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(54) **AUTO-PROGRAMMING OF A DRYER
BASED ON THE WASHER CYCLE**

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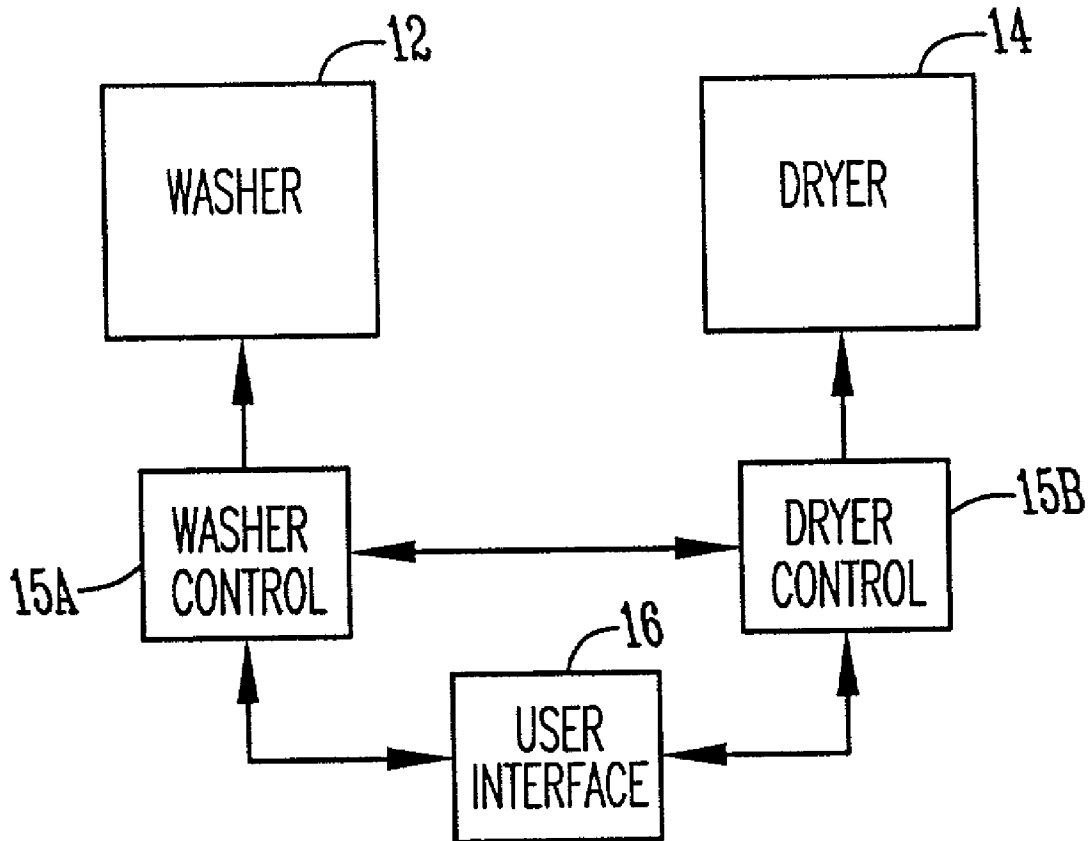
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(57) **ABSTRACT**

The present invention provides for a programmable appliance having a dryer and a control system operatively connected to the dryer, the control system adapted to create a dryer instruction based on the washing mode selection and to apply the dryer instruction to the dryer. According to a method of the present invention, a dryer is programmed by receiving a washing mode selection associated with a washer, automatically creating a dryer mode selection from the washing mode selection, and applying the dryer mode selection to the dryer.



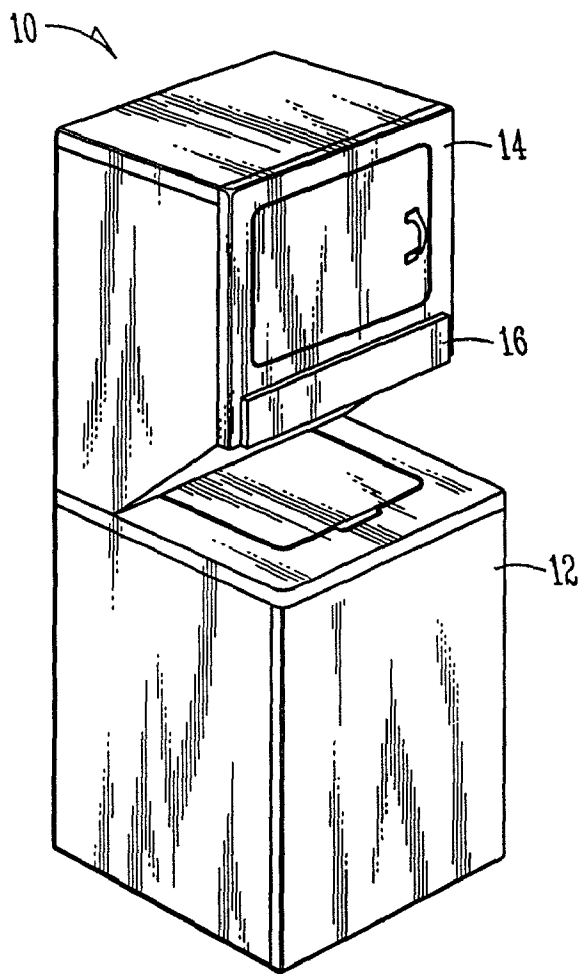


Fig. 1A

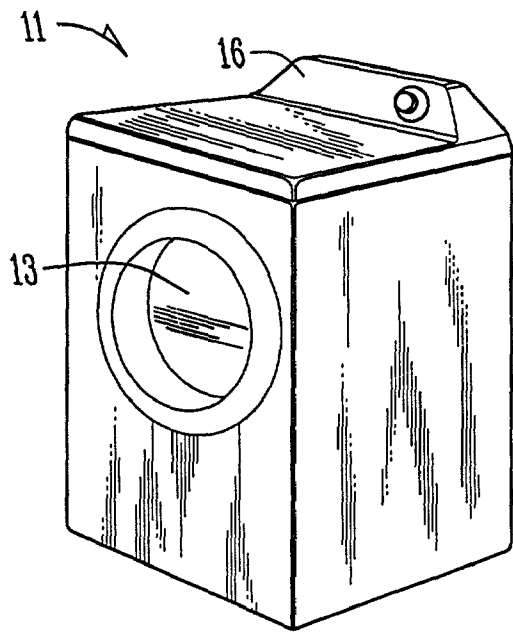


Fig. 1B

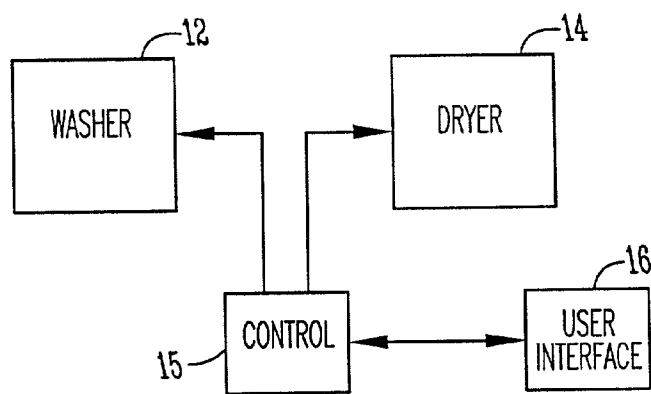


Fig. 2A

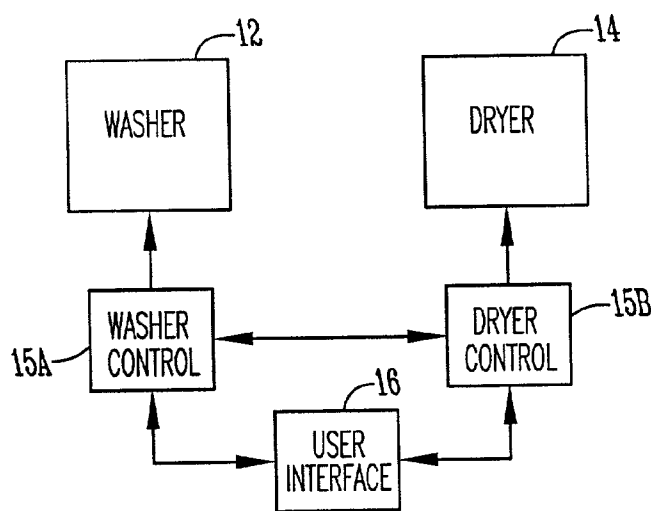


Fig. 2B

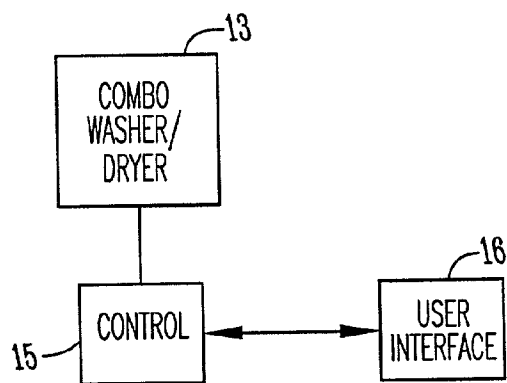


Fig. 2C

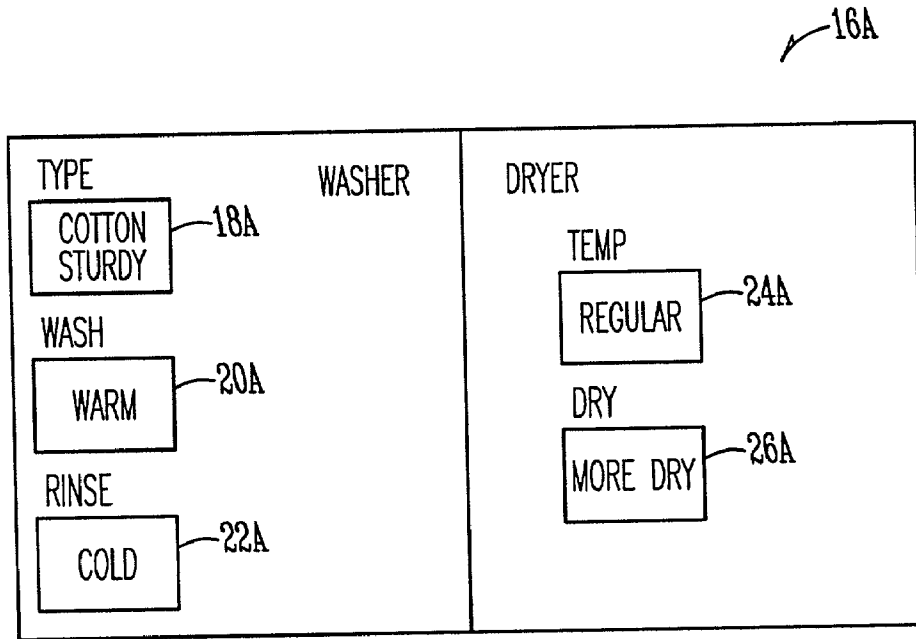


Fig. 3A

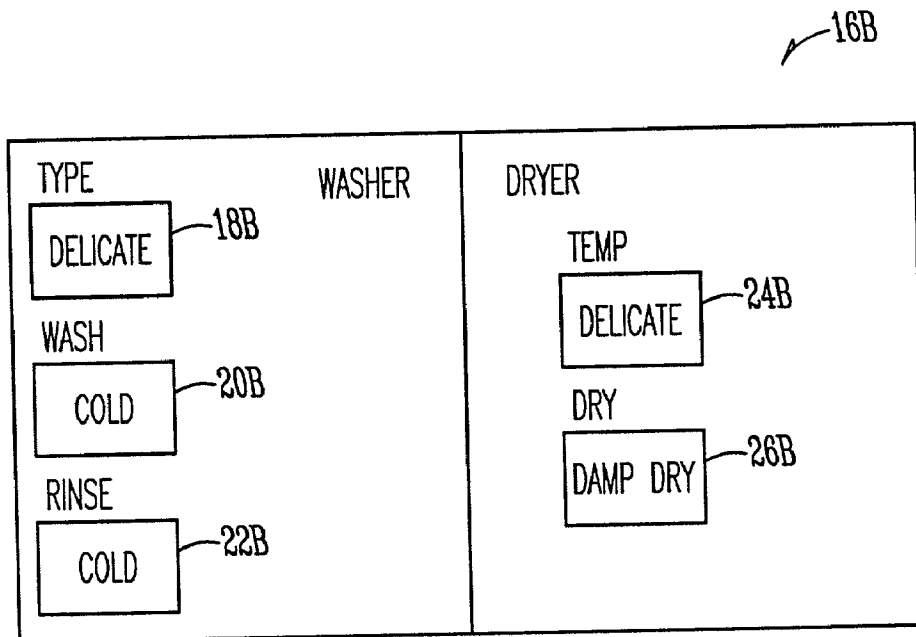


Fig. 3B

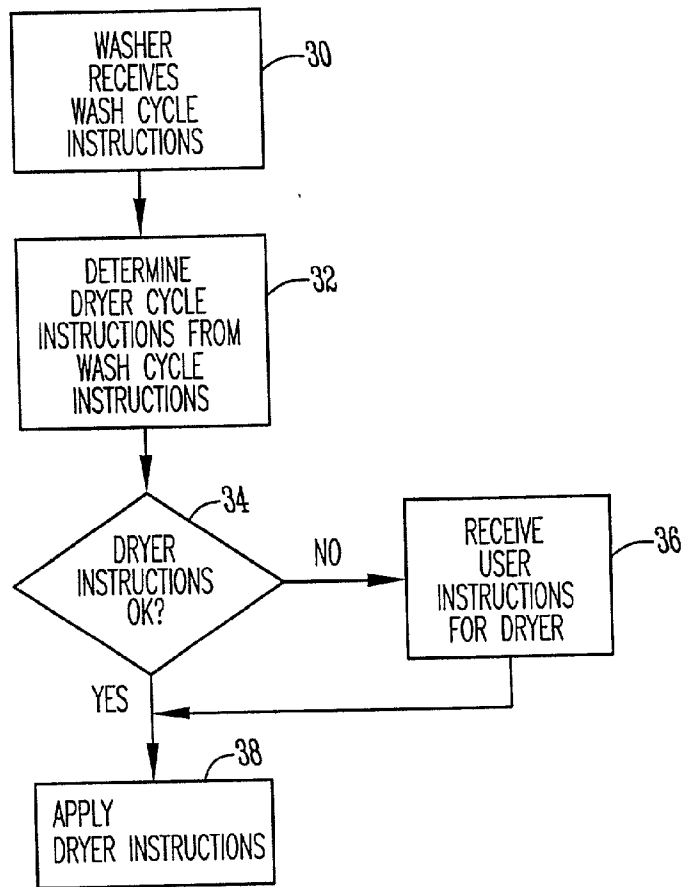


Fig. 4

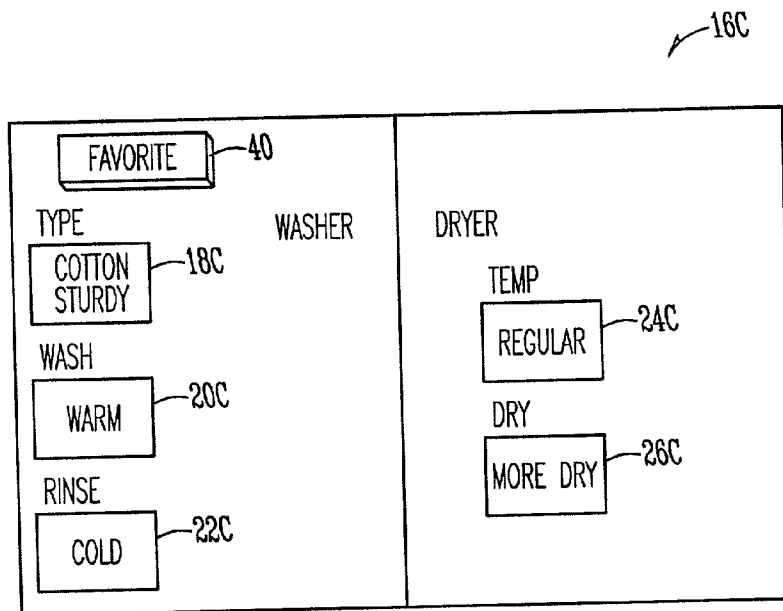


Fig. 5

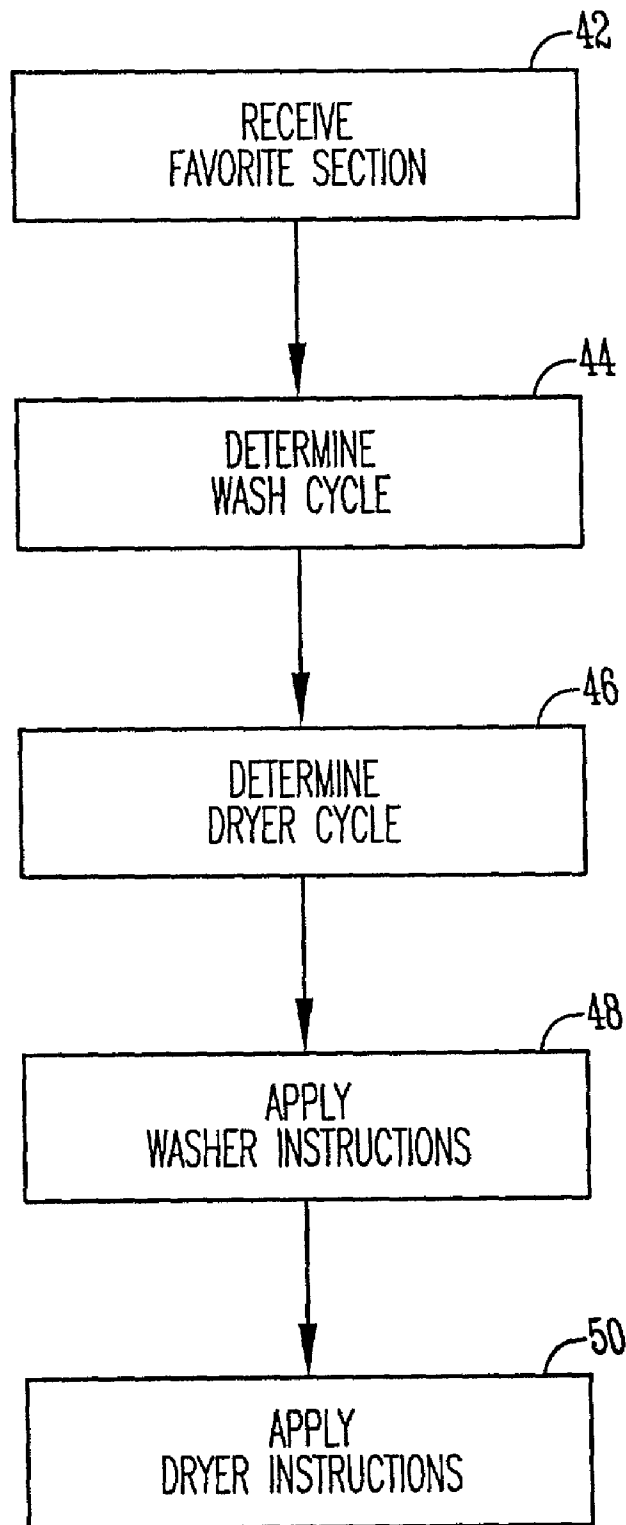


Fig. 6

AUTO-PROGRAMMING OF A DRYER BASED ON THE WASHER CYCLE

BACKGROUND OF THE INVENTION

[0001] This invention relates to a method, apparatus and system for auto programming of a dryer based on a washer cycle. More specifically, this invention relates to automatically determining dryer settings based on washer settings to reduce or eliminate an operator's need to manually control the dryer's settings.

[0002] Washing machines (also called washers) and drying machines (also called dryers) are two types of machines that are closely associated with one another. Typically, laundry is washed in the washing machine and then, upon completion of the wash cycle, the laundry is placed in the drying machine for drying. Of course, one need not use both machines and can use one or the other to perform its respective function. Nevertheless, these two types of appliances are often used in combination with each other, as shown in the prior art.

[0003] For example, U.S. Pat. No. 4,510,778 to Cotton discloses a combined washer and dryer unit. In addition, other prior art attempts have been made at combining the units themselves. For example, U.S. Pat. No. 3,707,856 to Niewyk, et al. discloses a combination washer/dryer. Similarly, U.S. Pat. No. 5,537,761 to Oh discloses a washing machine having a built in method of drying.

[0004] Despite these advances in the washers and dryers, problems remain. In particular, problems regarding user interface of washers and dryers have not been addressed.

[0005] Thus, it is a primary object of the present invention to provide a method, apparatus, and system for an auto programmable dryer that improves upon the state of the art.

[0006] Another object of the present invention is to provide a method, apparatus and system for an auto programmable dryer capable of determining dryer selections based on washer cycle selections.

[0007] Yet another object of the present invention is to provide a method, apparatus and system for an improved dryer that reduces the amount of user interaction required to properly select dryer settings.

[0008] A still further object of the present invention is to provide a method, apparatus and system for an auto programmable dryer that provides for a single control unit to be used to control both a washer and a dryer.

[0009] Yet a further object of the present invention is to provide a method, apparatus and system for an improved dryer that is capable of storing dryer selections.

[0010] These and other objects, features, or advantages of the present invention will become apparent from the specification and claims.

BRIEF SUMMARY OF THE INVENTION

[0011] The present invention is a method, apparatus and system for auto programming of a dryer based on a washer cycle. The apparatus of the invention provides for a programmable dryer. The dryer has a control system adapted to create a dryer instruction based on a washing mode selection and to then apply the dryer instruction to the dryer. In this

manner, the appliance can receive a washing mode selection from a washer and determine drying instructions based on the washing mode selections. This reduces the number of selections that need to be made by an operator of the dryer, simplifying the process of washing and drying laundry.

[0012] According to a system of the present invention a washer and dryer are in communication with one another. The washer includes at least one user input for controlling a wash cycle. Then the dryer is adapted to receive a dryer input for controlling drying based on the wash cycle of the washer. The washer and dryer can be within the same housing and/or can be stacked. Further, the washer and dryer can be part of a combination unit where a single chamber is used for both washing and drying.

[0013] According to a method of the present invention, a dryer can be programmed to receive a washing mode selection associated with a washer. Then the method provides for automatically creating a dryer mode selection based on the washing mode selection and applying the dryer mode selection to the dryer. The method provides for receiving verification of the dryer mode selection from an operator and receiving modifications to the dryer mode selections from the operator if need be. Further, according to the method of the present invention, multiple dryer mode selections and/or washing mode selections may be grouped as a favorite selection. Then an operator need only select the favorite selection in order to effectively make all the associated selections.

[0014] Thus, the present invention provides for advantages in the convenience and use of the dryer as dryer mode selections can be automatically established based on washer mode selections.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1A is an isometric view of a stacked washer and dryer according to the present invention.

[0016] FIG. 1B is an isometric view of a combination washer and dryer according to the present invention.

[0017] FIGS. 2A-C are block diagrams showing washer/dryer systems according to the present invention.

[0018] FIGS. 3A through 3B are pictorial representations of user interfaces according to the present invention.

[0019] FIG. 4 is a flow diagram of a method according to the present invention.

[0020] FIG. 5 is a pictorial representation of a user interface according to the present invention.

[0021] FIG. 6 is a flow diagram of another method according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0022] FIG. 1A is a diagram of a stacked washer and dryer according to the present invention. FIG. 1A shows a system for washing and drying 10 having a washer 12 and a dryer 14. The system also includes a control panel 16. Although the system 10 shown is a stacked configuration, the present invention contemplates any placement of a washer with respect to a dryer provided that the washer 12 is in operative communication with the dryer 14.

[0023] Another embodiment of the present invention is shown in FIG. 1B. In FIG. 1B a combination washer/dryer 11 uses a chamber 13 for both washing and drying. The combination washer/dryer 11 includes a control panel 16.

[0024] FIG. 2A is a block diagram showing the washer 12 in operative connection with a control unit 15 which is operatively connected to a user interface 16. The control unit 15 can provide electronic control of the washer 12 and dryer 14. For example, the control unit 15 can include an intelligent control such as a processor, controller, electronic circuit, or other control mechanism. The user interface 16 operatively connected to the control 15 may provide for user input and/or user output. For example, the user interface 16 may include dials, buttons, and switches such as are conventionally associated with washer and/or dryer controls. Alternatively, the user interface 16 may include a display, a touch screen display, or other means for providing user input and/or user output.

[0025] FIG. 2B is a block diagram where control is divided between a washer control unit 15A and a dryer control unit 15B. The washer control unit 15A is in operative communication with the dryer control unit 15B. Each of the control units can include an intelligent control such as a processor, controller, electronic circuit, or other control mechanism. Each of the control units 15A and 15B are also operatively connected to a user interface 16.

[0026] FIG. 2C shows another embodiment where a combination washer/dryer 11 is operatively connected to a control unit 15 and the control unit 15 is operatively connected to a user interface 16.

[0027] FIGS. 3A and 3B show examples of a user interface 16. The user interface 16 shown is illustrative and not limiting as the present invention contemplates any number of user interfaces including any number of input controls. For example, in FIG. 3A, a user interface 16A is shown. In user interface 16A, the type of laundry being washed is indicated by control 18A which provides for "cotton sturdy." Similarly, the wash temperature is selected by the user input 20A. The user input 20A indicates "warm." This instructs the washer to use warm water in the wash cycle. Another user input is indicated by user input 22A. Here, user input 22A indicates the rinse temperature of the water used during the rinse cycle. The user input 22A indicates that "cold" rinse water should be used.

[0028] Similarly, the user interface 16A includes dryer controls. For example, the temperature of the dryer can be selected. The control 24A indicates that the temperature to be used for drying is "regular." Similarly, an additional drying instruction 26A is indicated showing that the dryer should use a "more dry" mode, which results in a greater drying time period.

[0029] Similarly, FIG. 3B shows a user interface for a washer and dryer. In FIG. 3B the washer is set to delicate mode 18B, the wash temperature is set to cold 20B and the rinse cycle is set to cold 22B, the dryer portion is set to delicate 24B and the drying instruction is set to damp dry 26B. The present invention contemplates any number of washer and dryer selections. Those given are merely illustrative.

[0030] According to the present invention the washer instructions or controls are used to determine the drying

instructions or controls. For example, the settings for the washer shown in FIG. 3A, including "cotton sturdy" with a "warm" wash cycle and a "cold" rinse cycle are, interpreted according to the present invention to indicate a dryer temperature of "regular" and a dryer instruction of "more dry." Similarly, the washer instructions in FIG. 3B can be used to create dryer instructions. For example, the "delicate" type with the "cold" wash cycle and the "cold" rinse cycle for the washer indicate that an appropriate dryer setting would be for the temperature to be set to a "delicate" temperature and that the dry setting be set to "damp dry." In this manner, the present invention provides for a dryer to be programmed based on the washer instructions.

[0031] The present invention further provides that the user interface 16 need not show both the washer settings and the dryer settings simultaneously. Instead, the washer settings of FIG. 3 may be displayed, the dryer settings being held in escrow until the dryer door is opened or another event occurs. Once the dryer door is opened or another event occurs, the settings for the dryer are shown by the user interface 16. The dryer settings shown are preferably automatically selected based on the washer settings.

[0032] FIG. 4 provides one example of a method according to the present invention. In step 30 of FIG. 4, the washer receives wash cycle instructions. The washer can receive these instructions from a user through a user interface or otherwise. In step 32, wash cycle instructions are used to determine dryer cycle instructions. The present invention provides for this determination to be made based on a table of wash cycle instructions and corresponding dryer cycle instructions that can be stored in a control unit. Optionally, the table can be modified by the past selections made by an operator. The present invention contemplates any number of methods of associating wash cycle instruction, with dryer instructions, the use of the table is merely one often convenient method. Other methods may be more appropriate for use in a particular application. The present invention fully contemplates these and other variations.

[0033] In step 34, a user can optionally determine whether the dryer instructions are appropriate. If not, then in step 36 the operator can modify the instructions or otherwise provide alternative instructions for a drying operation. If in step 34, an operator confirms the dryer instructions, then in step 38 the dryer instructions are applied to the dryer. The present invention contemplates that steps 34 and 36 are optional. The dryer can automatically proceed without confirmation or alteration of the instructions by an operator.

[0034] FIG. 5 illustrates another user interface of the present invention. According to FIG. 5, the user interface 16C has a favorite option 40. The favorite option 40 allows an operator to select a favorite setting. The favorite setting is a collection of one or more washer and/or dryer instructions. The favorite selection is used to auto program the entire washing and drying cycle. The favorite selection can be stored in nonvolatile memory.

[0035] FIG. 6 illustrates a method for applying a favorite selection. In step 42 a favorite selection is received. The favorite selection can be received through use of a button or other input. Based on the favorite selection 42, the washer

cycle is determined in step 44. Once the washer cycle is determined in step 44, the dryer cycle is determined in step 46. Then the washer instructions are applied in step 48 and dryer instructions are applied in step 50. The present invention contemplates that the steps need not flow in the order given. For example, the washer instructions can be applied before the dryer cycle is determined.

[0036] Thus, methods, system, and apparatus for auto programming of a dryer based on a washer cycle has been disclosed. The present invention provides for variations in the specific washer settings and dryer settings used, the type of user controls, the physical configuration of the washer/dryer, the configuration of the electronic controls, and other variations.

What is claimed is:

1. A programmable appliance comprising:
 - a washer;
 - a dryer; and
 - a control system operatively connected between the washer and the dryer, the control system adapted to create a dryer instruction based on a washing mode selection and to apply the dryer instruction to the dryer.
2. The programmable appliance of claim 1 further comprising a user input operatively connected to the control system.
3. The programmable appliance of claim 2 wherein the control system is adapted to modify a dryer instruction with a user instruction received from the user input.
4. A system for washing and drying comprising:
 - a washer adapted to receive at least one user input for controlling a wash cycle;
 - a dryer in communication with the washer, the dryer adapted to receive a dryer input for controlling drying based on the user input for controlling the wash cycle of the washer.
5. The system of claim 4 wherein the user input is selected from a set comprising a touch display, a dial, a button, and a switch.
6. The system of claim 4 wherein the washer and the dryer are positioned in a stacked position.
7. The system of claim 4 further comprising a housing wherein the housing contains the washer and the dryer.
8. The system of claim 7 wherein the washer and dryer share a single chamber.

9. A system for washing and drying comprising:

- a washer;
- a dryer;
- a control system operatively connected to the washer and the dryer, the control system adapted to receive at least one wash cycle instruction;

wherein the control system is adapted to control the dryer according to dry cycle instructions, the dry cycle instructions based on the at least one wash cycle instruction.

10. The system of claim 9 further comprising a user input operatively connected to the control system, the user input adapted to receive the wash cycle instructions from an operator.

11. The system of claim 9 wherein the washer and dryer are stacked.

12. The system of claim 9 further comprising a housing wherein the housing contains the washer and the dryer.

13. The system of claim 9 further comprising a user display operatively connected to the control system.

14. A method of programming a dryer comprising:

receiving a washing mode selection associated with a washer;

automatically creating a dryer mode selection from the washing mode selection; and

applying the dryer mode selection to the dryer.

15. The method of claim 14 further comprising receiving verification of the dryer mode selection from an operator.

16. The method of claim 14 further comprising receiving modifications to the dryer mode selection from an operator.

17. The method of claim 14 wherein the washing mode selection is selected from the set comprising: a wash cycle temperature, a rinse cycle temperature, a type of wash load, and a favorite selection.

18. The method of claim 14 wherein the dryer mode selection is selected from the set comprising a temperature selection, a time selection, a dry selection, and a favorite selection.

19. The method of claim 14 further comprising displaying the dryer mode selection on a user interface.

20. The method of claim 19 wherein the step of displaying the dryer mode selection on a user interface occurs after a dryer door is opened.

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