets of combinations before commencing his performance, I form at the opposite end of the grand-organ rod C a notched recess *e*, designed to receive the hooked end of the bar *f*, which is pivoted on the crank *g*, formed on the end of the rolling rod *h*. The opposite end of this rod *h* has a crank formed on it, connected, as indicated, to a crank *i*, formed on the end of the rolling rod *j*, carried in suitable bearings and running parallel with the rod H. Like rod H, the rod *j* has three cranks *k*, *m*, and *n*, the crank *k* being connected to the block *o* by the rod *p*, the crank *m* to the damping-action P by the rod *q*, and the crank *n* is connected by the rod *s* to a block similar to block *o* on the opposite end of the instrument. Both blocks are similar to the block N and its corresponding block and are carried by similar pivoted frames, and each contains corresponding plungers, which operate in conjunction with the same slides; but as the block N and its corresponding block on the opposite end of the instrument are connected to the rolling rod H and the block *o* and its corresponding block on the opposite end of the instrument to the rod *j* the plungers in one pair of blocks will have no effect on their particular slides during the period that their operating-rod is stationary, while the plungers on the other pair of blocks are brought into action by the rolling of their particular rod.

With the view of instantaneously bringing one set of blocks and its connections into action and instantaneously throwing the other set out of connection with the operating mechanism, I provide the following simple mechanism for producing the desired effect: I provide a double-crank rod *t*, one crank of which is connected to the pivoted crank-lever E by a piece of leather *u* or other flexible material. The other crank *t* is connected by a similar piece of material *v* to a crank *w*, formed on the end of the rod *x*. A crank *y* is formed on the opposite end of the rod *x*, and is connected by a piece of leather *z* or other flexible material to an arm 2, connecting to a rolling rod 3, which has a projecting link 4, formed on it and extending below the block 5, attached to the end of the push-stop 6. The bar *f* is connected to a similar push-stop 7 by mechanism similar to that just described, extending from the bar E to the push-stop 6, and the two push-stops 6 and 7 are connected together by a pivoted bar 8, so that when the push-stop 6 is pressed in the push-stop 7 is simultaneously pushed out, and as the pushing in of the stop 6 causes the bar E to drop so that its end shall be immediately in front of the end of the grand-organ rod C it follows that the bar *f* is simultaneously raised clear of the grand-organ rod C and the combination controlled by the bar *f* is thrown out of action. By this arrangement two or more combinations may be brought into action by the grand-organ knee-movement, and when the combinations are set one combination will always be on, but may be changed for another at any time by merely pushing in the push-stops 6 or 7, which may be instantaneously done without breaking the continuity of the music. The combinations may be entirely distinct and different from each other, depending of course upon the sets of reeds in the organ. The louder combinations, if desired, may include the softer ones. If desired, the adjustability of the combinations may be dispensed with, the manufacturer in such cases setting the combination permanently, placing fixed substitutes for the plungers V necessary to produce the combination desired.

The advantages of the arrangement by which the instantaneous changes of combinations may be effected will be appreciated by any musician.

In addition to the arrangement I have described for effecting the various combinations, I provide simple means by which the full power of the organ may be instantaneously secured by the simple movement of a single stop, one stop being arranged so as to operate mechanism by which the power of the organ will be reduced to what combinations are set, while the other stop is connected with mechanism by which the full power of the organ is thrown on. Thus the player has complete control of the instrument and is enabled to change the character of sound by one motion. The mechanism for thus operating the full organ consists of two push-stops 9 and 10. The push-stop 9 has a wedge-shaped block 11, which extends over the crank

12, formed on the rod 13. This rod is suitably journaled and has a crank 14 formed at each end, and each crank 14 is connected, as indicated, to a pivoted bail 15, extending over the plunger ends of the weighted levers *d*. Consequently, when the push-stop 9 is pressed in, its block 11 presses down on the crank 12, causing the rod 13 to roll, and through its cranks 14 draw down the bails 15, so as to depress all the levers *d* which have not already been set in some combination, thus bringing the full power of the organ instantaneously into action. The push-stops 9 and 10 are connected together by the pivoted bar 16, in order that the push-stop 9 may be thrown out by simply pressing in the push-stop 10, the parts described being so arranged that the moment the push-stop 10 is pressed in the bails 15 are raised, so as to permit the weighted levers *d* to resume their initial position.

In order to enable the performer to arrange his combinations before commencing to play, and at the same time to permit him to use the ordinary draw-stop movement with the solo-action alone or with both, I arrange a damping-action by which any stop, if drawn, will only speak so long as the grand-organ knee-movement is not used, the knee-movement by which the combinations are brought into action being arranged to simultaneously raise the damping-action, which allows the mutes to close. The instant that the knee-movement is released to dispense with the combinations the damping-action descends into connection with the mutes it has previously closed. Any stop may be drawn out or pushed in while the damping-action is on or off or when it is coming into or going out of action.

As described at the commencement of this specification, the damping-action P is connected by the rod Q to the rolling rod H, and is also connected to the rolling rod *h* by the rod *q*, so that no matter which combination is being used the action of the knee-movement A raises the damping-action at the time that the particular combination is brought into action.

As all the stops connected with the damping-action operate the same, I will merely describe the mechanism of one stop, showing how it operates the slides T and is affected by the damping-action. 17 is a stop on which the wedge-shaped block 18 is pivoted. 19 is a bent wire connected to the rod 20 and extending below the block 18. 21 is a similar bent wire connected to the rod 22 and extending below the block 18. Each of the rods 20 and 22 has two or more fingers 23, extending over and resting upon the spools 24, a single spool being placed on each of the slide-operating rods 25, which are connected to the bass and treble actions. When the stop 17 is drawn out, its block 18 is brought into contact with the bent wires 19 and 21, and these wires, through their rods 20 and 22 and fingers 23, operate the slide-rods 25, so as to cause them to move their respective slides T, causing the reeds they are connected with to be in a position to speak when their respective valves are acted upon by the keys.

When the combinations I have described in the early part of this specification are brought into action, it is of course necessary that the reeds operated by the stop 17 should be damped, and it is with that view that I provide the damping-action P. This action is connected to the blocks 18 by the links 26. Consequently, when the damping-action is raised, as before described, the blocks 18 will be clear of the bent wires 19 and 21, and the slides T, operated by the stop 17, will be permitted to spring back and damp their respective reeds, leaving in action only such slides as are operated by the combination.

With the view of enabling the performer to swell either the treble without the bass or the bass without the treble, or both treble and bass together, all from the same knee-swell, I introduce what I term an "automatic divided swell." Many beautiful effects are brought out by means of this important device, and by the use of it an organ becomes wonderfully improved in its expressive powers.

With the old form of swell the solo-stop could never be properly managed, as the swelling in the melody made the accompaniment in the bass much too prominent, and would frequently prove so strong that the solo-stop could not be heard. The soft stops borrowed from louder ones by half-opening of the mutes are always objectionable, their tone being uneven and indistinct, as well as defective in pitch.

The automatic divided swell provides a proper accompaniment for either treble or bass solo work, and enables the performer to give perfect expression to a melody or prominent part.

My automatic divided swell consists in arranging a divided swell-shutter so that each half of the shutter shall be completely under the control of the knee-swell, stops being provided by which the connection between the knee-swell and the shutter may be instantly made or broken and either the bass-swell or the treble-swell brought into connection with the knee-swell at the will of the performer.

27 is the bass-stop and 28 the treble-stop. 29 is a crank-rod suitably journaled and one end of it resting on the block 31, attached to the stop 27, and connected at its other end by means of a piece of leather or other flexible material to the inner end of the crank-rod 30, which has a weight 32 placed on it. The other end of the crank-rod 30 is connected by a strap 33, made of leather or other flexible material, to the hooked finger 34, which, when the stop is pushed in, projects over the end of the swell-rod 35. The opposite end of this finger 34 is pivoted on the bell-crank 36, the other end of which is con-

nected to the swell-shutter 37, which covers the treble-swell.

When it is desired to swell the bass, the stop 27 is drawn out, pulling its block 31 clear of the end of the crank-rod 29, thus permitting the opposite end of the said crank-rod 29 to be pulled down by the action of the weight 32, which weight will also cause the crank-rod 30 to rock, and through the strap 33 draw up the hooked finger 34 clear of the swell-rod 35, thus releasing the bell-crank 36 and allowing the treble-swell 37 to close, leaving the bass-swell under the control of the knee-swell.

It will be seen that the mechanism between the treble-stop 28 and bass-swell shutter is the same as that described between the bass-stop and the treble-swell. It follows, therefore, that by the simple adjustment of either the bass-stop or the treble-stop the bass-swell or the treble-swell is instantly brought into connection with the knee-swell, or they may both be brought into connection together, the swell or swells which is or are in action being completely under the control of the performer.

A disadvantage in the use of the vox humana has hitherto been that if the full organ was to be used immediately after the vox humana had been in use it was necessary first to push in the stop controlling it to avoid the waste of wind and the unmusical effect it produced with the full organ.

My automatic vox humana may be used with any appropriate solo-stop, and a change to full organ or other combination can be made at once without any change of stops, as the action of the grand organ suspends the motion of the vox humana until the knee-movement has been released, when if the stop has been left out the fan will immediately revolve as before. This desirable effect is secured by the following simple mechanism: 38 is the automatic vox-humana stop, on the end of which a wedge-shaped block 39 is fixed. This block when the stop is closed presses against the crank 40 and holds the rod 41, on which the crank is formed, in such a position as to tighten the cord 42, thereby holding the lever 43, which is pivoted at 44, and when the stop is opened the cord 42 is released and the lever 43 is drawn down by the action of the spring 45, pushing down the sticker 46, which presses open the pallet 47, thus putting into action the fan 48. 49 is a cord which connects the lever 43 with an arm formed on the rolling rod H, and 50 is a cord which connects the lever 43 with the rolling rod *j*. The moment that the grand organ is put into action the cords 49 and 50 are tightened, so as to raise the lever 43 when the sticker 46 is lifted from the pallet 47, which will instantly close. Consequently the vox humana is stopped the moment that the grand-organ action is brought into play.

It will be noticed that the various parts of the action of my improved organ, although controlled by one movement, are yet distinct from and independent of one another. The mute connections are brought under control in such a manner that without interfering with the regular stop-action any part of the new action can work directly on the mutes without hindering the action of some other parts. Of the action generally it will be a mistake to think that it is only suited for the cultivated musician. While it is sure of his support, it claims with confidence the approval of every one using an organ, as the simple parts of the action give to the most inexperienced player the power of producing effects at once striking and pleasing in their character.

What I claim as my invention is—

1. Two or more series of stops independently connected to the mutes, substantially as described, whereby each series of stops may be set for a different musical combination without interfering with the ordinary stops of the organ, in combination with the rolling rods connected with said stops and with the knee-push, and by which the performer can instantly change the action from one combination to another without any effort or break in the continuity of the music, substantially as and for the purpose specified.

2. A series of stops independently connected to the mutes, substantially as described, whereby various musical combinations may be set without interfering with the operation of the ordinary stops of the organ, in combination with the rolling rods connected with said stops and with the knee-push and by which the stops forming the combinations may be instantly brought into action and the ordinary organ-stop, which may at the same time be set, simultaneously damped, so that they will not interfere with each other or break the continuity of the music, substantially as and for the purpose specified.

3. One or more series of stops independently connected to the mutes, substantially as described, whereby each series of stops may be set for a different combination, in combination with the push-stops and weighted levers, by which the full power of the organ may be instantaneously secured by the simple movement of a single stop without interfering with the setting of the combinations, substantially as and for the purpose specified.

4. One or more series of stops independently connected to the mutes, substantially as described, whereby each series of stops may be set for a different musical combination, and one or more solo-stops independently connected to the mutes, in combination with a damping-action so arranged that any solo-stop if drawn can only speak so long as the grand-organ knee-movement is not used, the knee-movement, by which the combinations are brought into action, being arranged to simultaneously operate the damping-action so as to

close all the stops not connected with the combination, substantially as and for the purpose specified.

5. A divided swell-shutter, substantially as described, whereby each half of the shutter shall be completely under the control of a single knee-swell, in combination with stops by which the connection between the single knee-swell and each half of the shutter may be instantly made or broken in order that the bass-swell or the treble-swell may be brought into connection independently or simultaneously with each other and with the single knee-swell, substantially as and for the purpose specified.

6. A series of slides T, independently connected to their respective mutes or mechanical movements, in combination with mechanism by which the said slides may be independently or collectively operated upon, substantially as and for the purpose specified.

7. A series of slides T, independently connected to their respective mutes or mechanical movements, in combination with mechanism by which each slide is independently connected to its respective draw-stop, substantially as and for the purpose specified.

8. A block N, supported above the slide T by the pivoted frame U and connected by suitable mechanism to the knee-push A, in combination with the plungers V, suspended within the block N by mechanism connected to the stops X, so that one or more slides may be connected to the block N for the purpose of bringing it within the control of the knee-push, substantially as and for the purpose specified.

9. A crank-rod arranged in connection with the slide T and operated by a block pivoted on a draw-stop, in combination with mechanism arranged to elevate the block clear of the rod, substantially as and for the purpose specified.

Toronto, April 17, 1888.

ROMAINE CALLENDER.

In presence of—

CHARLES C. BALDWIN,

CHAS. H. RICHES.